PATENTABLE INVENTION.

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THE LAWYERS' CO-OPERATIVE PUBLISHING CO.

1893.

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Rec. April 2, 1903

R. R. ANDREWS, PRINTER, ROCHESTER, N. Y.

PREFACE.

MANY works upon the Law of Patents for Inventions have been published, but they have been written by jurists who have not been mechanics or inventors, and have not been familiar with the working of an inventor's mind. On the other hand, the decisions of the courts upon the question of what constitutes invention have been so contradictory, and of late years have been so frequently at variance with the earlier decisions, that at the present time unless the subject-matter of a patent is wholly new it is practically impossible to presume whether it is likely to be regarded as an invention in the estimation of a court or is not.

The diverse constructions of the law as to what constitutos invention are especially unfortunate in view of the creation of the present nine appellate courts; it being evident that unless these courts shall decide upon some common rules by which invention can be determined and the decisions of the different courts can be harmonized there will result the anomaly. that the decisions upon the same subject in one appellate circuit will clash with those in another. What such rules are to be must be determined by the courts, who alone have authority to deal with such matters; but it seems but fair that the views of inventors upon the subject should be considered; and the object of the author in publishing this book has been to endeavor to present these views. The author believes that he has some qualifications for the work because his practice as a Solicitor of

Patents, and as Expert in Patent Causes for forty-three years, and his engagement as Expert in probably a greater number of patent suits than it has fallen to the lot of any other expert to have been connected with, has brought him into intimate relations with inventors; and besides, he is an inventor himself, one of the inventions in which he was concerned, the original self-binding harvester (patented to Watson, Renwick & Watson, May 13, 1851, and to Watson & Renwick, August 16, 1853), of which he was a joint and the principal inventor, being of such importance that the present grain crops of the United States could not be harvested without its use.

Various decisions of the courts are referred to in the subsequent pages, and the book might have been greatly enlarged by multiplying these references and printing them in full. It has however been deemed sufficient to cite only such decisions as are directly to the matters treated of, and to give the references to the reports of them, so that the originals may be examined by those who wish to do so.

NEW YORK, February 1, 1893.

TABLE OF CONTENTS.

PART I.

PATENTABLE INVENTION.

§ 1. The Statute 1
§ 2. Dictum of the Court 1
§ 3. Determination of Invention by Assumption of the Action of a Peculiar Mental Faculty, a mere Opinion. 2
§ 4. Invention a Change from what is Old 3
§ 5. Determination of Invention by Rules and Evidence. 4
§ 6. Exceptions to General Rules 4
§ 7. Invention by Change of Form 5
§ 8. Invention by Change of Size 9
§ 9. Invention by Change of Proportions 11
§ 10. Invention by Change of Material 12
§ 11. Invention by Change of Location 13
§ 12. Invention by Change of Arrangement 15
§ 13. Invention by Application of an Old Thing to a New Purpose 17
§ 14. Invention by Application of an Old Device to Perform its Usual Function 24
§ 15. Invention by Substitution of one Old Device for Another 26
§ 16. Invention by Duplication 31
§ 17. Invention by Change of Direction of Motion 33
§ 18. Invention by the Practical Application of the Discovery of a New Property of Matter 34
§ 19. Invention Determinable by Rules and Evidence 34
§ 20. Objections to Rules, and Replies Thereto 36
§ 21. Fallibility of Opinion Formed after the Event 37
§ 22. Extent of Change Required for Invention 39

PART II.

INVENTIONS PATENTABLE BY LAW.

§ 23. Classes Enumerated in the Statute 41

A USEFUL ART.

§ 24. Definition of a Useful Art 41
§ 25. Processes Simple and Compound 41
§ 26. Process an Invention even if its Physical Operations are Old 42
§ 27. Novelty of Result not Essential to Invention in a Process 43
§ 28. Novelty of Implements, Tools, or Machines, or of Physical Operations, not Essential to Invention in a Process 43
§ 29. Simultaneous Action of Operations not Essential to Invention in a Process 44
§ 30. Invention may Exist in a Process when the Operations are Old in the same Art 44
§ 31. A Compound Process may be an Invention even when its Operations are Old both Individually and in their Relation to other Operations 45
§ 32. Process an Invention if the Old Order of Old Operations be Changed with a Beneficial Result 47
§ 33. Process may be a Mechanical one only 47
§ 34. Processes the Operations of which are Functions of Machines 49
§ 35. Invention in a Mechanical Process by the Change of Order of Old Operations 50
§ 36. Defective Specifications of Process Patents 52
§ 37. Proper Form of a Claim to a Process 52

MACHINES.

§ 38. Definition of a Machine 53
§ 39. Machines Simple and Compound 53
§ 40. Combinations as Understood by the Courts 54
§ 41. New Doctrine of Aggregations 55
§ 42. Result of Doctrine of Aggregations 59

§ 43. Mechanical Difference Between an Aggregation and a Combination 64
§ 44. Conditions under which a Combination Exists 67
§ 45. Patentable Combinations 68
§ 46. Substitutions in Old Combinations Patentable 69
§ 47. Devices Required to Make a Patentable Combination 74
§ 48. Rule as to Combination Claims 77
§ 49. Generic Combination 78
§ 50. Specific Combination 78
§ 51. Peculiar Combination 79
§ 52. Particular Combination 80
§ 53. Four Classes of Combinations 81
§ 54. Instance of a Generic Combination 81
§ 55. Instance of a Specific Combination 81
§ 56. Instance of a Peculiar Combination 82
§ 57. Instance of a Particular Combination 83
§ 58. Multiplicity of Combinations Possible 84

A MANUFACTURE.

§ 59. Definition of a Manufacture 84
§ 60. Invention in an Article of Manufacture 86
§ 61. Process of Making an Article of Manufacture is not a Distinguishing Characteristic of it 90

COMPOSITIONS OF MATTER.

§ 62. Definition of a Composition of Matter 93
§ 63. A Mechanical Composition of Matter 93
§ 64. A Chemical Composition of Matter 94
§ 65. Distinguishing Characteristics of Compositions of Matter 94
§ 66. Invention by Substituting one Ingredient for Another in a Mechanical Composition of Matter 95
§ 67. Invention by Substituting one Ingredient for Another in a Chemical Composition of Matter 97
§ 68. Invention by Change of Proportions of the Ingredients of a Composition of Matter 98

PATENTABLE DESIGNS.

§ 69. The Statute of 1842 98

§ 70. Dictum of the U. S. Supreme Court 99
§ 71. Definition of a Design 100
§ 72. Inadequacy of Protection by Limitation of Patentable Designs to Decorative 101
§ 73. Comparison of Act of 1842 with Sec. 4929 as to Useful Designs 102
§ 74. Classes of Patentable Designs 103
§ 75. Novelty Necessary in a Patentable Design 104
§ 76. Rules as to Patentability in Designs 106

PART III.

INVENTION PATENTABLE IN A REISSUE PATENT.

§ 77. Definition of a Reissue Patent 109
§ 78. Patentee's Right to Reissue a Defective Patent 109
§ 79. Analogy of the Reissue of a Patent for Invention to the Reformation of a Deed for Real Estate 110
§ 80. Statute as to Reissue 110
§ 81. Invention Claimable in a Reissue Patent According to the Former Construction of the Act 112
§ 82. Evidence as to the Original Invention 113
§ 83. Examples of Reissue Patents with Enlarged Claims .. 114
§ 84. Revision of Reissue Patents by the Courts 116
§ 85. Former Construction of the Act Maintained up to about 1880 116
§ 86. New Legal Construction of Act Relating to Reissues. 116
§ 87. New Legal Construction of the Statute of Reissue Incomprehensible to the Mechanic 126
§ 88. Objections to an Unwarranted Restriction of the Claim of a Reissue Patent 127
§ 89. Understanding of the Law of Reissue by Mechanics. 130
§ 90. Grounds for the Understanding of the Mechanic 131
§ 91. Understanding of the Mechanic same as Courts Prior to about 1878 133
§ 92. Fraudulent Reissues 134
§ 93. Period Allowed for a Reissue 135

§ 94. Period Allowed for Reissue by New Legal Construction 136
§ 95. View of the Mechanic as to the New Construction of the Period Allowed for Reissue 137
§ 96. Actual Invention Rarely Set Forth Correctly in an Original Patent 139
§ 97. Effect of Value of Invention upon the Necessity for Reissue 139
§ 98. Injustice of Restriction to a Fixed Period for Reissue 140
§ 99. Doctrine of Dedication to the Public for Part of Full Invention not Claimed in Original Patent 140
§ 100. Dedication to Public of Unclaimed Part of Invention of Original Patent not Recognized by Earlier Decisions 142
§ 101. Reissue must be Applied for within a Reasonable Period 144
§ 102. Reasonable Period for Reissue 146
§ 103. Reasonable Period for Reissue with Reduced Claims 148
§ 104. Equitable Right of a Manufacturer Before Reissue to Continue to Manufacture Subsequently 148
§ 105. Frequent Course of Infringing Manufacturers 150
§ 106. Equitable Construction of Law of Reissue 151

TABLE OF CASES.

This table is not a list of all the cases that have been adjudicated by the courts, but contains only the titles of those cases which have been selected as typical, and which illustrate the subjects treated in this volume.

A.

Adams, H. H., *v.* Joliet Mfg. Co., 3 Bann. & Ard. 1 33

B.

Bailey Washing & W. Mach. Co. *v.* Lincoln, 4 Fish. Pat. Cas. 379 134
Bantz *v.* Elsas, 1 Bann. & Ard. 351 134
v. Frantz, 105 U. S. 160, 26 L. ed. 1013 137
Battin *v.* Taggert, 58 U. S. 17 How. 74, 15 L. ed. 37 ..... 116, 134, 136, 144
Black *v.* Thorne, 10 Blatchf. 66 134
Blake *v.* Stafford, 6 Blatchf. 195 134

C.

Cahoon *v.* Ring, 1 Cliff. 592 16
Calkins *v.* Bertraud, 6 Biss. 494 134
Clements *v.* Odorless Excavating Apparatus Co., 109 U. S. 641, 27 L. ed. 1060 117
Cochrane *v.* Deener, 94 U. S. 780, 24 L. ed. 139 50
Coon *v.* Wilson, 113 U. S. 268, 28 L. ed. 963 146

D.

Davoll *v.* Brown, 1 Woodb. & M. 53 62
Dorsey Harvester R. R. Co. *v.* Marsh, 6 Fish. Pat. Cas. 387 .. 134

E.

Earle *v.* Sawyer, 4 Mason, 1 ..... 4, 27, 38, 39
Eickemeyer Hat Blocking Mach. Co. *v.* Pearce, 10 Blatchf. 403 134

F.

Foote *v.* Silsby, 1 Blatchf. 445, 2 Blatchf. 264, 270 ..... 22, 23
Freeman *v.* Asmus, 145 U. S. 226, 241, 36 L. ed. 685, 691 .. 120, 125
Furbush *v.* Cook, 2 Fish. Pat. Cas. 671 ..... 74, 76

G.

Gage *v.* Herring, 107 U. S. 640, 27 L. ed. 601 117
Gibson *v.* Harris, 1 Blatchf. 167 134
Goodyear *v.* New York Gutta Percha & I. R. Vulcanite Co. 2 Fish. Pat. Cas. 312 12
v. Wait, 5 Blatchf. 468 134
Gorham Co. *v.* White, 81 U. S. 14 Wall. 525, 20 L. ed. 736 .. 99
Grant *v.* Raymond, 31 U. S. 6 Pet. 218, 244, 8 L. ed. 376, 385 ..... 110, 133, 143, 151

H.

Hailes *v.* Van Wormer, 87 U. S. 20 Wall. 353, 22 L. ed. 241 86
Hancock Inspirator Co. *v.* Jenks, 21 Fed. Rep. 911 40
Hussey *v.* Bradley, 5 Blatchf. 134 134

I.

Ives *v.* Sargent, 119 U. S. 652, 30 L. ed. 544 145

J.

James *v.* Campbell, 104 U. S. 356, 26 L. ed. 786 ..... 117, 126
Jordon *v.* Dobson, 2 Abb. U. S. 398 134

K.

Knight *v.* Baltimore & O. R. Co., Taney, 106 146

L.

Lehnbeuter *v.* Halthaus, 105 U. S. 96, 26 L. ed. 940..... 103

M.

McClurg *v.* Kingsland, 45 U. S. 1 How. 202, 11 L. ed. 102.. 149
Mahn *v.* Harwood, 112 U. S. 354, 361, 28 L. ed. 665, 668....
.....117, 125, 141
Many *v.* Sizer, 1 Fish. Pat. Cas. 21..... 39
Marsh *v.* Seymour, 97 U. S. 348, 24 L. ed. 963..... 134
Matthews *v.* Boston Machine Co., 105 U. S. 54, 26 L. ed. 1022 137
Miller *v.* Bridgeport Brass Co., 104 U. S. 350, 26 L. ed. 783
.....119, 126, 137, 141, 144
Morris *v.* Royer, 2 Bond, 66..... 134
Mowrey *v.* Whitney, 81 U. S. 14 Wall. 620, 20 L. ed. 860... 19

N.

Neilson *v.* Harford, Webster Pat. Cas. 295, 310, 328..... 22
New Process Fermentation Co. *v.* Maus, 122 U. S. 413, 30 L.
ed. 1193..... 45
New York Belt. & Pack. Co. *v.* Magowan, 27 Fed. Rep. 111,
aff'd in 141 U. S. 332, 35 L. ed. 781..... 26

O.

O'Reilly *v.* Morse, 56 U. S. 15 How. 62, 14 L. ed. 601...112, 134

P.

Parham *v.* American Button-hole, O. & S. M. Co., 4 Fish.
Pat. Cas. 468 134
Parker *v.* Hulme, 1 Fish. Pat. Cas. 44..... 32
Pearce *v.* Mulford, 102 U. S. 112, 26 L. ed. 93..... 1
Potter *v.* Holland, 4 Blatchf. 238 134
Prentice *v.* Stearns, 118 U. S. 435, 28 L. ed. 1059 110
Providence Rubber Co. *v.* Goodyear, 76 U. S. 9 Wall. 788,
19 L. ed. 566.....34, 115, 134, 136

R.

Reckendorfer *v.* Faber, 92 U. S. 347, 23 L. ed. 719 55
Reedy *v.* Scott, 90 U. S. 23 Wall. 352, 23 L. ed. 109 134
Rubber Step Mfg. Co. *v.* Metropolitan R. Co., 3 Bann. & Ard. 252 25

S.

Seymour *v.* Marsh, 9 Phila. C. C. 380 134
v. Osborne, 78 U. S. 11 Wall. 516, 20 L. ed. 33 ... 15, 63, 134
Silsby *v.* Foote, 61 U. S. 20 How. 378, 15 L. ed. 953 24
Smith *v.* Downing, 1 Fish. Pat. Cas. 91 39
v. Goodyear Dental Vulcanite Co., 93 U. S. 493, 23 L. ed. 983 90
Stimpson *v.* Westchester R. Co., 45 U. S. 4 How. 380, 11 L. ed. 1020 134
Stockton *v.* Maddock, 10 Fed. Rep. 132 40
Swain Turbine & Mfg. Co. *v.* Ladd, 102 U. S. 408, 26 L. ed. 184 117

T.

Teese *v.* Phelps, 1 McAllister, 48 40
Topliff *v.* Topliff, 145 U. S. 156, 170, 36 L. ed. 660, 661 ... . 117, 119, 125, 145
Tuck *v.* Bramhill, 6 Blatchf. 95 148

W.

Westinghouse *v.* Gardner & R. Air Brake Co., 2 Bann. & Ard. 55 134
Wheeler *v.* Clipper Mower & Reaper Co., 10 Blatchf. 181 ... 134
Wilson *v.* Rousseau, 45 U. S. 4 How. 646, 11 L. ed. 1141 ... . 114, 134, 136
Winans *v.* Denmead, 56 U. S. 15 How. 330, 14 L. ed. 717 ... 6, 8
Woodward *v.* Dinsmore, 4 Fish. Pat. Cas. 163 134
Woodworth *v.* Wilson, 45 U. S. 4 How. 712, 11 L. ed. 1171 .. 114
Wyeth *v.* Stone, 1 Story, 273 31

Y.

Yale Lock Mfg. Co. *v.* Berkshire Nat. Bank, 135 U. S. 342
34 L. ed. 168 146

PART I.

PATENTABLE INVENTION.

§ 1. The Statute.

Section 4886 of the Revised Statutes of the United States declares that—

"Any person who has invented or discovered any new and useful art, machine, manufacture, or composition of matter, or any new and useful improvement thereof, not known or used by others in this country, and not patented or described in any printed publication in this or any foreign country, before his invention or discovery thereof, and not in public use or on sale for more than two years prior to his application, unless the same is proved to have been abandoned, may upon payment of the fees required by law, and other due proceedings had, obtain a patent therefor."

The statute, however, does not define what is meant by the word "invented" or what is meant by the term "invention," and consequently the determination of what constitutes invention is left to the courts.

§ 2. Dictum of the Court.

As to what constitutes invention the following dictum was pronounced in 1880 by the United States Supreme Court (*Pearce* v. *Mulford*, 102 U. S. 112, 26 L. ed. 93):

"But all improvement is not invention, and entitled

to protection as such. Thus to entitle it, it must be the product of some exercise of the inventive faculties."

What these faculties are, or how they are to be distinguished from the constructive faculty of the mind, is a matter that is left by the Court in profound obscurity. No two persons can agree as to the line of demarcation between the two faculties, because from the variations in the characters of the minds of men, their differences in training and in experience, a change which to one mind appears to have involved the exercise of the so-called inventive faculty, is thought by another (after the event) to have been the result of merely the constructive faculty or of mechanical skill. Hence to test the existence of invention by the assumption of the exercise of mental faculties by which it has been produced, and which are indefinable, amounts simply to an attempted determination of a truth by mere judicial opinion, without reliance upon evidence and without recourse to rules by which a just conclusion can be reached.

§ 8. Determination of Invention by Assumption of the Action of a Peculiar Mental Faculty a mere Opinion.

To the scientific mechanic the procedure of determining the nature of an effect by an assumption of a cause by which it may or may not have been produced, is contrary to the method of proceeding in other cases. Thus, the faculties of the mind are forces, and, as with other forces, we know nothing of them except by their effects. We know nothing of the real constitution of the forces of electricity and heat; it is true that we have hypotheses that electricity is a fluid of some unknown kind, and that heat is a form of motion, but

these are but hypotheses which suit the present condition of human knowledge. On the other hand we know that when a certain effect is produced, the action or presence of the agency, whether heat, or electricity, or some other impalpable force, is to be inferred. It is the same with the impalpable forces of the human mind, such as those we call the constructive faculty and the inventive faculty; their action is to be inferred from the effects produced; and we should determine whether one or the other faculty has acted by the nature or character of the effect, instead of attempting to classify the effects as inventions or as mere skillful constructions falling short of invention, by an assumption that in some cases the inventive faculty has been exercised, while in others only the constructive faculty has acted,—an assumption which is incapable of proof in every case, and is a matter of mere opinion.

§ 4. Invention a Change from what is Old.

On the other hand, it has been well said (1 Robinson, Patents, p. 114) that "an invention is an unchangeable fact to which the law must conform." If this be true, then that fact, like any other fact, should be susceptible of being proved by evidence, and should not be determinable by the mere opinion of the court before whom the question of invention is tried. An invention, according to the statute first quoted, must be "new;" hence it must of necessity amount to a change from that which has previously been known, and if the question of how much or how little change is required to constitute invention is to be determined in every case by the mere opinion of the court, formed in every case *after the event*, the matter is at once removed from the domain

of evidence and is cast upon the sea of uncertainty where it is subjected to the varying qualities and the shifting views of the minds of judges, who, however well trained in the science of law, have as a general rule no personal experience in the operation of an inventor's mind.

§ 5. Determination of Invention by Rules and Evidence.

If the nature or character of the thing or effect produced is to determine whether it is to be classified as an invention or as a mere construction produced by mere mechanical skill, the question naturally arises, by what rules, if any exist, are we to measure this nature or character. On this subject it appears that the earlier decisions of the courts differ materially from many of those of later years in the respect that certain definite rules are deducible from the former, and those which have followed in the same line; while according to many later decisions of our highest court, invention is a matter of mere opinion formed by the court after the event. According to the earlier decisions and those which have followed in the same line, a change was decided to be new under the Patent Law when it had not been known or used before (*Earle* v. *Sawyer*, 4 Mason, 1); and to be useful if it would accomplish the purpose for which it was designed, and was not noxious or hurtful. These two requirements of novelty and utility are clearly susceptible of proof by evidence; and it is deducible from the earlier decisions and those which have followed in the same line, that a change which involves those requirements *is* an invention within the meaning of the Patent Law with certain well defined exceptions.

§ 6. Excéptions to the General Rules.

These excéptions are that the change, even when new

and useful, does not amount to invention when it is either one of the following matters:

A *simple* change of form, (using the language of the old Act of 1793) or (using the language of later days) a *mere* change of form.

A *mere* change in size or degree.

A *mere* change in proportions.

A *mere* change of material.

A *mere* change of location.

A *mere* change of arrangement.

A *mere* application of an old thing to a new purpose; or a double use of an old thing, as such an application is frequently styled.

A *mere* application of an old thing to perform its usual functions with its usual mode of operation, or movement.

A *mere* substitution of one old device for another.

A *mere* duplication of old devices.

A *mere* change of the direction of movement of a moving device.

The discovery of a new property of matter.

The word *mere* as above used is significant and important, because it involves the proposition that there are changes of some kind in each of the above respects which are not *mere* changes, but are substantial and amount to invention when the changes are new and useful. A consideration of a few cases will demonstrate the correctness of this proposition.

§ 7. Invention by Change of Form.

As an instance of a change of form which was an invention and patentable, we have the case of the Winans coal car of conoidal form. Previous to the date of his

invention it had been customary to make the bodies of coal cars of rectangular form; and, as these had flat sides which were subjected to transverse as well as tensile strains, sufficient material had to be used to maintain them in shape under the internal pressure of the coal. By reason of the change of form from rectangular to conoidal, the internal pressure of the coal did not tend to distort the car body; the material of the sides of the body was subjected to tensile strains only, instead of to transverse as well as tensile strains; and as the resistance of wood and iron to tensile strains is greater than their resistance to transverse strains, the car body could be made of thin material and of light weight, and as a consequence much less dead weight of car had to be drawn over the railroad than was required with cars having bodies of the old rectangular form.

Winans' patent was infringed, and the case finally came before the United States Supreme Court. *Winans* v. *Denmead*, 56 U. S., 15 How. 330, 14 L. ed. 717. In the case of this patent the defendant appears to have relied mainly upon the assumption that the terms of the patentees claim restricted the invention to the identical conoidal form described in the patent, which form the defendant did not use. But had the defendant's counsel been imbued with the modern system of defense in such a patent case he would no doubt have pleaded that the change in car bodies made by the inventor was only a change from one well known form (of rectangular horizontal section) to another (a circular section); that it was well known in other arts, as for example in the construction of steam boilers, water tanks, pipes, funnels, and other articles which have to sustain internal pressure; that a circular form of horizontal cross section

could not be distorted by internal pressure, and that consequently the change made by Winans was only an application to the art of constructing car bodies of a principle of construction which was well known in other arts; that any boiler maker or tank maker could make the Winans car body (of course after he had seen one or had been told of one); and that the alleged invention being only a change of form, was not patentable.

There is no doubt that some experts and many practical men, who of course formed their opinions after the date of the patent, could have been produced to set forth such views; and had the case to be tried at the present day it would, to say the least, be doubtful whether the patent could be sustained before the United States Supreme Court. Fortunately for the patentee, his case was tried at a date when the question of invention was not one of opinion formed after the invention had been made, but when judges were guided by common sense principles which even mechanics, who are unskilled in the law, are able to comprehend. The decision of the Supreme Court was rendered by *Mr. Justice* Curtis, one of those rare judges who combined an unexcelled knowledge of the principles and practice of law with the capacity to master mechanical subjects and to look through the sophistries of specious reasoning to the fundamental principles of right and wrong. It was undoubtedly true that the inventor had made use of an old mechanical principle or natural power, viz: that of constructing vessels with circular horizontal cross sections; but it was equally true that he had embodied in it an art (that of constructing car bodies) to which it had never before been applied; and he had thereby introduced into that art a mode of operation which was new in it. The court

appreciated this fact and laid down the following principle as applicable to the case.

"Under our law a patent cannot be granted merely for a change of form. The Act of Feb. 21, 1793, § 2, so declared in express terms; and though this declaratory law was not re-enacted in the Patent Act of 1836, it is a principle which necessarily makes part of every system of law granting patents for new inventions. *Merely* to change the form of a machine is the work of a constructor, not of an inventor; such a change cannot be deemed an invention, nor does the plaintiff's patent rest upon such a change. To change the form of an existing machine [the old car body] and by means of such change to introduce and employ other mechanical principles or natural powers, or, as it is termed, a new mode of operation, and thus attain a new and useful result, is the subject of a patent. Such is the basis on which the plaintiff's patent rests. Its substance is a new mode of operation by means of which a new result is attained. It is this new mode of operation which gives it the character of an invention, and entitles the inventor to a patent; and this new mode of operation is, in view of the patent law, the thing entitled to protection." *Winans* v. *Denmead*, 56 U. S. 15 How. 330, 14 L. ed. 717.

Such a mode of dealing with patent cases removes the question of invention from the uncertain realm of human opinion and relegates it at once to the domain of evidence, because it is always possible to prove as a matter of fact whether a change of form of an old machine (even when the changed form is old in other arts) has or has not introduced into the particular art to which the old machine and the new machine appertain, a mode of operation previously unknown in that art and therefore new to it.

§ 8. Invention by Change of Size.

As an instance of a change of size which is more than a *mere* change, we may cite the case of the invention of the safety lamp by Sir Humphrey Davy. Previous to its production there had existed the old lantern having a lantern case of perforated metal which protected the flame from wind and permitted the radiation of light. In the safety lamp there was also a perforated lantern-case, formed preferably of wire gauze, and corresponding in its relation to the flame with the old perforated lantern case; but the perforations of the former were much smaller in size than they were in the old lantern case; and by the use of this changed lantern case with small perforations Sir Humphrey Davy produced the well known safety lamp, the use of which in collieries, where fire damp or explosive gas is liberated from the coal, is universal. In fact it has proved to be one of the most beneficient inventions ever produced. Now had Sir Humphrey Davy made this change at the present day and got a patent for it, and should an action for infringement come before the courts with the modern opinions as to invention, it would no doubt be argued by learned counsel for the defendant that the old perforated lantern case fully anticipated the invention, because all that the patentee had done was to make the perforations of the lantern case smaller than they had been made before, and that this could be done by any mechanic skilled in working metals. The counsel would also argue that both perforated sheet metal and wire gauze (which is its equivalent) are found in the market now, as in the days of Sir Humphrey Davy, with perforations of all sizes from those of large size to those of much smaller size than are required in a safety

lamp, and that these various sizes were well known for a great variety of purposes; that the alleged invention was only a change in the size of the holes, and that such a change is too small an one to be called an invention, or is not such an one as Congress intended to be protected by the patent law. There is also good reason to believe that some experts could be found to express these views, and that there are judges, who decide cases by their own opinion as to what is patentable and what is an invention *after it has been made*, who would be led away by such reasoning; and that the patent would very likely be held to be void as not describing an invention, but merely a change of size.

When, however, such a case is judged by evidence, it appears that with the old lantern the perforated case or screen did only two things, viz: it screened the flame from currents of air, and permitted the light to pass through; whereas in the safety lamp of Davy, the perforated case or screen having perforations of smaller size performed not only the same two functions as that of the old lantern, but in addition prevented the passage of the flame of exploding gas; a function which the old perforations of large size were incapable of performing. This prevention of the passage of flame was a new mode of operation in lanterns with perforated metallic lantern cases, and was attended with a useful result; and in such a case (that is, when the change in size introduces a new mode of operation into the art or class of machines to which the thing changed appertains) the change is not a *mere* change in size, but is a material or substantial one; and there can be no reasonable doubt that a change even in size, which introduces a new mode of operation into a particular class of

machines, amounts to invention and should be protected by the patent law.

§ 9. Invention by Change of Proportions.

Many instances of invention consisting of a change of proportions are found in chemical combinations and compositions of matter. Take for example the case of the combinations of india rubber and sulphur. Charles Goodyear discovered that when crude or natural india rubber was combined with sulphur in comparatively small quantities, (from 6 to 20 per cent of the weight of the rubber) and the compound was heated, it became what is now known as soft vulcanized rubber, having the properties of pliability and extensibility of the original rubber with additional qualities or properties. Thus, the changed product was far less affected by heat and cold than crude rubber; and before it was subjected to the vulcanizing heat, it was in an inelastic putty-like condition in which it could be moulded into useful forms and could be thinned by a solvent so as to be spread on cloth. His patent was dated June 15th, 1844, and was reissued.

Subsequently, Nelson Goodyear discovered that if the proportions of the same two materials were changed by increasing the sulphur to 25 per cent and upwards of the rubber, the compound upon being subjected to heat lost the soft pliable quality of crude rubber and assumed the properties of horn, being non-extensible (by ordinary strains) and susceptible of being polished, and becoming in fact the substance known as hard rubber or vulcanite. The original patent for the new compound was granted May 6th, 1851, and was subsequently corrected by reissue. This improvement was decided to be

an invention. *Goodyear* v. *New York Gutta Percha & I. R. Vulcanite Co.*, 2 Fish. Pat. Cas. 312. In this case the change in proportions of the same two materials, rubber and sulphur, was attended with a change in the properties of the article and consequently in its mode of operation; and there can be no doubt that in such case the change even in proportions is not a *mere* change, but is a material and substantial one amounting to invention. On the other hand, if the change in proportions makes no change in the properties of the compound or in its mode of operation, then the change is a *mere* change and does not amount to invention.

§ 10. Invention by Change of Material.

As an instance of change of material which is not a *mere* change we have the present common washing and wringing machine having its rolls covered with india rubber. In September, 1848, a patent was issued to John Young for an improvement in washing machines, subsequently reissued in 1861. There had been previous instances of rolls covered with cloth and with felt, both of which are more or less elastic; but the Young machine was the first in which the rolls were covered with rubber, which was not only elastic, as the roll coverings of cloth and felt were, but was impermeable to water. The change of material in this case introduced into the art of constructing washing and wringing machines of the roller variety a new property, that of impermeability to water; the change made in this class of machines was not therefore one of *mere* degree or of the mere substitution of one well known material (india rubber) for another equally well known, (felt) but was a change of kind, and the patent was sustained. This case demon-

strates that although a *mere* change of material, that is, one in which the change is one of degree of old qualities, does not amount to invention, yet a change of material which imparts to a particular class of machines a new quality or property not previously possessed by that class, constitutes an invention.

§ 11. Invention by Change of Location.

As an instance of a change of location which is not a *mere* change, the product of mere mechanical skill, we may refer to the reaping machine of Seymour. The ordinary reaping machines of earlier date had comprised the following members, viz: a cutting apparatus extending across the front of the machine to cut the standing grain against which the machine was propelled, and a rectangular platform immediately behind the cutting apparatus to receive the cut grain as it fell; and the machine was used with an automatic rake which traversed the platform in a direction parallel with the cutting apparatus and perpendicular to the line of progression of the machine, and discharged the cut grain from it, delivering the grain at the side of the machine with the stalks *parallel* with the line of progression of the machine over the ground. This parallel delivery of the grain was objectionable for various reasons. There had been other reaping machines in which the cut grain after being raked from the rectangular platform was delivered upon a second platform of quadrantal form which was located at one end of the cutting apparatus and at the discharge end of the rectangular platform, and was fitted with an automatic rake whose teeth swept over the quadrantal platform in circular curves, so that the stalks of grain were partially turned and were delivered from

the quadrantal platform crosswise of the line of progression of the machine over the ground. This *crosswise* delivery of the grain is for various reasons better than the parallel delivery; but with machines of this second kind it is evident that *two* reaping platforms (the rectangular and the quadrantal) were required; also that two automatic rakes were necessary (one for each platform); and that the discharge of the cut grain from the place where it falls when cut is *indirect*, being first, crosswise of the line of progression of the machine, and second, in quadrantal curves.

Seymour's improvement consisted in locating or arranging a quadrantal platform directly behind the cutting apparatus, so that the cut grain could be swept by a rake *directly* from the cutting apparatus in circular curves, and was partially turned in its movement, and was therefore deposited on the ground with its stalks *crosswise* of the line of progression of the machine. This improvement therefore dispensed with one of the two raking platforms and with one of the two rakes of the second above variety of reaping machines, while at the same time it attained the beneficial delivery of the stalks of the grain crosswise of the line of progression of the machine.

In a suit under this Seymour patent one of the defenses was that the improvement did not involve invention, but merely the skill of the intelligent mechanic, skilled in the manufacture and use of harvesting machines; and this defense may be considered under two heads; first, that as both the rectangular raking platform and the quadrantal one were old, the change made by the patentee was a mere substitution of one old form of platform (the quadrantal one) in the place of

another old form of platform (the rectangular); second, that the change made by the patentee was a change of location of the old quadrantal platform, for whereas it had previously been located or arranged in a reaping machine at one end of the cutting apparatus, the change made was the location of it directly behind the cutting apparatus. That the change was not a mere substitution is evidenced by the fact that it was attended with a different mode of operation, resulting in the better delivery of the cut grain; that is, a delivery with the stalks crosswise of the line of progression of the machine instead of parallel therewith as effected by the use of the rectangular platform. That the change was not a mere change of location or arrangement is evidenced by the facts that the mode of operation was changed from indirect (as with the rectangular and quadrantal platforms combined) to direct; and that one of the two platforms and one of the two rakes, previously required when a quadrantal platform was employed in its old location, were dispensed with. The matter came before the United States Supreme Court upon appeal, and they decided that the change made by Seymour was a patentable invention. *Seymour* v. *Osborne*, 78 U. S. 11 Wall. 516, 20 L. ed. 33. It thus appears that when a change of location of an old device introduces a new mode of operation into the particular class of machines in which the change is made, or dispenses with a part of the old mechanism, the change is neither a *mere* substitution nor a *mere* change of location, but is a substantial change amounting to invention.

§ 12. Invention by Change of Arrangement.

An instance of a change in the arrangement of old devices which is not a *mere* change is found in the

Cahoon seed sowing machine. *Cahoon* v. *Ring*, 1 Cliff. 592. Cahoon's seed sower consisted substantially of a hopper to contain the seed and a centrifugal seed distributing wheel which received the seed from the hopper and distributed it centrifugally in the air. Previous to the date of Cahoon's invention, there had been centrifugal seed sowers in which an upright hopper (to contain the seed) was combined with a centrifugal seed discharging wheel arranged to revolve upon a vertical axis or shaft, so that the periphery of discharge of the wheel was in a substantially horizontal plane. In these machines the seed was fed from the hopper to the centrifugal discharging wheel at all sides of the vertical shaft. The practical result was that the seed was delivered from the centrifugal discharging wheel simultaneously at all of its sides and passed to the ground somewhat in the form of an umbrella; the seed never rising above the height of the centrifugal seed discharging wheel from the ground, and being distributed over a narrow strip of but few feet in breath. Cahoon, while retaining the upright seed hopper, the centrifugal discharging wheel and the wheel shaft of the earlier machines, changed the arrangement of the last two members relatively to the hopper so that the shaft was arranged horizontally (instead of being upright), and the periphery of discharge of the centrifugal wheel was in a substantially vertical plane, instead of in a horizontal one. By reason of these changes in arrangement, the mode of operation of the machine was changed, the seed from the upright seed hopper passed to one side of the shaft (of the centrifugal wheel) instead of to all sides of it; the discharge of seed took place at the upper side of the centrifugal discharging wheel, instead of at

all sides of it; and as the seed was thrown off at the upper side of the wheel in a substantially vertical plane (instead of a horizontal one) it rose many feet above the height of the discharger from the ground and was distributed throughout a breadth of sixty feet. In this case, therefore, the change of the relative arrangement of the same old devices (seed hopper, centrifugal discharging wheel, and shaft therefor) was attended with a new mode of operation, and with an improvement in the practical result; and in such a case the change is not a *mere* change in arrangement but amounts to invention.

§ 13. Invention by Application of an Old Thing to a New Purpose.

While it is undoubtedly true that many applications of an old thing to a new purpose do not constitute inventions yet there are instances when the change is not a mere application but amounts to invention. Thus, the annealing of articles of metal by first heating them to a sufficient temperature long enough to permit the molecules to assume the same condition throughout the mass, and by then compelling or permitting them to cool slowly, had been well known for many years, and among such articles were the metallic specula of reflecting telescopes which had been taken hot from the moulds in which they were cast, had been put into a heated oven, and had been permitted to cool slowly therein. With this knowledge in existence, Whitney, on April 25, 1848, patented a process of annealing the chilled cast iron wheels of railway cars. Such wheels are cast in composite moulds; the part of the mould which gives form to the circular tread of the wheel being formed by

a heavy cast iron ring, while the residue of the mould is formed of sand. When molten iron is poured into such a mould the portion which comes in contact with the iron ring of the mould is chilled (and thereby hardened) and cools rapidly, while the hot metal in contact with the residue of the mould (the sand portion) cools slowly because the sand is a much poorer conductor of heat than iron. As iron cools it contracts, and as the rim of the hot wheel is cooled rapidly by contact with the iron portion of the mould, while the residue cools slowly in the sand portion of the mould, the cooling of the metal is rapid at one part of the wheel (the chilled tread) and slow at the residue, and the contraction is unequal; the metal is subjected to internal strains and the body of the wheel tends to break loose from its rim. Even if actual breakage should not take place in cooling, the metal of the wheel is under the action of internal strains so that the wheel is liable to break in use by comparatively slight additional external strains. Attempts had been made to get over the difficulty by modifying the form of the plate or body of the wheel so as to permit it to change its form slightly in contracting, but these attempts had not been successful. According to Whitney's process the wheel is taken hot from the mould before it has cooled and contracted sufficiently to impair its ultimate strength, it is subjected to heat somewhat below that at which fusion of the iron commences, and is then allowed and compelled to cool slowly in an oven or previously heated chamber. The slow cooling of all the parts of the wheel from the high temperature permits all parts to cool and contract simultaneously and uniformly, and the practical result is that the cooled wheel is as free from internal strains as if it had been

cast in a mould formed wholly of one material, while at the same time the tread of the wheel retains the hardness incident to the rapid chilling of the molten metal by the cast iron portion of the mould. In a suit for infringement under Whitney's patent the case came ultimately upon appeal before the United States Supreme Court (*Mowry* v. *Whitney*, 81 U. S. 14 Wall. 620, 20 L. ed. 860) and the court when speaking of chilled car wheels made in the old way said:

"What they needed was (what is substantially described by one of the witnesses) the discovery of the fact that the chilled cast iron, constituting one part of the wheel, could be subjected to heat less than that which would cause fusion, without producing any material effect upon its hardness, while the cooling of the other parts of the wheel could be so prolonged, by applying that heat externally, as to enable all parts to cool without being subjected to the strain attendant on unequal contraction; and, in addition to the discovery, they needed the invention of the process by which it could be practically carried out. Such a discovery and such a process were needed for no other castings. The novelty of the patentee's invention is not therefore disproved by evidence that glass, or speculum metal, or even other iron castings had been annealed and slow-cooled prior to the time when it was made. Of this there is very considerable evidence, both in the testimony of witnesses and printed publications. The specification disclaims invention of annealing iron castings done in the ordinary mode. It claims annealing when applied to cast iron railroad wheels, in the mode or by the process described. It is not, therefore, merely an old contrivance or process applied to a new object, a case of double use.

"A new and previously unknown result is obtained, namely, the relief of the plate of the wheels from inherent strain without impairing the chilled tread; a result which, though anxiously sought, had not been obtained before Whitney's invention."

This example shows that when an old thing (in this case a process) is so applied as to obtain a new result, (the production of a chilled car wheel free from internal strains) the change or thing done is not a *mere* application of an old process to a new or different thing, but is an invention.

A similar instance of invention in the application of an old thing is found in the case of the stove regulator of Foote, described in his patent of May 26, 1842. The apparatus as a whole consisted of a stove with its draft valve (for the admission of air) connected by two levers with two expansion rods of sheet brass; screws and nuts also were used to adjust the expansion rods. The metal of the rods, being brass, expanded and contracted to a greater extent than the metal of the stove, which was iron; and by reason of the difference in extent of movement of the rods and metal of the stove, the draft valve was closed and opened. The patent was infringed and there was a trial by jury, with a verdict for the plaintiff. Various alleged anticipations by similar apparatus were set up, such prior devices showing the application by machinery of the unequal expansion and contraction of two different metals under the same degree of heat to various purposes, such as regulating the temperature of an apartment, or of a hot house, or of a water, oil or alkaline bath, by the contemporaneous admission of warm and discharge of cold air or fluid effected through the action of the regulator placed in the medium whose tem-

perature was to be regulated; or regulating the ventilation of a room by governing the admission of air into it. Afterwards the matter came before Judge Nelson on a motion for a new trial. This motion was denied, and the Court made the following statement of the patentee's invention, of the pre-existing structures, and of the law as applied to the facts.

"The substance of the discovery as claimed by the plaintiff and secured to him by the patent, is the application of the principle of the contraction and expansion of a metallic rod, by the use of certain mechanical contrivances particularly described and set forth, to the cast or sheet iron stove in common use, by which means he produces a self-regulating power over the heat of the same at any given degree of heat that may be desired within the capacity of the stove. This is the thing invented. It is in a word the application of a well known principle to a new and useful purpose; and the question is whether or not the patentee was the first and original inventor, or whether it was before known and in public use. Now, although it is shown (assuming for the present that we may look into the books not in evidence) that the principle had before been applied to the regulation of heat, as in the instance of Dr. Ure's 'Thermostat,' and Bonnemain's 'Heat Regulator,' and some others, yet, from aught that appears from the testimony or from any book that has been produced, the plaintiff was the first person who applied the principle to the regulation of the heat of stoves; and for this he was entitled to a patent, and to be protected in its enjoyment. Phillips, Patents, chap. 7, § 6, p. 101. It is not a new use of the principle as previously applied to the regulation of heat, which would not be patentable; but a new application

of it, by new mechanical contrivances and apparatus, by means of which a new and beneficial result is produced in the use of the article to which it has been thus applied, namely, the common cast or sheet iron stove." *Foote* v. *Silsby*, 1 Blatchf. 445.

Subsequently the case came again before Judge Nelson upon the trial of a feigned issue with reference to the novelty of the patented invention, several alleged anticipations of the two claims of the patent having been put in evidence. The Court then charged the jury as follows as to the rule of patent law applicable to the first claim, which was not restricted to particular machinery.

"Where a party has discovered a new application of some property in nature, never before known or in use, by which he has produced a new and useful result, the discovery is the subject of a patent, independently of any peculiar or new arrangement of machinery for the purpose of applying the new property in nature; and, hence, the inventor has a right to use any means, old or new, in the application of the new property to produce the new and useful result, to the exclusion of all other means. Otherwise the patent would afford no protection to an inventor in cases of this description; because, if the means used by him for applying his new idea must necessarily be new, then, in all such cases, the novelty of the arrangement used for the purpose of effecting the application would be involved in every instance of infringement, and the patentee would be bound to make out, not only the novelty of the new application, but also the novelty of the machinery employed by him in making the application." *Foote* v. *Silsby*, 2 Blatchf. 264.

The Court on this subject referred to the well known hot-blast case of *Neilson* v. *Harford* (Webster, Pat. Cases, 295, 310, 328), and also to Curtis on Patents, § 81.

The subject of the second claim of the patent was the new combination of four devices by which the application of the differential expansion of two different metals was made to regulate the draft valve of the stove, and thereby regulate the heat. On this subject the court said:

"There are four elements in it which I have named. The claim is for the combination of all of them, not for any one of them. It is immaterial whether or not the plaintiff was the inventor of any one or two of them, or of any less than the combination of the whole. They may all be old; and yet if the plaintiff was the first to combine all four of them for the particular purpose of regulating the heat of the stove by means of its own heat, he is entitled to be protected in that impr ement." *Foote* v. *Silsby*, 2 Blatchf. 270.

It thus appears that when there is a new application of some property in nature, never before known or in use, by which "a new and useful result is produced," the thing done is not a *mere* application but is an invention or discovery constituting the subject-matter of a patent. It further appears that when the application of the old thing is by a new combination of it with other devices, it is not a *mere* application, but produces a new combination which is an invention.

With reference to this case of the Foote heat regulator it is proper to add that the first claim was found to be anticipated by an older construction; consequently a disclaimer was filed restricting its scope to the regulation of the heat of the stove in which the expansive rod shall be acted upon directly by the heat of the stove, or the fire which it contains.

The case was subsequently appealed to the United

States Supreme Court which by a majority affirmed the decision of the lower court as to the validity of the patent. *Silsby* v. *Foote*, 2 Blatchf. 270, 61 U. S., 20 How. 378, 15 L. ed. 953.

The fact that the first broad claim of the Foote patent (before the disclaimer was filed) was anticipated by an older invention does not affect the rule of law laid down by Judge Nelson as applicable to such a case.

§ 14. Invention by Application of an Old Device to Perform its Usual Function.

The *mere* application of an old thing to perform its usual function does not amount to an invention. Thus let it be assumed that some inventor has devised new seats for a carriage body fitted with a top, but has not represented it in his patent nor manufactured it with side curtains to keep out wind and rain, while such side curtains have been long in common use for the same purpose in other carriages fitted with tops. Would the application of side curtains to the carriage body with the new seats be an invention, when the side curtains had been employed in the same art to perform the same function with the same mode of operation? We think that the application of the side curtains under such circumstances would be a *mere* application falling short of invention.

There are, however, cases in which the change amounts to more than a mere application. Thus, a Reissue Patent, No. 6229, was granted for the invention of Keene for improvements in carriage steps, the main improvement consisting in the application of a covering or plating of india rubber to the carriage step so as to produce a resilient surface which also tended to prevent slipping.

In a suit under the patent it was proved that similar platings of india rubber had been applied to stirrups and to the soles of shoes, and that such earlier platings were resilient and tended to prevent slipping. It was also proved that iron (non-resilient) carriage steps had been constructed previously with substantially the same form of surface as those of the patented rubber platings. The Court decided that the use of the preceding stirrup and sole platings, and the use of the non-resilient carriage steps did not establish any anticipation of the invention; and the patent was sustained. *Rubber Step Mfg. Co.* v. *Metropolitan R. Co.* 3 Bann. & Ard. 252. In this case it appears that the patentee's invention, although an application of an old thing (india rubber plating) to perform an old function (to give resiliency and to prevent slipping) introduced this function or mode of operation into a class of devices (carriage steps) or art in which it had not been previously attained; and in such case the change is not a mere application but produces a new combination which amounts to invention.

Another instance of the application of an old device to perform its usual function is found in the steam packing of D. C. Gately described in his Patent No. 86296, January 6, 1869. It consisted of a peculiar packing of cloth and certain other materials combined with an elastic backing of vulcanized india rubber. The first member of this combination (the peculiar packing) was old, being described in an earlier patent, but it was defective in being too rigid and in lacking the requisite elasticity to enable it to exert the requisite elastic pressure against piston rods which were packed with it. On the other hand, the second member (the vulcanized rubber) was old as an elastic material, and it had been

used as an ingredient of steam packing. Gately applied the vulcanized rubber to the back of the old peculiar packing, thereby imparting to it the usual elastic function or property which vulcanized india rubber possessed. In a suit under the patent the defendant contended that in view of the state of the art at the date of the issue of the Gately patent no invention was exhibited or shown. This defence was not successful, and the patent was sustained. *New York Belt. & Pack. Co.* v. *Magowan*, 27 Fed. Rep. 111, affirmed by the United States Supreme Court in 141 U. S. 332, 35 L. ed. 781. In this case it appears that the new packing produced by the patentee had a new collective mode of operation, because it combined in one structure the advantages of the old peculiar packing with the elasticity derived from the application of the india rubber, a result which had not been attained previously; hence the change was not a *mere* application of an old article (vulcanized india rubber) to the old packing, but produced a new combination which was patentable.

§ 15. Invention by Substitution of One Old Device for Another.

A substitution of one old device for another is a *mere* substitution when the substituted device does no more than the device which it replaces, and when the collective mode of operation of the article in which the substitution is made is not beneficially changed after the substitution. If, however, the collective mode of operation of the article is changed beneficially by the substitution, the change is not a *mere* substitution but amounts to invention. This proposition is well illustrated in the case of the shingle mill. The facts are as

follows: On November 3, 1813, Earle received a patent for a shingle sawing machine in which a perpendicular or *reciprocating* saw was combined with a bolt carriage (for carrying the bolt or block from which the shingles are sawed) which had not only a progressive longitudinal movement to feed the wood to the saw, but had also an unequal alternating lateral movement at its two ends so as to present first a thick portion of the end of the wooden block and then a thin portion to the saw, and thereby cause the shingles to be sawed tapering or of wedge form. On December 28, 1822 (nine years subsequent to the first patent) the same inventor (Earle) took out a patent for an improvement upon the original machine consisting in the *substitution of a circular saw* for the *reciprocating saw*. A suit for infringement of this patent resulted in a verdict for the patentee. Then the matter came before the Court on a motion for a new trial (*Earle* v. *Sawyer*, 4 Mason, 1) and the motion was denied. In this case the Court in its decision stated that "The former machine here alluded to and patented by the plaintiff, is a machine for manufacturing shingles called the *Improved Shingle Mill*, in which a perpendicular [reciprocating] saw, with appropriate machinery to move it, was exclusively used. The present patent [for the improvement] claims as an invention of the plaintiff, the substitution of a circular saw with the appropriate machinery [for imparting motion to that kind of saw] in the old machine for the like purpose of sawing shingles. With the exception of this substitution, all the other parts of the old machine, such as the carriage to move the block to be sawed, and the alternate motion on a diagonal line of each end of it, so as to present first a thick and then a

thin end to the saw, were unaltered. * * * It was proved [in the case] that circular saws were in use before * * * and it was testified [on the jury trial] that the machinery by which a circular saw should be substituted for a perpendicular [reciprocating] saw in the plaintiffs old machine, was so obvious to mechanics that one of ordinary skill, *upon the suggestion being made to him*, could scarcely fail to apply it in the mode in which the plaintiff applied his."

The practical value of the improvement was proved at the jury trial; it being shown that while the old machine (with the reciprocating saw) sold for $60 or $70, the new with the improvement sold for $150 or $200. The motion came before Judge Story, who has been well said "to have been one of the brightest ornaments of his profession and of his age;" and who "wrought so long, so indefatigably, and so well that he did more, perhaps, than any other man who ever sat upon the Supreme Bench to popularize the doctrines of that great tribunal and impress their importance upon the public mind." (Carson, The Supreme Court of the United States, 234.) He was in fact a jurist who, with his profound knowledge of law and of the mode of applying it, had the common sense to perceive that an inventor and patentee had some rights which a court should respect. His language when speaking of the patent is as follows:

"He does not claim (which is very material) to be the inventor of the circular saw, or of any mode or machinery by which it may be applied to sawing generally, or to sawing logs, or to sawing shingles. He claims to be the inventor of a combination of it in a particular manner with his old machine, for the purpose of sawing shingles. In what manner is the claim met? Not by

showing that any other person ever thought of or *invented such combination before*, for it is admitted that the plaintiff is the first person who conceived or executed it; but by showing, that he is not the inventor of a circular saw, or of the particular machinery of belts and drums and wheels, etc., by which such a saw is commonly put in operation; *and that the combination itself is so simple, that, though new, it deserves not the name of an invention.*

"The whole argument, upon which this doctrine is attempted to be sustained, is, if I rightly comprehend it, to this effect. It is not sufficient that a thing is new and useful to entitle the author of it to a patent. He must do more. He must find it out by mental labor and intellectual creation. If the result of accident, it must be what would not occur to all persons skilled in the art, who wished to produce the same result. There must be some addition to the common stock of knowledge, and not merely the first use of what was known before. The Patent Act gives a reward for the communication of that which might be otherwise withholden. An invention is the finding out by some effort of the understanding. The mere putting of two things together, although never done before, is no invention.

"It did not appear to me at the trial, and does not appear to me now, that this mode of reasoning upon the metaphysical nature, or the abstract definition of an invention, can justly be applied to cases under the Patent Act. That Act proceeds upon the language of common sense and common life, and has nothing mysterious or equivocal in it."

The learned judge further said:

"The first question then to be asked, in cases of this

nature, is, whether the thing has been done before. In case of a machine, whether it has been substantially constructed before; in case of an improvement of a machine, whether that improvement has ever been applied to such a machine before, or whether it is substantially a new combination. If it is *new*, if it is *useful*, if it has *not been known* or *used* before, it constitutes an invention within the very terms of the Act, and, in my judgment, within the very sense and intendment of the legislature. I am utterly at a loss to give any other interpretation of the Act; and indeed, in the very attempt to make that more clear, which is expressed in unambiguous terms in the law itself, there is danger of creating an artificial obscurity."

In this case it is perfectly clear that with the shingle mill of the earlier patent of 1813 the sawing of the shingles was *intermittent*, because it was done by a perpendicular, that is a reciprocating saw, which from the peculiarity of the teeth for sawing wood cuts at only the down stroke, while no cutting takes place during the return upward stroke; whereas when the circular saw was substituted, the cutting of each shingle became *continuous*, and, of course a much larger quantity of shingles could be sawed in the same time. It appears therefore, that although there was a substitution in an old combination (the shingle mill) of one old device (the circular saw) for another old device (the perpendicular or reciprocating saw), the inventor by that substitution, introduced into a particular machine (the shingle mill) a mode of operation (that of continuous sawing) which had not previously been known in that machine; this substitution was not therefore a *mere* substitution of one old device for another, that is, a substi-

tution without change of the mode of operation of the particular machine in which the substitution is made, but was a change which introduced a new mode of operation into that machine and amounted to invention.

§ 16. Invention by Duplication.

While a *mere* duplication of old devices is not an invention, a duplication involving a new mode of operation amounts to invention. Thus, in the case of *Wyeth* v. *Stone*, 1 Story, 273, the patentee had produced a machine for cutting a deep groove in ice to enable it to be readily separated into long pieces. The machine consisted in substance of a longitudinal stock or beam with a guide at one side, and with several cutters arranged behind each other projecting to progressively increased distances beneath the stock, so that the material was ploughed out by a succession of chippings or shavings by one passage of the machine over it. It was contended on the part of the defendant that the machine amounted in substance to no more than the carpenter's plough for grooving boards, a tool which has a stock with a guide at one side and a single projecting cutter cutting a single chip or shaving at each longitudinal movement of the implement, and that the use of a number of cutters in the ice plough was a mere duplication of the single cutter of the carpenter's plough. The improvement was declared to be patentable, Judge Story delivering the opinion of the court. In this case it is evident that there was a new mode of operation produced by the improvement, viz: that the material operated upon was removed by a successive series of cuts all produced simultaneously by the operation of the

machine, and the quantity removed at one operation depends upon the number of cutters with which the machine was fitted, each taking its own chip successively in distance but simultaneously in time, the amount removed being controlled *by the number of cutters;* whereas with the carpenter's plough the material was removed by a single cut, and the amount removed depended upon the *number of times* the tool was passed along the work.

A similar instance is that of the Parker water wheel invention. Before the date of the invention it had been customary to arrange a single reaction wheel or turbine upon a shaft, and in such case the pressure of the water upon what may be termed the face of the wheel, or that side at which the water entered the buckets or guides, was exerted endwise of the shaft and had to be sustained by the step or bearing thereof. According to one of the Parker improvements two such wheels were arranged in a pair *face to face* on the same shaft, and the water was supplied between them, so that the pressure of the water upon one wheel endwise of the shaft was counterbalanced by the equal and opposite pressure of the water upon the other wheel. Hence the endwise strains upon the shaft counterbalanced each other, and the bearings of the shaft were relieved of these strains. In this case it is evident that a new mode of operation (the counterbalancing of the strains) was produced by the peculiar mode in which the wheels were duplicated; and by reason of this new mode of operation the duplication of the wheels was not a mere duplication but amounted to an invention. The patent was sustained not only in a jury trial, but subsequently by a court of equity. *Parker* v. *Hulme,* 1 Fish. Pat. Cas. 44.

§ 17. Invention by Change of Direction of Motion.

An instance of a change of direction of motion which is not a *mere* change, is found in the Adams cornsheller, patented Oct. 15, 1872. Previous cornshelling machines had contained a combination of a rotating toothed cylinder and a stationary toothed shell to separate the grains from the cob, an endless apron to carry or feed the ears of corn to the shelling devices, and a revolving winged beater arranged between the shelling devices and the feeding apron. In such old machines the direction of motion of the wings of the revolving beater was the *reverse* of that of the ears of corn in their movement from the feed apron to the shelling devices; and the operation of the revolving beater was to *knock back* any ear of corn that might ride upon the others in their movement and to thereby tend to prevent the choking of the shelling devices. This mode of operation proved to be unsuccessful and the choking was not prevented. Adams discovered that when, with the same members arranged relatively to each other in the same manner, the direction of motion of the beater was changed so that its wings moved in a direction the *same* as that of the ears of corn, choking was wholly prevented, from the fact that the overriding ears, instead of being knocked back upon the others, were *driven forward* to the shelling devices. A new mode of operation was therefore produced by changing the direction of motion of one of the members of an old combination, without changing its construction and without changing either the number of members combined or their relative order or arrangement, and the change was properly declared to constitute an invention. *H. H. Adams* v. *The Joliet Manufacturing Co.*, 3 Bann. & Ard. 1.

§ 18. Invention by the Practical Application of the Discovery of a New Property of Matter.

There does not appear to be any condition of facts in which the *simple* discovery of a new property of matter amounts to an invention; but there are undoubtedly cases in which such a discovery accompanied with a practical application of it, by which the newly discovered property is made available for a useful purpose, amounts to invention. Take for example the case of the discovery by Charles Goodyear that sulphur is capable of combining with india rubber under the action of heat and that the compound can be put into various useful forms during its manufacture, and when completed has not only the useful properties of crude rubber but is free from some of its defects. In this case the new product or manufacture was decided to be an invention. *Providence Rubber Co.* v. *Goodyear*, 76 U. S. 9 Wall. 788, 19 L. ed. 566.

§ 19. Invention Determinable by Rules and Evidence.

The instances above referred to demonstrate that, even in cases in which the change from pre-existing things is the least when considered with reference solely to the *mechanical work* involved in making the change, the question whether the change amounts to invention or not may be determined by the application of plain, reasonable rules to the evidence that may be given; it being evident that in every case it is possible to prove as a matter of fact whether the change made has or has not introduced a new mode of operation into the particular art or class of machines to which the invention appertains; or has or has not enabled a new effect in kind to

be produced; or has or has not enabled an old effect to be more economically attained; or has or has not dispensed with parts of old mechanism; or, if a change of material, has or has not introduced a new property or quality into the class of articles to which the invention appertains. This is the method of determining invention which is satisfactory to the mechanic and inventor; and if the existence of invention is determined by this method, it is within the domain of evidence, and there must necessarily be substantial uniformity in the decisions of the courts; counsel also can form a reliable opinion as to the merits of cases which are submitted to them, and can advise their clients accordingly. Whereas, if invention is to be determined by opinion as to whether the supposed inventive faculty of the mind has or has not been exercised, evidence as to facts becomes practically valueless, because the decision must then depend upon the peculiar personal view of the court as to the assumed exercise or lack of exercise of a supposed mental faculty whose qualities and limits are indefinable.

If the question of invention or non-invention can be determined by evidence in cases such as the foregoing, in which the mechanical change involved is so small, how much more certainly must it be determinable in cases when the mechanical change is large; such as the production of a new device; or the production of a combination of two or more devices which have never before been combined; or the combination of an old combination with an additional device, whether new or old of itself, which enables a new result to be accomplished, or enables an old result to be accomplished by a new mode of operation or at a less cost than was possible by pre-existing means.

§ 20. Objections to Rules, and Replies thereto.

It may be urged that if the foregoing tests for determining invention be established as the proper ones, many changes claimed in patents will be declared inventions that are too insignificant and simple to be considered as such, and are unworthy of being attributed to the hypothetical exalted conception of the inventive faculty of the mind. To this objection it may be replied that as no one can define the limits of the inventive faculty it is impossible to determine by mere opinion what new changes which are beneficial in their results are so small or so simple as to be excluded from its range of action. There are also the following further considerations, viz: that no one is or can be injured by such a method of determining invention. The patentee can not be injured, because when he has a valid patent he has the opportunity of receiving whatever benefits may flow from the invention, and if there be such benefits the patentee has a right to them in consideration of the publication of his invention and the consequent right of the public to use it forever, after the expiration of the patent. The public cannot be injured because the patenting does not deprive them of any rights; as they have no rights to any changes which were previously unknown and non-existent, unless they be within the exceptions previously mentioned in § 6. To deny a patent for a new and useful change, or to declare a patent for such a change (which is not within the exceptions previously mentioned in § 6) void on the ground that it is too simple and insignificant to be deemed an invention, ignores the well known fact that the present high condition of our manufacturing industries has not been reached by mighty leaps, but has been attained by a series of progressive

steps, each of which when considered by itself may seem small and insignificant relatively to the present result, but each of which has formed the platform from which the next higher step has been projected; and in this view no one of the steps is really insignificant. Moreover the inventor has some rights which others are bound to respect, and to deny invention and patentability when a beneficial change embodying a new or better mode of operation has been produced is to defraud an inventor and patentee of his just rights for the benefit of the infringer. Besides, if the new change constituting the invention is insignificant and of no value as compared with things previously in public use for the same purpose, the public will undoubtedly refrain from using the new change, and the patent for it can do no harm. If, however, they do use it, the fact of such use, in preference to the use of that which was known previously, is conclusive evidence that the new change is not really insignificant. If a court should declare a new and useful change, that is not within the exceptions, to lack invention because the court may be of opinion, *formed after the event*, that the change is a small one, and should form this opinion notwithstanding the facts that the change was unknown before its production by the patentee and that it is used by an infringer afterwards, the patentee would be as certainly robbed under pretense of law as he would be if his personal property were taken from him by a highwayman.

§ 21. Fallibility of Opinion Formed after the Even'

It may however be urged by an infringer that the new change produced by the patentee is an obvious one, and

should not therefore be deemed an invention, however new and useful it may be and although it is not within the exceptions previously named in § 6. To this objection it may be replied that all opinions expressed by witnesses in patent litigation, and by the courts, as to the obviousness of patented changes, *are opinions formed after the event*, and are therefore entirely unreliable, because in such cases it generally happens that the change, after it has been made public and put into successful use, appears to some minds to be so simple that the wonder to them is it was not made before, and this circumstance reacts upon the mind and deprives it of the power of judging impartially. Because also it is one of the common infirmities of mankind to think (after the event) that they could have done without effort that which has been done by another; and when there is no real anticipation of a patented invention, nothing is easier to say than that it was an obvious change, that there is no invention it, and that it is not such a change as Congress intended to protect by the patent laws.

If the change was really an obvious one, how does it happen that it was not in use? If obvious, it certainly would have been used by others previous to its production by the patentee, especially in view of the fact that the use of the change by an infringer after the patentee publishes it is conclusive evidence that the change is one that is useful and was needed. No better criticism can be made upon the attempt to defraud a patentee of the benefits incident to his new and useful invention by stigmatising it as simple and obvious, than the language of Judge Story in the decision rendered in the case of *Earle* v. *Sawyer*, 4 Mason, 1, referred to in § 15.

§ 22. Extent of Change Required for Invention.

As to the extent of the change that is required to constitute invention, the earlier decisions of the courts and those which have followed in the same line have set forth this subject in language that cannot be excelled nor misunderstood, as follows:

"It is of no consequence, whether the thing be simple or complicated; whether it be by accident, or by long laborious thought or by an instantaneous flash of the mind, that it is first done. The law looks to the fact and not to the process by which it is accomplished. It gives the first inventor, or discoverer of the thing, the exclusive right, and asks nothing as to the mode or extent of the application of his genius to conceive or execute it." *Earle* v. *Sawyer*, 4 Mason, 1.

"It is of no consequence, as to the validity of a patent, how much or how little labor, study, or thought, the invention cost. * * * The degree of labor and thought may be sometimes evidence to the jury upon the question of invention; but although the invention be accidental, or a sudden flash of thought, the party is entitled to the benefit of his discovery." *Many* v. *Sizer*, 1 Fish. Pat. Cas. 21.

"Many of the patents or inventions which have been upheld are such slight changes from former modes or machines as to be tested in their material diversity chiefly by their better results, such as the flame of gas rather than oil, the hot blast rather than the cold, charcoal used in making sugar, hot water in place of cold in making cloth, etc." *Smith* v. *Downing*, 1 Fish. Pat. Cas. 91.

"If, in a patented improvement, a new and useful result has been attained, neither the simplicity of the struct-

ure nor the greater or lesser amount of intellect employed are of importance in determining the validity of the patent." *Teese* v. *Phelps*, 1 McAllister, 48.

"It is always difficult to determine what degree of improvement takes a case out of the mere exercise of mechanical judgment and puts it in the domain of invention or discovery. The general rule upon the subject is that any change in the position of old elements, whereby new and better results are accomplished, is a sufficient exercise of the inventive faculty to warrant the issuing of letters patent." *Stockton* v. *Maddock*, 10 Fed. Rep. 132.

"Though the difference between a patented thing and the prior art may be slight, yet if the difference involves a new and valuable result, it is patentable." *Hancock Inspirator Co.* v. *Jenks*, 21 Fed. Rep. 911. (Brown, *J.*)

PART II.

INVENTIONS PATENTABLE BY LAW.

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§ 23. Classes Enumerated in the Statute.

Section 4886 (previously quoted) specifies things for which patents may be granted as follows:

"Any new and useful art, machine, manufacture or composition of matter, or any new and useful improvement thereon."

A USEFUL ART.

§ 24. Definition of a Useful Art.

A useful art, as distinguished from the liberal, polite, or fine arts, is a mode of treatment of, or a method or way of operating upon, an object by which a change in its form, condition, quality, or properties is produced. This art class, therefore, includes what are commonly called methods and processes, whether they be simple or compound.

§ 25. Processes Simple and Compound.

A simple process is one consisting of a single operation or act; thus the solution of common salt in cold water is a simple process. A compound process on the other hand is one made up of two or more operations performed either successively or simultaneously on the article treated. Thus, the hardening of a steel article by

first heating it, and second, suddenly cooling it by plunging it into cold water, is a compound process consisting of two successive operations; while the method of producing a tempered steel article by first, heating it, second, plunging it into water (so as to harden it excessively), and third, heating the hardened article to a specific temperature to reduce its excessive hardness and brittleness, is a compound process consisting of three operations or acts performed successively upon the article treated.

§ 26. Process an Invention even if its Physical Operations are Old.

In order that a process may be an invention, it is not necessary that the operation or operations performed should be new of themselves, but only that they shall be new as applied to the particular class of articles to be changed. Thus, previous to the discovery of the art of hardening steel, it was no doubt a common thing for a blacksmith to plunge a hot forged *iron* article into water to cool it. Some one, however, at a later date must have made the discovery that when a hot *steel* article was suddenly cooled by plunging it into water it became excessively hard, while the iron article did not. The cooling of the hot iron article by the same physical operation was not the process of hardening steel nor an anticipation of it, because the former was not attended with a change in the condition or quality of the iron article operated upon; but inasmuch as a change was produced in the condition or quality of the steel when operated upon in the same way, the hardening of steel, by heating it and suddenly cooling it, was a new art or process notwithstanding the want of novelty in the mere physical operations performed.

§ 27. Novelty of Result not Essential to Invention in a Process.

In the instance of the hardening of steel above referred to the result was new at the date of the discovery. Novelty of the result, however, is not essential to constitute invention in an art or process, as there may be a new method or process of producing an old result or change. Thus, in the early period of the art of refining sugar, the molasses was permitted to drain or separate by the force of gravity from the mass of crystalized sugar and molasses, contained in moulds. At a later date, the molasses was caused to drain or separate from the sugar by centrifugal action; the moulds containing the crystalized sugar with the molasses being placed in a centrifugal machine and whirled around the axis thereof at a high speed. The practical result was the same in both cases, the crystals of sugar being drained of the molasses; but the two processes were substantially different, and the centrifugal process of draining sugar was a new one of attaining the old result.

§ 28. Novelty of Implements, Tools, or Machines, or of Physical Operations not Essential to Invention in a Process.

It is not essential to invention in an art that the implements, tools, or machines employed should be new, nor that they should perform any new function. Thus, in the process of dyeing, the vessels or vats that hold the dye liquor may be any that are suitable for the purpose. Whoever first invented the process of dyeing, by immersing the article to be dyed in the coloring liquor, undoubtedly used some common vessel which had been used previously to hold water. When the vessel contained clear water, and the cloth or yarn was immersed

in it, dyeng was not effected; but when the same vessel contained dye liquor, the immersion was attended with the change of color in the articles immersed, which we call dyeing. The vessel or implement was the same in both cases, and its function was the same in both, viz: to hold a liquid; but the process of dyeing when first effected was an invention because of the change effected in the article operated on, notwithstanding the lack of novelty of the implement or vessel, and the lack of novelty in its function.

§ 29. Simultaneons Action of Operations not Essential to Invention in a Process.

It is not essential to invention in a new compound process that the operations composing it should be performed simultaneously on the article. The compound process by which a tempered steel article is produced (§ 25, *ante*) is an illustration of this proposition, because with that process the hardening operation and the subsequent heating operation do not act simultaneously upon the article, but act successively.

§ 30. Invention may Exist in a Process when the Operations are Old in the same Art.

It is not essential to invention in a new compound process that one or more of the operations composing it should not have formed part of a preceding compound process even in the same art; but invention may exist in the application of the same old operation at a different stage in an old process, so that by reason of the change the *collective mode of operation* is new and is attended with a beneficial result. Thus, in the manufacture of beer it was customary to subject the liquid to

two fermentations, the first active and the second slow. The first was effected in casks whose bung holes were open to the atmosphere, while the second was effected in closed casks and under the pressure of the carbonic acid gas liberated from the fermenting liquid. According to the invention described in the patent of George Bartholomae, No. 215,679, May 20, 1879, the old process was changed by conducting the active fermentation in closed casks under the pressure of the carbonic gas; that is, the pressure of carbonic acid gas was applied during the first or active fermentation in the same manner as it had been applied previously during the second or slow fermentation. The change was attended with the saving of a considerable quantity of beer which overflowed from the open casks in which the active fermentation had previously been conducted, and also with other advantages, and the new compound process was declared to be a patentable invention by the United States Supreme Court. *New Process Fermentation Co.* v. *Maus*, 122 U. S. 413, 30 L. ed. 1193.

§ 31. A Compound Process may be an Invention even when its Operations are Old, both Individually and in Their Relation to Other Operations.

A compound process by which a new or a changed result is produced, or by which an old result is produced in a more economical manner, may be an invention even when the operations composing it are not only old when considered individually, but are old in their relation to other operations. Let it be assumed, for example, that there were two known processes in use, the one consisting of four consecutive operations which may be designated A, B, C, D, and the other of four consecutive operations which may be designated E, F, G, H, and

let it be assumed that some person discovered that by treating the article by the first two operations of the first old process and then by the last two of the second old process, an article could be produced differing in its condition or properties from the articles made by the use of either of the old processes; or had discovered that the same article could be produced by the change with less labor or less loss of material; the new process would consist of the operations A, B, G, H, whose collective mode of operation, considered as a whole, might or might not result in the production of an article materially different from the collective mode of operation of either of the old processes. The assumed case may be considered as one of substitution of the two old operations A, B, of the first old process into the second old process in place of the two operations E, F, of the latter process. In this case if the substitution resulted in the production of an article differing in its properties or in its condition from either of the articles produced by the two old processes, that production would be conclusive evidence that the substitution was not a mere substitution, but was attended with a new mode of operation as a whole, and the new process would be an invention. Again, if the article produced by the new compound process had the same properties or was in the same condition as that produced by either one of the old processes, but the substitution of operations enabled the old article to be produced more rapidly or to be produced with a less waste of raw material, or to be produced with less labor, or to be produced by machinery instead of by hand, and therefore in each case more economically than by the old processes, that fact would be conclusive evidence of a change in the mode of operation of the process as a whole,

and the substitution of operations would not be a *mere* substitution but must of necessity be attended with a new mode of operation, and would amount to invention.

§ 32. Process an Invention if the Old Order of Old Operations be Changed with a Beneficial Result.

A change in a compound process may amount to invention when the change consists of a change in the order in which the operations are performed. Thus, in the case of the British patent of Helliwell for water-proofing cloth two materials were used, alum and soap. It had been customary to mix the solutions of these two materials and then to immerse the cloth in the liquid mixture. The change made by the patentee consisted in immersing the cloth first in a solution of the alum, and then in a solution of the soap. According to the old process the mixture and action of the two materials upon each other took place *before* the cloth was treated with them, and consequently the aluminous soap produced by the action of the materials was only superficial upon the cloth and speedily wore off. According to the new process the mixture and action of the two materials upon each other took place in the cloth itself *after* the treatment or *during* it; and consequently every fibre of it was permeated by the first solution in which the cloth was immersed, the aluminous soap was formed in the material after or upon the application of the cloth to the second liquid, and the water-proofing effect was permanent. In this case the change from the old process to the new one involved a new mode of operation attended with an improved result and amounted to invention.

§ 33. Process may be a Mechanical one only.

It has been held in substance that there cannot be a

true patentable process worked out by machinery alone; or in other words that there is no such thing as a mechanical process. This is not in accordance with the experience of expert mechanical engineers, as they recognize many mechanical processes by which crude materials are changed into manufactured products. Thus, the operations of grinding, sawing, planing, milling, and turning, are to the mechanical engineer as clearly processes as the operations of dyeing, tanning, vulcanizing and smelting. With each one of these two groups of processes one or more machines of some kind is required to enable the process to be carried out; and if the first group do not constitute processes because they cannot be practiced without the use of mechanical devices or machines, then for the same reason dyeing and tanning are not processes because vats (which are machines) are required to practice them; for the same reason vulcanizing is not then a process because its practice requires the use of steam boilers and strong vulcanizing chambers (both of which are machines), and smelting is not then a process because its practice requires the use of a furnace and a blowing engine, which are machines. Each of the first group of operations is to the mechanical mind just as clearly a process by which a change is produced in the form, condition, quality, or properties of the article operated upon, as each of the second group of operations; and in each case the operation may be practiced by the use of machines which differ radically from each other in their modes of operation. This fact may be readily shown by illustration: Suppose for example that in the manufacture of some article it became necessary to grind it with water, and then to separate the water from the

ground material. It is evident that this second operation might be effected in various ways. Thus the water might be expelled by pressure, or by subjecting the mixture to centrifugal action in a centrifugal machine, or by evaporation. Each of these three operations is distinct from the others and requires the use of machines radically different from those required by each of the other two processes; and to infer that the expulsion of water by pressure and by centrifugal action are not processes because these operations cannot be effected without machines and are therefore merely the functions of machines, while the expulsion of water by evaporation is a process because heat is required, as well as a vessel (which is a machine) and a furnace to hold the fuel (which is another machine), is to the mind of the mechanical engineer and inventor an absurd conclusion. Certainly the first person who discovered that a log could be divided into boards by the process of sawing it, as distinguished from the original process of division by splitting the log, discovered a very valuable process; and if at the same time he had invented a saw mill for doing the work and there had been a patent law in force, he should not only have been entitled to a patent for the saw mill, but also to a patent for the new process which he had discovered and which could be practiced by the use of many saw mills differing materially from the one invented by him, and some of them possibly not included in the purview of any claim he might properly have made to his machinery.

§ 34. Processes the Operations of which are Functions of Machines.

There are numerous instances in the arts of compound mechanical processes in which every operation is the

work or function of a machine. Thus the method of manufacturing flour from grain is a strictly mechanical process; the original process consisting of the two operations of grinding (to reduce the grain to a powdery condition), and of bolting or sifting (to separate the flour from the hulls or bran). Within this generation a most valuable improvement has been made in this process, by grinding the grain at first coarsely so as to crack the kernels with the least possible production of dust, and subsequently reducing the cracked kernels to powder by one or more succeeding grinding operations, each preceded by a cleansing operation by which the flakes and light specs of bran are removed before the next grinding operation. This process is distinctly the work of machines and therefore mechanical from beginning to end; but the Supreme Court of the United States declared the invention to be a patentable process (*Cochrane* v. *Deener*, 94 U. S. 780, 24 L. ed. 139), and to the mechanical engineer it is just as clearly a compound process as is the production of a light colored cotton fabric by the compound process of first bleaching the fabric and then dyeing it, notwithstanding the fact that the operations of the former (the new flour process) are mechanical, while those of the latter (the dyeing process) are chemical.

§ 35. Invention in a Mechanical Process by the Change of Order of Old Operations.

Invention may exist in a compound mechanical process as well as in a compound chemical process by reason of a beneficial change in the order of the operations performed, thereby involving a *new collective mode of operation* or *new mode of operation as a whole.* Thus, in the

common horseshoe it is well understood that the curved toe portion is required to be thinner at its inner concavely curved edge than at its outer convexly curved edge. It had been the practice to make horseshoes by machinery by the following series of operations, viz: first, compressing a straight piece of iron of the requisite length between dies or by properly formed rolls so as to give it the requisite variation in cross section at different parts of its length corresponding with the same parts of the finished shoe; second, bending the changed straight bar edgewise upon a former to transform it into the U form of the finished horseshoe. The bending operation deformed the iron, crimping it at its concave edge, and practically perfect horseshoes were not produced. Subsequently it was discovered that if the order in which the two operations were performed was reversed, so that the bar was bent into the U form first, and was subsequently compressed while bent so as to impart the desired cross sections at its different parts, practically perfect horseshoes could be produced, because the bent bar could be readily held from changing its U form during the pressing required to give it the requisite cross sections at its different parts. In this case the change was not only a change in the order of operations, but it was attended with a change in the perfection of the result attained, and was therefore a real invention. Had the change in the order of operations produced the same defective article as before, and had there been no saving in labor or in material by the change, it would have been a *mere* change in the arrangement or order of the operations and should not properly have been regarded as an invention.

§ 36. Defective Specifications of Process Patents.

According to the experience of the author much of the difficulty that has been experienced in the courts in cases involving mechanical processes has arisen from the imperfect manner in which the specifications of patents have been drawn up. Thus it is a common practice for a specification to set forth in its preamble that the inventor has made certain new and useful improvements in *machines* for doing a specific work; to follow this statement by a reference to drawings of machinery purporting *to represent the invention;* and to append a claim to doing the specific work by means of devices (named in the claim) substantially as before set forth. It is not unusual to contend before a court that such a claim is one to a process which is not restricted to substantially the means or mechanical devices described in the specification or to their equivalents; and it is not to be wondered at that courts under such circumstances have occasionally enunciated dicta against the patentability of a mechanical process, because it is plain that a claim to doing a work by certain recited means is tantamount to a claim for the recited means for doing the work, and is not a process claim; and this understanding of the claim is rendered free of doubt if the preamble of the specification states the invention as consisting of improvements in a *machine* or *machines*, without mention of a process.

§ 37. Proper Form of a Claim to a Process.

A true process claim should recite the operations of which the new process is composed in the order in which they are to be practiced, without naming any mechanical device; and the preamble of the specification should

state that the inventor has made an invention of a new and useful process; or, if he has invented both a process and a new machine for carrying it into practical effect, the preamble should state both facts. And although certain mechanical devices must always be described in the descriptive portion of a specification of a process invention to enable the process to be understood, the specification should clearly state the particular operation of the process performed by each mechanical device or group of devices that is described, so that the process claim or claims which recite the operations may be clearly understood.

MACHINES.

§ 38. Definition of a Machine.

The term *machine* comprehends every device by means of which force can be utilized or a useful operation can be performed.

§ 39. Machines Simple and Compound.

Machines may be classified as simple and compound, the former consisting of a single member or device having but one function and the latter of two or more members or parts; the class, therefore, includes tools, implements, and furniture of all descriptions, whose members are fixtures relatively to each other, as well as machines whose members move relatively to each other while operating. Simple machines are comparatively rare, a good example of one being a measure for grain; while many machines which are commonly regarded as simple are really compound. Thus a cold chisel for chipping metals is generally regarded as a simple tool or machine, yet, upon examination, we find that it really

has two members, which are the cutting point, and the shank through which the point is held and guided, and the force is applied to do the work. In this case the machine consists of a combination of two members whose functions are different; and while the result attained or work performed by the simultaneous operation of the two members is due to the action of both or the collective action of the two, the action of either one does not change the mode of operation of the other. If the cutting point be separated from the handle it still has the capacity to cut, but in this condition it would be practically valueless because of the impracticability of directing it and applying sufficient force to it. The shank when detached from the cutting point could still be grasped by the hand, could be moved in any direction, and could have force applied to it, but it would be practically valueless for any useful purpose until combined with the cutting point or with some other device. Hence it does not follow, as has been sometimes erroneously affirmed, that the members of an implement or machine are not in true combination with each other when they do not modify each others functions or modes of operation.

§ 40. Combinations as Understood by the Courts.

As the Patent Law was generally understood in this country up to about 1870, *whenever two or more devices were connected together so as to operate to produce a result which was due to their collective operation*, the connected members constituted a combination properly so-called, and properly patentable (if new and useful and not within the exceptions previously mentioned, § 6, *ante*), whether that result was due to the consecutive operation of the

members or to their simultaneous operation; and whether all operated at all times, or some one or more members operated at one time and some one or more at another time; and whether all the members co-operated to produce the same product or result, or some co-operated to produce one product or result, and others another product or result.

§ 41. New Doctrine of Aggregations.

But of late years a new doctrine has been promulgated with reference to a new and useful combination of devices, viz:

"The combination, to be patentable, must produce a different force, effect, or result in the combined forces or processes from that given by their separate parts. There must be a new result produced by their union; otherwise it is only an aggregation of separate elements?" *Reckendorfer* v. *Faber*, 92 U. S. 347, 23 L. ed. 719.

This doctrine of *aggregation* was enunciated by the Supreme Court in a case in which a lead pencil was fitted at one end with a piece of rubber, so that the same wooden holder or handle presented at one end the lead for making marks and at the other end the rubber or eraser for erasing marks. The whole constituted an exceedingly useful tool or implement which in various forms is in common use ever since the original invention was made. It is proper to say that the patentee in the Reckendorfer case was not the original inventor of the broad combination of holder or handle, pencil-lead, and rubber eraser, as this had been previously invented by Lipman, but was only an improver. As, however, the patentee had claimed a combination, the court took occasion to state its new theory of the law

on that subject, and therefore this case is referred to. It is extremely difficult for a mechanic to understand this doctrine as communicated by the decision, especially in view of the illustrations given by the court of the things constituting in its opinion true and patentable combinations. In reference to the combined pencil and eraser the Court says: "The handle for the pencil does not create or aid the handle for the eraser. The handle for the eraser does not create or aid the handle for the pencil. Each has and each requires a handle the same as it had and required without reference to what is at the other end of the instrument, and the operation of the handle of and for each is precisely the same, whether the new article is or is not at the other end of it."

To the mechanic the above statement appears to be a mechanical mistake, because there was but one handle for the two end devices (lead and eraser), the handle being reversible in the hand of the user; and, because, if the statement had been true, the movement of the holder and pencil lead could not possibly have moved the eraser, and the movement of the same handle (or holder) and eraser could not possibly have moved the pencil lead; whereas it was a matter of visual perception that the movement of the one handle or holder carried with it both the lead and the eraser in every one of its movements, and did this because the three were immovably connected and combined together so as to form a single compound implement.

As an illustration of a patentable combination contrasted with the so-called "aggregation of separate elements" contained in the combined pencil and eraser, the court referred to a stem-winding watch, which,

strangely, is in precisely the same category with the combined pencil and eraser. Of this watch the Court says:

"The office of the stem is to hold the watch, or hang the chain to the watch; the office of the key is to wind it. When the stem is made the key, the joint duty of holding the chain and winding the watch is performed by the same instrument. A double effect is produced or a double duty performed by the combined result. In these [among them the stem-winding watch] and numerous like cases the parts co-operate in producing the final effect, sometimes simultaneously, sometimes successively. The result comes from the combined effect of the several parts, not simply from the separate action of each, and is, therefore, patentable."

Now, when we endeavor to understand the distinction which the court attempted to elucidate between an unpatentable aggregation and a patentable combination, we are confronted with the following facts: When the watch is in the pocket or is hanging from the chain, the chain is operating through the stem, either to secure the watch or to hold it, but the winding mechanism connected with the stem is then temporarily inoperative; and when the combined pencil is used to erase, the rubber is operated through the holder or handle but the pencil lead (although held by the pencil holder) is then temporarily inoperative: When the winding mechanism of the watch is being operated by the stem, the chain is not operating (as the watch during the winding must necessarily be held firmly by the hand) and the chain is merely held by the stem ready for operation when required; and when the pencil lead is operated by the holder, the rubber eraser is not operating and is merely

held by that holder. The chain on the watch does not affect in any manner the operation of the winding mechanism, nor does the latter in any manner affect the operation of the former; so also with the combined pencil, the eraser does not affect the operation of the pencil lead, nor does the latter affect the operation of the former.

The Court said, "When the lead is used, it performs the same operation and in the same manner as it would do if there were no rubber at the other end of the pencil;" so with the watch, when the winding mechanism is used it performs the same operation and in the same manner as it would if there was no chain hanging from the ring of the stem. The Court said further of the combined pencil, "When the rubber is used, it is in the same manner and performs the same duty as if the lead were not in the same pencil;" and in the watch we find that when the chain is used to hold the watch, it is in the same manner and performs the same duty as if the winding mechanism were not in the watch connected with the same stem that holds the chain. The stem in the stem-winding watch undoubtedly connects the chain and the winding mechanism so that the three are combined in one compound implement or machine; and in like manner the holder connects the lead and the rubber eraser so that these three are combined in one compound implement or machine. The stem of the watch undoubtedly does "a double duty," that of holding the chain so that it may operate when required and that of operating the winding mechanism so that it may be operated when required; and in like manner, the holder of the pencil does "a double duty," that of holding the rubber eraser so that it may be operated when required, and that of operating the pencil lead so that it may be operated when required.

If we take the view that it is the watch and not the chain that is held by the stem, the above comparison is equally correct, because, when the stem is operating to hold the watch, the winding mechanism is not being operated; and when the pencil holder operates the eraser, the lead is not being operated. On the other hand, when the stem is used to operate the winding mechanism the former is not operating to hold the watch (which is then of necessity held directly by the hand); and when the pencil holder is used to operate the lead, it is not used to operate the eraser.

If the stem winding mechanism, and chain or watch, constitute a patentable combination because the stem performs a duplex function, it is impossible for a mechanic to perceive why the pencil handle or holder, lead, and eraser, do not equally constitute a patentable combination because the handle or holder performs a duplex function; and if the former is a patentable combination, while the latter is an unpatentable aggregation, this conclusion is merely a matter of opinion.

§ 42. Result of Doctrine of Aggregations.

If this new doctrine of aggregation be sound, then a host of new and useful machines and implements which have been invented and patented are unpatentable aggregations. Thus every compound tool, however novel and useful, is an unpatentable aggregation. Take, for example, the common carpenter's hammer, with a striking face at one side of its helve or handle and a claw at the other side. Whenever it was produced it was a new and most useful invention in the common sense understanding of that term. It consists of the combination of the handle, striking head, and claw, in which the three are

so combined that the handle performs the duplex function of swinging the striking face for delivering a forcible blow, and of lever for operating the claw to draw a nail. According to the common sense view of a mechanic, the three are not only connected but are combined for operation; but according to the view of the court given in the Reckendorfer case "the parts claimed" (by the common sense mechanic) "to make a combination are distinct and disconnected" as a matter of law, and the tool as a whole "is only an aggregation of separate elements;" and was not an invention.

Take again the case of a machine whose members move relatively to each other while operating. The old "speeder" or "fly-frame" for spinning cotton had a single row of spindles upon the spindle-rail at the front of the frame, and all these spindles were driven by a single driving shaft through the intervention of suitable gearing. Davoll improved this machine by arranging a second row of spindles in the same machine upon the same spindle-rail, the second row being behind the first row and the spindles of the second row being opposite the spaces between the spindles of the first row. Both rows were driven by the same driving shaft. By the improvement only about half the floor space was required for the same number of spindles as with the single row machines; hence one double row machine did about the work of two single row machines, and did it more economically because, as there were about twice as many spindles in the same length of machine, one operator could attend to a larger number of spindles; and as but little additional gearing was required over that for the single row, there was a less loss in friction and less power was required than with the same number of spindles

arranged in single rows in two machines. In the Davoll machine the same single driving shaft was combined with two sets of spindles, and performed the duplex function of driving the two distinct rows; but each spindle of each row spun its separate yarn and the operation of one spindle did not affect in any manner the operation of any other one, the number of yarns spun being produced by the separate actions of the spindles. The improvement was new and was exceedingly useful because of the advantage in a large cotton factory of being able to do about double the work in the same space and with a reduction of the labor and power per pound of cotton spun. The change made by the inventor was not a *mere* duplication of the mechanism of the old machine, because in that case every part of the machinery would have been duplicated; whereas a large portion of it remained unchanged. The change was not a *mere* change in size of the old machine, because in that case the changed machine would have been about twice as long to accommodate about double the number of spindles; whereas the length of the machine remained substantially the same. The improved machine was patented; was it a patentable combination or an unpatentable aggregation of separate elements? In the Reckendorfer case the court sets forth the proposition that: "The combination, to be patentable, must produce a different force, or effect, or result, in the combined forces or processes, from that given by their separate parts. There must be a new result produced by their union; if not so, it is only an aggregation of separate elements." The word "result" here is evidently intended to mean a single result produced by the combined action of all the elements, because the court illustrates its views by refer-

ence to a saw-mill in which the combined action of a saw and a log-carriage produce the single result of a board. In the old fly-frame, however, each separate spindle did its own work; and when the machine was changed by Davoll the additional spindles did not affect in any manner the separate operations of the old spindles in producing yarns, or of the mechanism for driving them, or the separate yarns spun by them, although both the new and the old spindles were combined by the frame of the machine and by the single driving shaft and intermediate gearing which operated them simultaneously. Judged, therefore, by the law of the Reckendorfer case, the Davoll improvement was legally only an aggregation of separate elements. The jury in the case of *Davoll* v. *Brown* under the patent, being men of ordinary common sense, were of a different opinion, as they found a verdict for the patentee; and the judge before whom the case was tried appears to have agreed with them. Subsequently a motion came before *Judge* Woodbury for a new trial on the ground of alleged errors in the charge to the jury and in the specification of the patent; and this motion was refused. *Davoll* v. *Brown*, 1 Wood. & M. 53.

Another dictum laid down in the Reckendorfer case is as follows, in reference to the illustrations given by it of patentable combinations: "In these and numerous like cases the parts co-operate in producing the final effect, sometimes simultaneously, sometimes successively. The result comes from the combined effect of the several parts, not simply from the separate action of each; and is, therefore, patentable." The Davoll case is an instance that this proposition is not sound mechanically when applied to machines whose members (the spindles) ope-

rate upon articles (yarns) which are separate from each other and constitute separate effects or results.

Let us next consider how this same dictum applies to some machines in which the members operate upon the same material. Take the case of a harvester. The cutting apparatus cuts the grain and then its work upon the article is ended. The platform behind the cutting apparatus receives the cut grain as it falls, but without altering or affecting in any way the operation of the cutters or the cut grain produced by its action, and without aiding the work of cutting. The rake gathers the grain which falls on the platform and discharges it. Now it may properly be said that the platform and the rake co-operate (giving this word the meaning evidently intended by the court from the illustration of the sawmill), the result of their combined action being the gathering of the cut grain and its delivery in a gavel; but what have these two devices to do with the action of the cutting apparatus? Is not this clearly a case where the result produced by the machine comes simply from the separate actions of the cutting apparatus first, and of the combined platform and rake afterwards? Was the man who first combined (using the word in a mechanical sense) an automatic rake with the cutting apparatus and platform of a harvester, an inventor of a patentable combination of cutting apparatus, platform, and rake, or the producer of "only an aggregation of separate elements?" The Supreme Court before the days of the Reckendorfer decision appears to have been of the opinion that the self-raking harvester was a patentable combination, as in the case of *Seymour* v. *Osborne*, 78 U. S. 11 Wall. 516, 20 L. ed. 33, they decided that the combination of a cutting apparatus, a platform of a particular form, and

a sweep-rake, was a patentable combination; even when every one of these elements considered separately was not only old, but was found in other but different combinations in older harvesters. The court in this case was undoubtedly governed by the rule of law then practically in force, viz: that the new mode of operation produced by the new combination was conclusive evidence of invention, the new mode of operation being the *collective operation* of the combination as a whole.

§ 43. Mechanical Difference Between an Aggregation and a Combination.

The difference between an aggregation and a combination is well understood by mechanics and may be illustrated as follows: Let a stool be placed near a table so that a person sitting upon the stool can bear his back against the rim of the table. The function of the stool in this association of devices is to support the weight of the sitter at a convenient distance from the ground; while the function performed by the table is to hold the back of the sitter upright. The two articles are disconnected in the common sense understanding of the term, and neither affects the other or the work done by the other. This is a case of mechanical aggregation. Now assume that the piece of the table or back-rest against which the sitter leaned his back is removed from the residue and is connected with the stool by uprights at one side of the seat. We then have a chair in which the same elements (stool and piece taken from the table) perform the same functions as before, so far as the sitter is concerned; but, in the case of the chair, the piece taken from the table and now constituting part of the chair is sustained in its operating position by the stool,

and the two form members of one compound machine. In this case there is a clear mechanical combination of stool and back-rest, forming the piece of furniture commonly called a chair.

Take again the case of the multiple watch key. The common watch key had a single pipe (for fitting and turning the square winding stem of the watch) combined with a holder for holding and turning the pipe. As the winding stems of different watches vary in size, six different keys of different sizes were required by a watch repairer. Subsequently, six pipes of the progressive different sizes were combined radially with a single holder so as to project from it like the spokes project from the hub of a wheel. The six separate keys when laying side by side on a work bench, or if tied together in a bundle, constituted an aggregation; the six pipes of different sizes connected with one holder which is common to all constitute a mechanical combination. The compound tool was a new and exceedingly useful one, as it saved the time required to take up and put down several of the single keys in order to find one that would fit the watch to be wound. The new tool when first produced was not a *mere* duplication or multiplication of the old single tool, because in that case it would have had six holders as well as six pipes; nor was it a *mere* multiplication or duplication of the pipes of any one of the single keys, because in that case its pipes would have all been of the same size. It had a new mode of operation in the mechanical sense, because it had the capacity or property of winding all the different sizes of winding stems, while each of the old keys could wind those of but one size; and this new capacity or property was, mechanically speaking, a new result. The

compound watch key seems simple and obvious enough *after its invention;* if it had been both *before its invention*, it would undoubtedly have been produced as soon as watches were made with winding stems of different sizes.

Again, in the early stage of the manufacture of cut nails in this country, tapering slips of iron were cut successively from a piece of nail plate by a machine having knives or cutters operated by power. These slips were picked up by an operator and presented one at a time to a second machine by which they were gripped near the larger end, and the larger extremity projecting beyond the grippers was compressed endwise or, technically speaking, upset, to form the head of the nail. As the two machines stood side by side, they constituted an aggregation, it being immaterial whether or not one worked at identically the same speed as the other. An ingenious mechanic put together those members of the two machines which acted directly upon the material, and connected them with one driving shaft so that they operated in concert and so that the slip cut by the cutting devices passed directly to the grippers and heading tool, all secured and operated in the same frame. The same devices performed precisely the same functions as they did in the two distinct machines, and so far as the product was concerned (the complete nail) there was no new result. But when the devices were put together in one machine, two things had to be done; first, to conceive mentally that the devices could be combined and in what manner; second, to combine them mechanically by a frame so that they were held in their proper relative positions for operation, and to combine them also with the same driving shaft (through intervening power

transmitting devices) so that their several operations were properly timed and that the grippers and header were in the proper positions to receive the cut slip when it was delivered by the knives or cutters; in other words to combine them so that the several acting devices would operate in concert. The new machine thus produced had a new collective mode of operation, which as a whole did not exist in either of earlier two machines, viz: it cut, gripped, and headed, and performed these three operations consecutively and in concert. This result was a new mode of operation, although the resulting product (the nail) was old; and the new machine was, in the estimation of a mechanic, a true and patentable combination, notwithstanding the fact that the action of the cutting members or devices was not affected or changed by the addition of the grippers and header, or that the action of the last two was neither affected nor changed by the addition of the first.

§ 44. Conditions under which a Combination Exists.

The foregoing instances show that a mechanical combination exists when two or more devices are connected, so that one sustains the other in doing its work or performing its function, even though neither moves when operating; also, when two or more devices are so connected that the result of the connection is a duplex or multiplex mode of operation, and that the combination as a whole has a duplex or multiplex capacity or property; also, when two or more devices are so connected in one machine or implement that it has a new collective mode of operation, although the said devices operate separately and successively, and although neither affects the peculiar function of the other or acts upon

the article at the same moment with the other to produce the result by simultaneous joint action; also when two or more devices are so connected in one machine as to operate successively in concert to produce a result which is due to their successive concerted actions; as well as when, as in the case of the saw mill referred to in § 42, two or more devices are connected in one machine so as to operate simultaneously to produce a result which is due to their simultaneous joint action. The examples also show that the result attained is not necessarily the production of a new article, but is frequently the new collective mode of operation effected in producing an old article, or in accomplishing an old purpose.

§ 45. Patentable Combinations.

In order that the combination may be patentable it should not fall within any one of the exceptions mentioned in § 6, *ante;* and there is no objection to the requirement that the result of the combination shall be new, provided the real result be considered. Thus in the case of the illustration of the stem-winding watch set forth as a patentable combination by the Supreme Court, that court conceded that there was a new and double or duplex effect or result, the same stem performing two distinct duties which were not performed simultaneously; but, while precisely the same kind of double or duplex effect or result was performed by the single handle or holder in the compound pencil combination, the court was unable to perceive the fact. And it is often the case that the real result is not appreciated. Take the case of a cart from which the axle-tree and wheels have been removed, we may say that the result of its use in that condition is to hold articles and

to enable them to be moved by a horse; add the axle and wheels and we may say that the result is the same as before, because in both cases the cart body will hold articles and the shafts enable the articles so held to be moved by a horse. This conclusion as to the result in the last case is mechanically unsound, because it comprises only a part of the real result of the cart with wheels, as compared with the combination of a cart body and shafts without wheels; the real result of the former being not only to hold the articles and enable them to be moved by a horse, but also to enable the articles to be held and moved with greatly reduced friction and force. In like manner the real result in a compound tool is its duplex or multiplex capacity; and it often happens that when the product of a machine is an old result in product, there is, nevertheless, a new result consisting in a new mode of operation, either collective or collective and joint, by which that old product is produced.

§ 46. Substitutions in Old Combinations Patentable.

In the progress of invention many primary or generic combinations have been devised for performing useful operations, and many improvements upon such primary combinations have been made in which one or more of the devices of the primary combinations have been replaced by others of the same genera but of different species. It is a common defense in suits under patents for such secondary or specific combinations, as they may be termed, to contend that the substituted devices are *mere* equivalents or substitutes for those which they have replaced in the primary or generic combination, and that, therefore, the secondary combination of species

which have never before been combined is not an invention. If, however, we test the case by the principles previously laid down it is easy to decide whether the change is a mere substitution of one well known device for another, or amounts to an invention which is patentable.

As an illustration of such a case of specific combinations amounting to invention, we have the Earle shingle mill with the circular saw previously referred to. § 15. We have another illustration in the Crompton loom for fancy weaving (patent dated November 24, 1837; subsequently extended, and reissued September 13, 1853). The new combination produced by Crompton was composed of four devices called respectively the pattern cylinder, the series of double hooked jacks, the lifter, and the depressor. The jacks were upright bars connected with the leaves of heddles by which the warp threads were put into their proper relative positions for the passage of the shuttle, or technically the shed was opened for that passage; some of the warp threads being raised above a mean line by the depression of the proper jacks while others were lowered or drawn down from the same line by the lifting of others of the jacks. Each jack was constructed with two hooks in reversed positions, one near each end of the jack. The lifter and the depressor were horizontal bars arranged crosswise of the jacks, and they had reciprocating rising and descending motions imparted to them, preceding each throw of the shuttle. Hence, if the upper hook or hooks of any one or more jacks were held within the range of movement of the lifter, it or they were raised; and if, at the same time, the lower hook or hooks of any other one or more jacks were held within the range of movement of

the depressor, it or they were depressed or drawn down. The pattern cylinder was a barrel which carried a pattern chain and was partially turned one step at a time for each movement of the shuttle, and just before the lifter and depressor were moved. The pattern chain carried by this cylinder was fitted with projections separated by spaces. When the jacks were in their normal positions the lower hook of each was within the range of movement of the depressor; but when by the turning of the pattern cylinder a projection of the pattern chain came opposite any jack, that jack was moved so that its hook was put within the range of movement of the lifter so as to be lifted by it, the lower hook of the same jack being simultaneously moved out of the way of the depressor. When a space of the pattern chain came opposite the same jack, that jack resumed its normal position with *its upper hook out of the range of the lifter* and with its lower hook within the range of movement of the depresser so as to be drawn down by it. As the jacks were connected with the heddles that controlled the warp threads, and as the jacks were controlled by the pattern chain for being lifted and for being depressed, the variation of the projections of the pattern chain varied the figure of the weaving. In this combination the pattern cylinder was simply turned, in order to cause the pattern chain to change the positions of the jacks, and was not moved in any other way.

The defendant set up that there were two old looms in one of which (called the Witch loom) the same pattern chain as Crompton's was combined with a depressor (but without a lifter) and with single hooked jacks, each having a hook at only one of its ends. In this case the shed was opened by the movement of some of the warp

threads in one direction only, the return movement in the reverse direction being effected by weights; and it was conceded that to open the shed in this way, that is, by moving a part of the warp threads in one direction only, strains the warp. In the other old loom, that of Jones and Milldun, there was a combination of double hooked jacks, a lifter, and a depressor, with a pattern cylinder which carried a pattern chain unlike Cromptons in the respect that, in order that it might operate upon the jacks, the pattern cylinder had not only to be turned but had to be swung from and towards the jacks for every resetting of the latter. The defendants insisted that Crompton having knowledge of both the old looms, no invention was required to combine the pattern cylinder (with its chain) of one old loom, with the double hooked jacks, the lifter and the depressor of the other old loom; and therefore that Crompton's combination was not an invention but a case of mere substitution. As in the shingle mill case, some witnesses expressed their opinion in favor of this view of the defendant and some expressed the opposite opinion. The fact, however, appeared that Crompton's new combination, while using the old double hooked jacks, and lifter and depresser, dispensed with the swinging movement of the pattern cylinder previously used in combination with those devices; and that while using a pattern cylinder which was old in a different combination, it avoided the straining of the warps that attended the use of that different combination.

The judge (Curtis), when charging the jury, stated the law to be as follows:

"The true inquiries for you to make in this connection are whether the combination made by Crompton

was new and useful? If it was a new and useful combination within the meaning of the patent law, it was the subject-matter of a patent, and is not important whether it required much or little thought, study, or experiment to make it, or whether it cost much or little time or expense to devise and execute it. If it was a new and useful combination of parts, and he was the first to make the combination, he is an inventor, and may have a valid patent. When I say it must be new, I do not refer to the materials out of which the parts are made, nor merely to the form or workmanship of the parts, or to the use of one known equivalent for another. These may all be such as never existed before in such a combination, and yet the combination may not be new, in the sense of the patent law. To be new in that sense, some new mode of operation must be introduced. And it is decisive evidence, though not the only evidence, that a new mode of operation has been introduced, if the practical effect of the new combination is either a new effect, or a materially better effect, or as good an effect more economically attained by means of the change made in the combinations of the patentee. A new, or improved, or more economical effect, attributable to the change made by the patentee in the mode of operation of existing machinery, proves that the change has introduced a new mode of operation, which is the subject-matter of a patent; and when this is ascertained, it is not a legitimate subject of inquiry, at what cost to the patentee it was made, nor does the validity of the patent depend on an opinion formed after the event, respecting the ease or difficulty of attaining it. Witnesses have described to you the practical advantages of Crompton's loom over any other loom for the weaving of fancy

fabrics, previously known, and have pointed out the cause of these practical advantages. They attribute them to the modification made by Crompton in the Jones and Milldun loom, changing the double action of the cylinder to a single rotary motion. If this is so, if he first made this modification, and thus made a combination not only new in fact, but which produced the practical advantages described, he was entitled to a patent for that combination, though each one of its elements were known before, and two out of three of those elements had actually been combined in the Jones and Milldun loom. When he introduced the third element, which had not previously been combined with the others, and thereby made a better loom, he made an invention within the meaning of the patent law." *Furbush* v. *Cook*, 2 Fish. Pat. Cas. 671.

The jury being men of common sense found for the plaintiff; and it will be noticed that the action of the judge in this case corresponds with that of *Judge* Story in the shingle mill case, and embodies the principle referred to in § 15, *ante;* and also with the action of the United States Supreme Court in the case of *Seymour* v. *Osborne*, referred to in § 11, *ante;* the collective mode of operation of the Crompton combination being new.

§ 47. Devices Required to Make a Patentable Combination.

In the consideration of complex machines the question frequently arises how many or how few of the members of the entire machine are required to constitute a proper combination; one of the common objections in the Patent Office to the grant of claims to combinations being that they do not recite all the parts of the machine that are

necessary for producing a useful result, and therefore that the combination as recited in the claim is inoperative and unpatentable. The same objection has been set up as a defense in patent suits before the courts. The objection when made in the Patent Office has been overruled on many occasions upon appeals taken to different Commissioners of Patents from adverse decisions by the Primary Examiners and by the Board of Examiners in Chief; but still the same objection is frequently made, thereby subjecting the applicant to delay and to the expense of combating an unreasonable objection. The courts have frequently denied the sufficiency of such an objection as a defense in a patent suit, the clearest statement on the subject being that made by Judge Curtis in the Crompton Loom case previously referred to. In that case the defendants insisted that the claim was invalid because the shed of warp threads for the passage of the shuttle could not be formed without a fourth part not recited in the claim; namely, certain inclined wires, whose office was to hold in position those jacks which were not operated upon by the pattern cylinder, so that the depressor would engage with their hooks in sinking; and that it was necessary to embrace this fourth element in the claim to make the combination an operative one. The court (Curtis, *J.*) charged the jury as follows:

"Nor is it requisite to include in the claim for a combination, as elements thereof, all parts of the machine which are necessary to its action, save as they may be understood as entering into the mode of combining and arranging the elements of the combination. If inclined wires are necessary to the action of the combination specified, so are many other parts of the machine, and

all parts necessary to the action and combination specified might be said to enter into the mode of combining and arranging the elements of the combination, but need not be and ought not to be included in the combination claimed." *Furbush* v. *Cook*, 2 Fish. Pat. Cas. 669.

If the objection that a claim does not recite all the devices that are required in an operative machine were sound, it would follow that many new sub-combinations of devices having members less than sufficient to accomplish by themselves a *complete* useful result would be unpatentable. Take the case of the Crompton loom, above referred to, what complete useful result can be accomplished by that combination, even with the wires added, considered apart from the loom in which it is a combination subordinate to the loom as a whole, and therefore what is commonly known as a sub-combination? Its function in the loom is only to move the warp threads according to the design determined by the pattern chain; but the warp threads might be moved forever without accomplishing any complete useful purpose unless the sub-combination were used in connection with, among other devices, a shuttle and mechanism for throwing the shuttle through the shed that is opened and closed by the Crompton combination; so that the warp threads moved by that combination and the filling or weft thread carried by the shuttle may be combined to form cloth as the complete useful result.

The objection if sound also would prevent the granting of patents for a host of useful machines and implements which cannot accomplish a complete useful result until applied to others. Thus, a door lock is incapable of performing a complete useful result until it is applied to a door, and yet no mechanic would deny that the

members of a door lock constitute a patentable combination. If, also, the objection were sound, the frame of every machine and every bolt, nut, screw, shaft, and cogwheel would have to be recited in every claim, because if these be omitted in constructing the machine, the members recited in the claim could neither be held in their operative positions nor operated practically, and the detached members lying upon a floor would amount only to an aggregation of those members. The objection therefore is absurd, the fact being that when a patentee states "I claim the combination of" such and such devices the use of the term combination implies whatever combining mechanism is required to enable the recited members or devices to operate in concert substantially as described in the descriptive part of the specification. Moreover, when a new sub-combination exists in an operative machine, the fact that the machine as a whole will operate is conclusive evidence that the sub-combination forming part of the machine is operative, however few its members may be as compared with the entire number of members of which the machine as a whole is composed. The sub-combination is therefore useful and operative to make the complete machine of which it forms part; and in many cases it may be equally useful and operative to form a part of other machines in which it can be used with advantage; and if it be new and useful and not within the exceptions mentioned in § 6, the inventor has a right to it wherever it may be used.

§ 48. Rule as to Combination Claims.

The proper rule as to claims to combinations appears to be as follows, viz:

An inventor is in every case entitled to a claim commensurate with his invention, and the combinations invented by him may be generic, specific, peculiar, or particular according to the circumstances of each case.

§ 49. Generic Combination.

If the inventor be the first who combined devices of two or more distinct genera to produce a useful result, he is entitled to a claim that will secure to him the use of the combination of those genera, without restriction to any particular species of those genera, and without recital in his claim or restriction to the peculiarities of the combining mechanism by which he has combined the devices. The invention then consists of the generic combination of the two or more devices, and the claim is a generic claim with the legal effect that a subsequent new combination of particular species of the same genera of devices is included in the purview of the generic claim notwithstanding the fact that the subsequent new combination has an improved mode of operation, or accomplishes an additional function to that effected by the generic combination first made.

§ 50. Specific Combination.

If the generic combination be old, and a subsequent inventor be the first to combine two or more species of the same genera of devices in such manner that a new collective mode of operation is attained which is not attained by the old generic combination made by the first inventor (as was the case with the combination of the Crompton loom and with the harvester of Seymour), such subsequent inventor is entitled to a claim that will

secure to him the use of the combination of those species having the mode of operation described in the narrative part of the specification, without recital in the claim of, or restriction to the peculiarities of the combining mechanism by which he has combined his species of devices. The invention then consists of the combination of two or more specific devices, and the claim is a specific one, which while it does not include all the genera of devices of which the claimed devices are species, has the legal effect that a subsequent new combination of other species of the same genera, which new subsequent combination has the improved mode of operation incident to the patented specific combination, even though accomplishing an additional function thereto or attended with a new mode of operation as a whole, is included in the purview of the specific claim.

§ 51. Peculiar Combination.

If the generic combination be old and an inventor be the first to combine the same genera of the generic combination by means of combining mechanism differing from that previously used with the old generic combination, but attended with a new mode of operation, he is entitled to a claim that will secure to him the use of the combination of the genera by means of the peculiar combining mechanism used by him, and the combination is distinguished not only by the character of the generic devices but also by the peculiar mode of operation of the new combining mechanism by which the generic devices are combined. The claim should in such case recite not only the principal generic devices, but should also recite the combining mechanism either by name or by mention of the new mode of operation produced by it. In such

case the invention consists of the peculiar combination of two or more generic devices, and the claim is a peculiar one, which while it does not include the old generic combination of the principal devices nor new combinations of those generic devices by means of combining mechanism operating as the combining mechanism of the old generic combination did, has the legal effect of including within its purview subsequent new peculiar combinations having combining mechanism which produces substantially the same mode of operation as the combining mechanism of the claimed peculiar combination does, even though improved methods of operation be attained by the new subsequent combination.

§ 52. Particular Combination.

This last rule is sound with reference to new combinations of specific devices by means of particular combining mechanism not previously used in producing the combination of the same species of devices; and in such case the claimed combination is distinguished by the combined characteristics of the species of devices that are combined and of the combining mechanism. The claim in this case is a particularly restricted one, which should recite not only the principal specific devices, but should recite also the particular combining mechanism either by name or by mention of the particular mode of operation produced by it; and the claim is a particular one. Such a claim is generally very restricted in its purview; but if new and productive of a new collective mode of operation, is nevertheless entitled to include in its purview equivalents for the various devices required by its language.

§ 53. Four Classes of Combinations.

Combinations may therefore be classified as Generic, Specific, Peculiar, and Particular; and instances of these four classes are found in the history of every useful art.

§ 54. Instance of a Generic Combination.

In the history of the steam engine in the United States, the first cut-off valve which was used to cut off the supply of steam from the boiler to the cylinder before the stroke of the piston was completed, thereby permitting the steam between the cut-off valve and the piston to expand during the residue of the stroke, was a disc valve placed in the steam pipe and operated by a cam upon the engine shaft. This cut-off valve was supplementary to the ordinary steam valves of the cylinder, the cut-off valve being arranged between the boiler and the steam valves; and the cam was secured rigidly on the engine shaft, so that the cut-off of the steam was invariable, being generally effected at half the stroke of the piston. Here we have a combination of the steam cylinder, the cut-off valve, and means for operating the latter; and as this was the earliest combination of these three kinds or genera of members, it was a generic one, and the claim should have been broad enough in its purview to include every species and location of cut-off valve which was adapted to the work, and every species of operating means capable of operating the cut-off valve for the purpose required.

§ 55. Instance of a Specific Combination.

Subsequently, the mechanism for operating the cut-off valve was modified and was combined directly with the customary steam valves of the engine. This change

enabled each steam valve (which admitted steam to the steam cylinder) to do also the work of cutting off the supply of steam thereto at a fractional part of the stroke of the steam piston, and dispensed with the supplementary cut-off valve. The improvement was a valuable one, not only on account of the saving of the cost of the supplementary cut-off valve previously used, but also because the position of the cut-off valve, when it is also operated as the steam valve, is the closest possible to the cylinder, so that there is the least possible quantity of steam additional to that in the steam cylinder to be expanded; and the economy is greater than with the previous supplementary cut-off valve. The cut-off mechanism in this case was invariable as with the first of generic combination. The new combination consisted of the steam cylinder, the steam valve, and the means for so operating the latter as to cut off the supply of steam by its action; and the combination was a specific one. The claim in this case should have included in its purview every species of steam valve used as the cut-off valve, and every species of mechanism that could be combined with it so as to operate it as required to admit the steam and to cut off its supply from the boiler at a fractional part of the stroke of the piston.

§ 56. Instance of a Peculiar Combination.

Another step in the art was to make the device which operated the cut-off valve mechanism of such construction that its operation was variable, so that the cut-off could be adjusted to take place at any desired fractional part of the stroke of the piston. The combination then consisted of the steam cylinder, the cut-off valve, and the variable means for operating the latter with the

capacity of adjustment. It is plain that the variable means could be combined either with the steam valve operating as a cut-off valve, or with a supplementary cut-off valve, that is with all the species of valves included within the purview of the generic combination; but as the combination claimed must have been restricted in view of the previous state of the art to the variable capacity of the combining mechanism, the combination would be classified as a peculiar one, although it should have included in its purview every species of valve capable of being operated in the combination as a cut-off valve, and every operative location for such a valve, as well as every species of variable mechanism adapted to operate the cut-off valve variably.

§ 57. Instance of a Particular Combination.

Still a further step in the art was to combine the steam cylinder with a particular species of cut-off steam valve known as the drop-valve, and with variable mechanism for operating it so that the cut-off steam valve could be liberated from the mechanism by which it was opened to admit steam to the cylinder at the commencement of the stroke, and could be permitted to drop independently of that mechanism, and to drop and cut off the supply of steam at different fractions of the stroke of the piston of the steam cylinder, as found expedient. The combination in this last case consisted of the steam cylinder, the steam valve, and the variable liberating mechanism by whose action the steam valve was opened and liberated. The combination, in view of the preceding state of the art was necessarily restricted to the steam valve and to the variable liberating mechanism for operating it; and the combination of the claim would

be classified as a particular combination. It should nevertheless have included within its purview every variety of steam valve that could be operated as a drop cut-off valve, and every species of variable liberating mechanism that was adapted to open and liberate such a valve with the capacity of variability in the time of liberation.

§ 58. Multiplicity of Combinations Possible.

The foregoing illustrations do not imply that the combinations referred to as illustrations were the only ones that could have been or were properly patented, because there actually were in the useful art of steam engineering a number of modified combinations of the last three classes, commonly known as "valve motions," which were new and useful and had special new collective modes of operation that distinguished them from others previously known, so that they were not within the exceptions previously stated in § 6, and consequently constituted inventions. A corresponding state of facts may and generally does occur in every useful art.

A MANUFACTURE.

§ 59. Definition of a Manufacture.

The term manufacture or article of manufacture is generally applied to articles of utility made by hand or by machinery, or in other words to manufactured products or articles of merchandise, such, for example, as cloths, baskets, articles of clothing, pottery, glassware, nails, screws, etc. But the term "manufacture" as used in the United States Patent Law, has a very indefinite meaning, arising from the fact that many com-

posite articles which are really articles of manufacture, are claimed in patents as combinations of the members composing them, and are therefore regarded by the courts as within the category of machines. It is possible that this peculiarity of the language of the claims, coupled with a legal idea that a combination cannot exist unless the members operate jointly to produce a result, has led to the modern doctrine of aggregations. If this be the fact, the difficulty should be obviated by patentees claiming as articles of manufacture many composite articles such as stoves, furniture, articles of clothing, tools, and implements, whose members do not move relatively to each other while doing the work for which they are designed.

An article of manufacture properly so-called should be distinguished by its peculiar properties, qualities, mode of operation, or structure. Thus, when an india rubber shoe was first produced, it was distinguished from all shoes previously produced of raw hide, leather, or cloth, by the property or quality of impermeability to water; and had such an article been produced first in the United States and a patent taken out for it, the claim should have been for a foot covering impermeable to water as a new article of manufacture. The claim in such case should not have been simply for an india rubber shoe; because as such a shoe was the first known foot covering that was impermeable to water, the claim should have been commensurate with the invention, and should therefore have been broad enough to comprehend a foot covering having that impermeable property, whether made of india rubber or equivalent material (such as gutta percha, subsequently found) capable of imparting the impermeable property to that particular class of manufactured articles.

§ 60. Invention in an Article of Manufacture.

When considering this matter of a manufacture let us again consider the case of the carpenter's claw hammer. See § 42, *ante*. It is an article comprising in one structure the property of applying a forcible blow and the property of drawing a nail. It is a composite structure, having a helve or handle compounded with a striking head and a claw; no one of these members moves relatively to the other two in operating; and when it was first invented, it might properly have been claimed as an article of manufacture consisting of a handle, a striking head, and a claw, combined in one implement; the term implement being in this case used advisedly, because from its derivation (*in* and *plere*) it implies an article which fulfills a want. Had the court seen fit in the case of the Reckendorfer composite pencil and eraser to consider it as an article of manufacture distinguished by the peculiarities that the same handle or holder was fitted or combined (using this term in the mechanical sense previously explained, § 42) at its opposite ends with a marker and an eraser, the doctrine of aggregations although invented by counsel to win a patent cause might never have been adopted by a court. In the stove case (*Hailes* v. *Van Wormer*, 87 U. S. 20 Wall. 353, 22 L. ed. 241, patent of Aug. 11th, 1863) the court might properly have taken the same view as to the article being an implement or article of manufacture; for while the patented stove was pronounced to be an unpatentable invention on the ground that it was an aggregation and not a combination, it might have been regarded as a composite article of manufacture comprising in a single structure certain mechanical features or devices which were utilized simultaneously for the useful purpose the

stove was devised for, viz: for utilizing the light and the heat simultaneously evolved by burning coal.

That the patentee was not mechanically wrong in believing that a true mechanical combination existed in the composite structure, appears from the following considerations. The members recited in the claim were, the illuminating openings, the flame expansion chamber, coal supply reservoir, fire pot, descending flue, and draft flue. The fire pot enclosed and supported the fuel so that it might be burned to evolve light and heat: The flame expansion chamber was an annular chamber above the fire pot, and below the coal reservoir; it with the illuminating openings (which were made of mica) confined the products of combustion so that they could not escape into the room, and compelled them to descend through the descending flue (against the natural tendency of heated gases to ascend); it also supported the coal supply reservoir: The descending flue conducted the hot gaseous products of combustion from the flame chamber to the base of the stove so that they might heat it; the draft flue conducted the products of combustion from the base of the stove (where they were delivered by the descending flue) upward to the nozzle to which the smoke pipe was applied in use: The coal supply reservoir closed the otherwise open top of the flame expansion chamber, and supplied the coal to the fire pot: The illuminating openings, which were formed of mica, permitted the light from the burning fuel to radiate into the room, thus enabling the light to be utilized; they also co-operated with the gas expansion chamber in confining the products of combustion and compelling them to pass down the descending flue. All of the above members operated simultaneously to enable the

light and heat evolved by the fuel to be utilized. Remove the fire-pot from these assembled devices and the residue were rendered useless for want of means to hold the burning fuel. Remove the flame expansion chamber, and the whole stove would have been disorganized. Remove the descending flue, and neither the ascending draft flue would have been operative, nor would the base of the stove (to which the descending flue conducted the gases) have been operative as a radiator of heat. Remove the ascending draft flue and the residue of the stove would have been useless for the want of an enclosed passage for the gases from the base of the stove to the stove pipe nozzle. Remove the coal supply reservoir, and the top of the annular flame expansion chamber would have been left open for the escape of all the products of combustion; the two flues also would have been inoperative for the lack of means to compel the hot gases to pass into them, and the apparatus would have been useless; there would also have been no means of supplying the fire pot automatically with fuel as it burned away. Remove the illuminating openings, and the gases would not have been confined and compelled to pass through the flues; and if the illuminating openings had been replaced with opaque non-illuminating devices, then a material and substantial part of the duplex result of the apparatus (the radiation of light from the burning fuel into the room) would have been frustrated. Under such circumstances it is plain that each and every member recited in the claim co-operated with the others for the accomplishment of the duplex result attained by their connection in a single implement; they did not constitute an unconnected aggregation of devices in any mechanical sense or common

sense meaning of that phrase, but constituted a true mechanical combination; and if they did not constitute a legal combination, it is only because of a doctrine which was unknown until about the date of this case, and under which, if it be carried to its legitimate conclusions, no assemblage of mechanical devices however new and useful can be a legal combination unless some one or more of the members move in doing their work, or unless all the members composing the combination operate jointly to produce only a single result which is not duplex or multiplex. If the composite implement had not been a new one why was it that the defendant was unable to find a single old structure embodying all its features of construction, but found only some of the features of construction in one old stove, and some in another? And of the utility of the composite structure as a whole there was no question. Had the stove containing this combination of this first claim, and had the composite pencil, been regarded by the court as implements or articles of manufacture filling wants, the questions of infringement and of whether the language of the specifications did or did not restrict the claims to peculiarities of the members would not have been affected, and the Patent Law would not have been unsettled by a new theory which in the case of such composite implements withdraws the question of invention from the domain of evidence and makes its determination a mere matter of opinion. Whether such mechanical combinations are or are not properly claimed as legal combinations appears to be a matter of the mere form of the language of the claim, which should not defraud an inventor of his right to a patent for a new and useful invention.

§ 61. Process of Making an Article of Manufacture is not a Distinguishing Characteristic of it.

It has been previously stated (§ 10) that a change of the material of which an article of manufacture is made is evidence that it is an invention, whenever such change introduces a new property, or quality, or mode of operation into the class of articles to which the changed article belongs. Of late years a new doctrine on this subject has been promulgated by the United States Supreme Court. *Smith* v. *Goodyear Dental Vulcanite Co.* 93 U. S. 493, 23 L. ed. 983. In this case the court when defining the patentee's invention used the following language:

"The invention, then, is a product or manufacture made in a defined manner. It is not a product alone, separated from the process by which it is created. The claim refers in terms to the antecedent description, without which it cannot be understood. The process detailed is thereby made as much a part of the invention as are the materials of which the product is composed."

According to this doctrine a change of the process by which an article is made makes it a substantially different article from an old one of the same kind and having the same physical peculiarities, and therefore makes the article made by the different process a patentable one. Let us test this doctrine by an example.

Glass tumblers were formerly made exclusively (as the higher grades now are) by the process of "blowing." According to this process a small mass of molten glass is gathered upon one end of an iron tube; by blowing air through the tube this mass is expanded into a globular flask; the bottom of this flask is flatted by pressure against a flat stone; the flask is cut off near its neck,

and the vessel so produced is connected at its bottom to the end of a rod (the "punt" or "punty"); the vessel is reheated so as to be plastic and is caused to rotate by turning the rod axially while it lays crosswise upon the arms of a chair occupied by the glass blower; as the vessel is revolved, certain tools are pressed by hand against the plastic vessel, and it is manipulated into the required form of a tumbler. Subsequently glass tumblers were made by moulding them or pressing them. According to the simplest mode of conducting this process, a mass of molten glass is dropped into an iron mould whose interior corresponds with the external form of the finished tumbler; then a plunger, whose external form corresponds with the form of the interior of the tumbler, is forced upon the glass in the mould, thereby squeezing it into the space between the mould and the plunger. Now, in this manufacture by moulding or pressing, there might have been two new things; the combination of the mould and plunger might have been new, in which case it would have been a patentable invention as a machine: The process of moulding glass also might have been new, in which case it would have been a patentable invention as a process. But the glass tumbler produced by the moulding or pressure process and by the use of the moulding machine, has precisely the same qualities, and properties, and mode of operation as the glass tumbler produced by the older blowing process. Was the pressed tumbler a new invention? Is it an article differentiated from the old glass tumbler in any of its attributes by the process by which it was produced? We think that to say it is, is contrary to common sense and to the rules by which articles are distinguished mechanically.

Take again the case of the sugar manufacture previously referred to (§ 27, *ante*). The sugar contained in the moulds was drained of its accompanying molasses, in the older process, by gravitation. In the later process, the same kind of sugar in the same moulds was drained of its accompanying molasses centrifugally. In this case the centrifugal machine adapted to hold the moulds was new and was patented as a machine; the process was new as applied to the drainage of sugar, because the fact that sugar could be drained in that way was a discovery, and the process of draining sugar centrifugally was an invention. But was the sugar, when drained centrifugally, a new and patentable article of manufacture because of the process by which it was produced when every one of the qualities and properties of the article were identical with the sugar drained by gravitation? We think not, and that the former was simply the same old article produced by a new process and by the operation of a new machine. Hence the theory that an article, which differs in no material quality or property or mode of operation from some old article, is characterized by the "defined manner" or process by which it is made, and that if it be made by a different process it is a new article, appears to be unsound and illogical. If a person has produced an article, and such article possesses new attributes, the article itself is new and useful; if the process by which the article is made has heretofore been unknown, that process is new and useful; if a special machine has been devised to manufacture the article, that machine is new and useful; and in each case if the change from what is old or the thing done does not fall within the exceptions previously noted in § 6, *ante*, that change or thing

should be legally and properly a patentable invention. If but one of the three things done happens to be new, and the patentee makes the mistake of omitting or neglecting to claim it, and of claiming one or both the other things which turn out to be old, that course is a grave misfortune to the patentee, as the patent would be void for want of novelty; but that unfortunate fact for the patentee does not, in our opinion, justify a court in sustaining a void patent by the mechanically illogical and unsound theory that the process by which an article is made is in some recondite way embodied in and characterizes the article.

COMPOSITIONS OF MATTER.

§ 62. Definition of a Composition of Matter.

A composition of matter may be defined as a compound of two or more substances which possesses a property or quality that is not possessed by the substances individually. The substances used constitute the ingredients of the composition or compound. Compositions of matter may be classified as mechanical and chemical.

§ 63. Mechanical Composition of Matter.

Gunpowder is an intimate mixture or composition of charcoal, saltpetre, and sulphur in certain definite relative proportions, and it has the property of rapidly evolving an immense volume of gases by its combustion. If these ingredients be intimately mixed in the condition of powder and no further operation be performed upon the mixture, the product is what is commonly known as meal powder, and it burns rapidly in air without exploding.

If meal powder (such as above mentioned) be subsequently changed in its structure by being formed into grains, the grained compound, commonly known as gunpowder, in burning evolves gases with such intense rapidity as to produce the effect known as explosion.

In the case of gunpowder, whether in the condition of meal powder or in the granular condition, the mixture is a purely mechanical composition of matter, as may be proved by the fact that the ingredients may be separated or dissociated unchanged in their chemical composition, by the mechanical operations of lixiviation and washing.

§ 64. Chemical Composition of Matter.

Another instance of a composition of matter is nitroglycerine, which is produced by the simultaneous action of nitric and sulphuric acids upon glycerine. In the compounding of this article the peculiar chemical composition and properties of both the nitric acid and the glycerine are changed, their chemical constitution is broken up, and some of the constituent elements of the two ingredients combine chemically in changed definite proportions to form a new chemical substance which is a violent explosive and differs in its properties from those of the substances by whose action it is produced.

§ 65. Distinguishing Characteristics of Compositions of Matter.

The first two instances above mentioned (§ 63) show that a composition of matter may be distinguished from other substances by its ingredients and by the properties or qualities attained by compounding them, even when the compound is a mechanical mixture. The second example shows that a composition of matter may be dis-

tinguished from another, as grain powder is distinguished from meal powder, by its structure, even when the composition having the new structure is a mechanical mixture of the same ingredients and in the same proportions as are found in another composition (meal powder) provided a useful property or new mode of operation is imparted to the mixture by the change of its structure, and in this case the change of structure is not within the category of a *mere* change of form, but is a substantial change. The last example of a chemical composition (nitroglycerine) shows that a composition of matter may be distinguished from others not only by its properties or qualities, but also by its chemical constitution when its elements are chemically combined. In each of the three cases the novelty of the composition and the new property or mode of operation are susceptible of proof by evidence, and the composition, if new and capable of being utilized for any useful purpose, is an invention and should be a patentable one, however simple and obvious it may appear to be *after it has been produced.*

§ 66. Invention by Substituting One Ingredient for Another in a Mechanical Composition of Matter.

The first above two examples (§ 63) may be considered as instances of original compositions of three ingredients combined together to produce the useful effects incident to compounding them, but the question arises whether the substitution of a different ingredient in a known mechanical compound in place of one of the ingredients of that compound does or does not constitute an invention. Let us test this matter by an illustration. Nitroglycerine is a free flowing explosive liquid and therefore has its particles in such intimate relationship that pres-

sure upon one of its particles is propagated throughout the mass, and a slight blow or jar detonates the mass. This property of explosion by a slight blow producing pressure renders the handling of nitroglycerine exceedingly dangerous. Nobel discovered that when the liquid nitroglycerine is compounded mechanically with a fossil earth in a powdery condition this property is neutralized; the explanation of change of effect or mode of operation appearing to be that whereas in the liquid nitroglycerine its particles are in such intimate relationship as to be in concussive contact, they are separated when the nitroglycerine is mechanically compounded with a powdered solid substance and concussive contact is prevented. The name of Dynamite was given to this new compound, and it was a new and very useful invention, for while it possesses the valuable properties of nitroglycerine as an intensely active explosive, it is free of the risk of explosion by a slight jar or blow incurred in handling and transporting it.

Dynamite is a mechanical composition of liquid nitroglycerine and a powdered solid, and after Nobel's discovery new dynamites were devised in which the powdered fossil earth used by Nobel was replaced by other solid substances in the condition of powder. In one of these new dynamites the solid ingredients employed were the same as those of gunpowder; that is to say, the producer of the new dynamite compounded nitroglycerine with meal powder instead of with fossil earth powder. Was this change a mere substitution of one material for another, or was it more? When the original dynamite was exploded the solid matter with which the nitroglycerine was compounded was incombustible and inert to produce gases. Hence the volume of gases produced was that

incident to the explosion of the nitroglycerine of the compound alone. With the new dynamite the powdery solid matter was combustible, and when the compound was exploded the gas produced was the sum of those evolved by the nitroglycerine and of those evolved by the meal powder, and this was a new mode of operation. In the respect that the meal powder in the new compound neutralized the dangerous property of unmixed nitroglycerine for handling, the meal powder was the equivalent of the fossil earth powder, and the new compound clearly embodied Nobel's invention; and if this had been all that the meal powder did, the change from fossil earth powder to meal powder (each being an old pulverulent material) would have been a mere substitution of one well known pulverulent material for another; but in the respect that the change imparted to the new compound the new mode of operation, the change was not a mere substitution of one ingredient for another, but produced a substantially new composition of matter, analagous to a new combination of old mechanical devices. Hence in the case of such a change in a mechanical composition the product is an invention which should be patentable; and in such a case the question whether invention exists is not a matter of mere opinion but is capable of proof by evidence.

§ 67. Invention by Substituting One Ingredient for Another in a Chemical Composition of Matter.

The same principles hold good in cases of chemical compositions. Thus, common salt, chemically known as chloride of sodium, is a chemical compound of sodium and chlorine, one atom of each. The atom of sodium may be replaced by an atom of calcium, in which case the chemical compound is known as the chloride of cal-

cium. But the properties or qualities of the two chlorides are wholly dissimilar in several important respects, and consequently if some person had produced the chloride of calcium subsequent to the existence of the chloride of sodium, the change would not have been a mere substitution of one known ingredient (calcium) for another (sodium) in an old composition of matter, but would have been an invention.

§ 68. Invention by Change of Proportions of the Ingredients of a Composition of Matter.

There is also the question with reference to a composition of matter, whether a change of the proportions in which the same ingredients are compounded does or does not constitute an invention. We have an instance of such a change in the case (previously referred to in § 9) of the soft vulcanized rubber, or composition of rubber and sulphur invented by Charles Goodyear, and the hard vulcanized compound of rubber and sulphur (Vulcanite) subsequently invented by Nelson Goodyear. In the latter case the change in the proportions of the sulphur to the rubber produced a compound (vulcanite or hard rubber) having qualities in many respects different from those of the older soft rubber compound of Charles Goodyear. Hence the change was not a mere change of proportions, but was a substantial one amounting to invention, and it was recognized as such by the court.

PATENTABLE DESIGNS.

§ 69. The Statute of 1842.

By the Patent Act of 1842, a new class of articles commonly known as designs were made proper subjects

of patents. The section of that Act relating to this subject is in the following words:

"That any citizen or citizens, or alien or aliens having resided one year in the United States and taken the oath of his or their intention to become a citizen or citizens, who by his, her, or their own industry, genius, efforts, and expense, may have invented or produced any new and original design for a manufacture, whether of metal or other material or materials, or any new and original design for the printing of woolen, silk, cotton, or other fabrics, or any new and original design for a bust, statue, or *bas relief* or composition in *alto* or *basso relievo*, or any new and original impression or ornament, or to be placed on any article of manufacture, the same being formed in marble or other material, or any new and useful pattern or print, or picture to be either worked into or worked on, or printed, or painted, or cast, or otherwise fixed on any article of manufacture, or any new and original shape or configuration of any article of manufacture not known or used by others before his, her, or their invention or production thereof, and prior to the time of his, her, or their application for a patent therefor, and who shall desire to obtain an exclusive property or right therein to make, use, and sell and vend the same or copies of the same, to others, by them to be made, used, and sold, may make application in writing to the Commissioner of Patents expressing such desire, and the commissioner, on due proceedings had, may grant a patent therefor, as in the case now of application for a patent."

§ 70. Dictum of the United States Supreme Court.

In the leading decision on this subject (*Gorham Co.* v. *White*, 81 U. S. 14 Wall. 525, 20 L. ed. 736) by the

United States Supreme Court the court made the following dictum:

"The acts of Congress which authorize the grant of patents for designs were plainly intended to give encouragement to the decorative arts. They contemplate not so much utility as appearance, and that, not an abstract impression or picture, but an aspect given to those objects mentioned in the acts. It is a new and original design for a manufacture, whether of metal or other material; a new and original design for a bust, statue, *bas relief.* or composition in *alto* or *basso relievo*; a new or original impression or ornament to be placed on any article of manufacture; a new and original design for the printing of woolen, silk, cotton or other fabrics, a new and useful pattern, print, or picture, to be either worked into, or on, any article of manufacture; or a new and original shape or configuration of any article of manufacture — it is one or all of these that the law has in view."

§ 71. Definition of a Design.

The design of an article whatever it be, is *the appearance of the thing*, as distinguished from its structure; and according to the above quoted decision a design to be patentable under the Act of 1842 must have been decorative as distinguished from useful, and consequently only those designs were patentable under this decision which are decorative. While this decision was apparently required under the language of the Act of 1842, it does not follow that it applies to all cases which may arise under the language of the Act now in in force. U. S. Revised Statutes, § 4929. Every mechanic and manufacturer knows that there are multi-

tudes of strictly useful shapes or configurations of articles whose appearances are so attractive or whose configurations are so useful as to insure large sales of them in preference to other articles of the same mechanical structure, but of different forms or configuration. These useful shapes and configurations are gotten up frequently with great labor and expense, as in the case of stoves, but as under the dictum in the Gorham case such useful shapes and configurations are not decorative, patents for them have been declared void by the courts.

§ 72. Inadequacy of Protection by Limitation of Patentable Designs to Decorative.

It is well understood by manufacturers that whenever one has produced an article of new and useful shape or configuration which takes the market, but whose structure is not protected by a patent, his rivals in the trade immediately copy this shape or configuration in articles of the same structure made by them; and they thus deprive the originator of the reward to which he should be equitably entitled by reason of the labor and money he has expended. In cases where the articles are made of cast iron or of plastic materials all that is frequently necessary in order that copies of articles of new and useful forms or configurations may be produced is to purchase in the market those of the original manufacturer, to dress them up, and to use them as patterns for producing fac-simile imitations. Hence, either the language of the Act of 1842 or the interpretation of it in the Gorham case fell short of protecting a large class of meritorious manufactured articles which have no novelty in structure, and therefore are not patentable as machines or articles of manufacture, but have new and useful

shapes or configurations which, while not decorative, are of value to the manufacturers because their appearance pleases the eyes of the users and gives the articles a preference in the market.

§ 73. Comparison of Act of 1842 with Section 4929, as to Useful Designs.

If the language of the United States Court in the Gorham case (which is that of the Act of 1842) be compared with the Act now in force (§ 4929) it will appear that in one respect the two differ: Thus, the language of the Act of 1842 and of the court in the Gorham case is "a new and original shape or configuration of any article of manufacture;" while the language of the present Act is "any new, *useful* and original shape or configuration of any article of manufacture;" and it is somewhat significant that the word "useful," which the language of the Act of 1842 omits, is affixed to but one of the classes of articles enumerated in the present Act, and is not found in the denomination of any other of those classes.

At the time the Design Act of 1842 was asked for, it was understood by mechanics and manufacturers that a law was wanted which would protect manufacturers in the use, among other things, of their patterns for castings; and that when they had succeeded in producing useful forms or configurations of articles of manufacture, which had no patentable features of structure, they should be protected from having these forms or configurations copied wholesale by their rivals in trade. The Gorham decision was made under the original Act of 1842, which does not contain the word "useful" and has since been repealed, and as the language of the

present Act differs from that of the repealed Act under which the decision was rendered, it does not follow that the present Act, like the original Act of 1842, excludes from its purview the protection of a new, useful, and original shape or configuration of any article of manufacture which is not decorative. The United States Supreme Court appears to be leaning to this view, because in the case of *Lehnbeuter* v. *Holthaus*, 105 U. S. 96, 26 L. ed. 940, they, by their decision, admitted a a show case of a useful design to be patentable when there was nothing strictly decorative about it.

§ 74. Classes of Patentable Designs.

The present Act divides the articles to be protected into four classes as follows:

1. Any new and original design for a manufacture, bust, statue, *alto relievo* or *bas relief*.

2. Any new and original design for the printing of woolen, silk, cotton, or other fabrics.

3. Any new and original impression, ornament, pattern, print, or picture to be printed, painted, cast, or otherwise placed on or worked into, any article or manufacture.

4. Any new, useful and original shape or configuration of any article of manufacture.

While the first three of these classes are undoubtedly decorative, the last class is "useful" as distinguished from decorative; and in view of the language of the Act, and of the equitable consideration that manufacturers should be protected in the use of those useful forms or configurations of articles which they have produced and which approve themselves to the public, it is but just that the language of the present Act should, if

possible, be so construed as to include in the purview of the last class those appearances which are not strictly decorative but are useful.

§ 75. Novelty Necessary in a Patentable Design.

A design to be patentable must be new; but the question of how much or how little novelty constitutes a patentable design as distinguished from designs previously known does not at present seem to be well settled. In the Gorham case the court, when speaking upon the infringement of a design for spoons, said:

"We are now prepared to inquire what is the true test of identity of design. Plainly, it must be sameness of appearance, and mere difference of lines in the drawing or sketch, a greater or smaller number of lines, or slight variances in configuration, if [not] sufficient to change the effect upon the eye, will not destroy the substantial identity. * * * So a pattern for a carpet, or a print, may be made up of wreaths of flowers arranged in a particular manner. Another carpet may have similar wreaths, arranged in a like manner, so that none but very acute observers could detect a difference. Yet in the wreaths upon one there may be fewer flowers, and the wreaths may be placed at wider distances from each other. Surely in such a case the designs are alike. The same conception was in the mind of the designer and to that conception he gave expression. * * *

"We hold, therefore, that if, in the eye of an ordinary observer, giving such attention as a purchaser usually gives, two designs are substantially the same, if the resemblance is such as to deceive such an observer, inducing him to purchase one supposing it to be the other, the first one patented is infringed by the other."

In the Gorham case there was no evidence before the court to the effect that the general configuration was not new, but there are many cases of designs where the general configuration is old and the only novelties are in the features or details. Thus, while the appeal in the Gorham case was pending, a manufacturer submitted to the author two pieces of carpet showing designs; the one patented, the other made by the manufacturer. He was threatened with a suit under the patent and wanted an expert opinion as to whether he did or did not infringe. In each of the two designs there was a plain ruby ground; in each there was a lattice formed figure of narrow stripes of shaded yellow leaves crossed diagonally so as to form what may be termed diamond panels; and in each diamond space or panel there was a group of shaded yellow leaves. The general configuration, the arrangement of figures, and the general appearances of the two designs were the same, so that an ordinary purchaser who saw the two in different stores and was not an acute observer accustomed to compare designs (which was the test in the Gorham case) would be very likely to take one for the other. The author informed the manufacturer of the Gorham appeal then pending, and of the complainants view of the case, which was subsequently taken by the Supreme Court, and said that if the court on appeal should decide that when a patentee specified his design by details (as the Gorham Company did, in the descriptive part of their patent in suit) the patentee was restricted to substantially the same details or features, then the manufacturers' design was not an infringement. But if the court, on appeal, should take the view that it was the general appearance of the design that determined the question of substantial iden-

tity, then the manufacturer infringed, because his design was substantially identical with the patented design in the general configuration and arrangement of the figures, and in their colors. "But," said the manufacturer, "I have something else to show you;" whereupon he produced a roll of a dozen specimens of carpet, the design of every one of which was a lattice formed pattern of shaded leaves forming diamond shaped patterns with groups of shaded leaves in the panels; in each case also the colors were the same as those of the patented design and of the manufacturers design (shaded yellow leaves upon a ruby ground); the figures were all of nearly the same dimensions; and the only differences were in the details or features of the leaves. In fact each of the old designs was as close an approximation in the general appearance to the patented design, as the manufacturers' was which was claimed as an infringement. "Now," said the manufacturer, "all these dozen specimens were old at the date of the patentee's design patent, how do these affect the matter?"

If the view of the Supreme Court in the Gorham case be the rule of law applicable to all cases of design patents, then in such a case as the above the manufacturer's design infringed; but in that event the patent was void when judged by that same rule (especially as illustrated by the carpet example referred to in the decision), because the patented design was anticipated by the old designs, as the appearances of the former as closely resembled each of the old designs, as the manufacturer's design resembled the patented one.

§ 76. Rules as to Patentability in Designs.

Such a decision in such a case would, however, work great injury to producers of design patents, because

there are a host of cases in which the *novelty of the design is its details only*, the general appearance being old. Hence the reasonable rules to a mechanic on the subject of designs appear to be that when the general configuration is new the patent may be broad enough in its scope to cover it: but when the general configuration is old, while the details of the design are new, then a patent may be granted for the design characterized by the new details, which should be specified in the description; and such a patent should be valid. The two cases are exactly analagous to a patent for a generic combination in machines, and a patent for a specific combination; and while there may be but one patent for the general appearance of a design, there may be a number of subsequent patents for designs having new specific peculiarities of the same general appearance; and these subsequent patents, while all included in the purview of the generic design patent may be all patentable independently of each other.

PART III.

INVENTION PATENTABLE IN A REISSUE PATENT.

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§ 77. Definition of a Reissue Patent.

A "reissue patent," properly so designated, is a new patent taken out by the original patentee, or his legal representative, upon the surrender of the original patent and for the residue of the term thereof, with a corrected specification setting forth correctly the invention which the patentee intended to be protected by his original patent, but which that patent is either inoperative to protect, by reason of a defective or insufficient specification, or is invalid to protect by reason of the patentee having claimed as his own more than he had a right to claim as new.

§ 78. Patentee's Right to have a Reissue of a Defective Patent.

That a patentee who had a defective patent had an equitable right to surrender it and to have a corrected patent issued to him when the defect "arose from inadvertence or mistake and without any fraud or misconduct on the part of the patentee," was admitted by the Su-

preme Court in the decision in the case of *Grant* v. *Raymond*, 31 U. S. 6 Pet. 218, 8 L. ed. 376; and this right was conceded in January, 1832, before the first special statute on the subject of reissues became law in July, 1832. Hence the first statute on the subject and those which have succeeded it have merely embodied in statute law the equitable right to which the patentee was conceded to be entitled before the first statute was passed, and have provided a special proceeding for the correction of defective patents.

§ 79. Analogy of the Reissue of a Patent for Invention to the Reformation of a Deed for Real Estate.

The right of a patentee to have a defective patent reformed or corrected by reissue is in accordance also with the practice of courts of equity with reference to instruments defining other property. Thus, in actions under deeds with reference to land it has been well settled that if the deed under which the plaintiff claims title is not effectual to convey the land by reason of a mistaken description, equity will relieve the plaintiff by reforming the deed. Such relief can be obtained only in a suit in equity brought for that purpose. *Prentice* v. *Stearns*, 113 U. S. 435, 28 L. ed. 1059. With inventions, the patent is the deed, and the statute relating to reissues (§ 4916) has provided the mode of its reformation without the necessity of a suit in equity.

§ 80. Statute as to Reissue.

The statute now in force (§ 4916) is in the following words:

"Whenever any patent is inoperative or invalid, by reason of a defective or insufficient specification, or by

reason of the patentee claiming as his own invention or discovery more than he had a right to claim as new, if the error has arisen by inadvertence, accident, or mistake, and without any fraudulent or deceptive intention, the Commissioner shall, on the surrender of such patent and the payment of the duty required by law, cause a new patent for the same invention and in accordance with the corrected specification, to be issued to the patentee, or. in the case of his death or of an assignment of the whole or any undivided part of the original patent, then to his executors, administrators, or assigns, for the unexpired part of the term of the original patent. Such surrender shall take effect upon the issue of the amended patent. The Commissioner may, in his discretion, cause several patents to be issued for distinct and separate parts of the thing patented, upon demand of the applicant, and upon payment of the required fee for a reissue for each of such reissued letters patent. The specifications and claim in every such case shall be subject to revision and restriction in the same manner as original applications are. Every patent so reissued, together with the corrected specifications, shall have the same effect and operation in law, on the trial of all actions for causes thereafter arising, as if the same had been originally filed in such corrected form; but no new matter shall be introduced into the specification, nor in case of a machine patent shall the model or drawings be amended, except each by the other; but when there is neither model nor drawing, amendments may be made upon proofs satisfactory to the Commissioner that such new matter or amendment was a part of the original invention, and was omitted from the specification by inadvertence, accident or mistake, as aforesaid."

§ 81. Invention Claimable in a Reissue Patent According to the Former Construction of the Act.

The reissue patent is required to be "for the same invention" as the original patent; but the judicial interpretation of these words has varied greatly in different ages of the United States Supreme Court. Under the practice of the United States circuit courts and of the United States Supreme Court prior to about 1877, it was settled law that the reissue patent was to be for the same invention which the patentee *intended* to be secured by the original patent. Thus, in the case of *O'Reilly* v. *Morse*, 56 U. S. 15 How. 62, 14 L. ed. 601, in which the reissue patent of Morse was in suit and had a specification and claims materially different from those of the original patent, *Chief Justice* Taney (an admitted strict constructionist) delivered the decision of the Supreme Court in reference to the reissue of the Morse patent with "*additional* specifications" to those contained in the original patent, in the following language:

"We do not think it necessary to dwell upon the objections taken to the proceedings upon which the first patent was issued or to the additional specifications of the reissued patent of 1848. In relation to the first, if there was any alteration at the suggestion of the commissioner, it appears to have been a matter of form, rather than of substance; and, as regards the second, there is nothing in the proof or on the face of the reissued patent to show that the invention therein described is not the same with the one intended to be secured by the original patent. It was reissued by the proper lawful authority; and it was the duty of the Commissioner of Patents to see that it did not cover more than the original invention. It must be presumed, therefore, that it does not, until the

contrary appears. Variations from the description given in the former specification do not necessarily imply that it is for a different discovery. The right to surrender the old patent and receive another in its place, was given for the purpose of enabling the patentee to give a more perfect description of his invention, when any mistake or oversight was committed in his first. It necessarily, therefore, varies from it."

The words "intended to be secured by the original patent" are worthy of notc, as well as the last sentence above quoted.

Under this construction of the law any patentee who had a patent that was inoperative to protect him in the use of his *entire* invention by reason of insufficient claims was properly permitted to surrender his original patent and to take out a reissue patent for the residue of the term of the original patent, and with claims broader in scope than those of the original patent, provided it was shown to the satisfaction of the commissioner of patents that the broader claims were embodied in the original invention at the date of the original application, and provided that the defect of the specification of the original patent had arisen from inadvertence, accident or mistake, and without any fraudulent or deceptive intention. Reissue patents so taken out were sustained by the courts.

§ 82. Evidence as to the Original Invention.

In some cases parol evidence as to omissions in the specification of the original patent was admitted; but as such evidence was liable to be fraudulent, it was received with great caution. In the majority of cases the fact that the subject-matter of the new claims of the reissue was

found embodied in the patentee's model filed in the Patent Office with the application for the original patent, or in the patentee's original drawings on file in the Patent Office, or was described (although not claimed) in the specification of the original patent, was considered conclusive evidence that such subject-matter formed part of the invention intended to be patented by the original patent, and for which the law authorized him to receive a reissue patent.

§ 83. Examples of Reissue Patents with Enlarged Claims.

Thus in the case of the Woodworth planing machine (patent dated December 27th, 1828) the specification of the original patent did not describe or claim pressure rollers for holding the rough board to the bed of the planing machine against the tendency of the revolving planing blades to draw it from that bed; yet in the reissue patent "for the same invention," granted July 8th, 1845 (during the extended term of the patent), the administrator of the patentee was permitted to describe and base two claims upon these pressure rollers upon the ground that there was satisfactory evidence that they formed part of the invention of Woodworth at the date of his application for the original patent. The validity of the reissue patent was subsequently affirmed by the United States Supreme Court in the cases of *Wilson* v. *Rousseau*, 45 U. S. 4 How. 646, 11 L. ed. 1141, and *Woodworth* v. *Wilson*, 45 U. S. 4 How. 712, 11 L. ed. 1171.

Another instance of the enlargement by reissue of the scope of the claims of the original patent is found in the case of the patent of Charles Goodyear for the manufacture of vulcanized india rubber. The language of the claim of the original patent was:

"I claim the preparing and curing the compound of india rubber, sulphur, and a carbonate or other salt or oxide of lead, by subjecting the same to the action of artificial heat, substantially as herein described."

This claim, although perfectly operative to protect as much as was recited in it, rendered the patent inoperative to protect the full or entire invention made by Goodyear because it was limited in scope to the use of "a carbonate or other salt or oxide of lead," and it was undoubtedly the fact that each of these substances was absolutely useless and inoperative in the vulcanizing process and amounted to a mere adulterant. Hence infringers of the entire invention of Goodyear escaped the purview of the claim by leaving out the adulterants recited therein. The patent was divided upon the reissue and the claim to one of these reissue patents was as follows, viz:

"What is claimed as the invention of Charles Goodyear, deceased, is the new manufacture of vulcanized india rubber (*whether with or without* other ingredients) chemically altered by the application of heat, substantially as described."

The scope of the claim in the reissue was thus greatly enlarged or broadened as compared with that of the claim of the original patent; but as there was no reasonable doubt that the subject of the reissue claim was within the invention or discovery of Goodyear at the date of his application for the original patent, the reissue patent was sustained on appeal by the United States Supreme Court. *Providence Rubber Co.* v. *Goodyear*, 76 U. S. 9 Wall. 788, 19 L. ed. 566. In this case one of the grounds of appeal was that Goodyear's two reissue patents were invalid, "because they are broader than

the claims of the patent surrendered by the executor." And on this point the Supreme Court declared, "It is the right of the patentee and his representatives to enlarge or restrict the claim so as to give it validity and secure the invention;" thereby reiterating the judgment of the same court in a similar case of the enlargement of the scope of a claim by reissue. *Battin* v. *Taggert*, 58 U. S. 17 How. 74, 15 L. ed. 37.

The reissue of the telegraph patent of Morse has already been referred to in § 81.

§ 84. Revision of Reissue Patents by the Courts.

The grant of reissue patents like that of original patents is subject to revision by the courts, who have always had the power to decide whether the reissue is or is not fraudulent, and whether the subject-matter of the claims of the reissue did or did not constitute the original invention of the patentee at the date he applied for the original patent. Hence any error made by the Commissioner of Patents in the grant of the reissue could and always can be corrected in the courts.

§ 85. Former Construction of the Act Maintained up to About 1880.

The practice of permitting patentees to surrender patents which were inoperative to protect the real or full invention made by the inventor by reason of too narrow claims, or were invalid by reason of the patentee having made too broad claims, thereby "claiming as his own invention more than he had a right to claim as new," was conceded by the courts up to about 1880.

§ 86. New Legal Construction of Act Relating to Reissues.

In 1880 a new departure was taken by the United States Supreme Court who then discovered that the

previous practice of the court, composed of such judges as Marshall, and Story, and Nelson, and Curtis, was wrong, and that "it was never intended to allow a patent to be enlarged; but to allow the correction of mistakes inadvertently committed, and the restriction of claims which had been improperly made or which had been made too broad." *Swain Turbine & Mfg. Co.* v. *Ladd*, 102 U. S. 408, 26 L. ed. 184.

This dictum was followed by another restricting the right of the patentee by reissue still more narrowly. Thus, in the case of *James* v. *Campbell*, 104 U. S. 356, 26 L. ed. 786, the court said, "the law does not allow them [patentees] to take a reissue for anything but the same invention described and *claimed* in the original patent." The ground of this dictum appears to be that if a reissue claim is of broader scope than any claim of the original patent, then the reissue patent is not "for the same invention" as the original patent. This dictum is affirmed in the cases of *Gage* v. *Herring*, 107 U. S. 640, 27 L. ed. 601; *Clements* v. *Odorless Excavating Apparatus Co.* 109 U. S. 641, 27 L. ed. 1060; *Mahn* v. *Harwood*, 112 U. S. 354, 28 L. ed. 665.

This modern construction of the law of reissue by the Supreme Court appears at first view to have been relaxed in the recent case of *Topliff* v. *Topliff*, 145 U. S. 156, 36 L. ed. 660, in which the scope of the claim in suit (the 2d) appears to have been materially enlarged by the omission of a requirement characterizing the combination claimed in the original patent, and characterizing also the claim of the first reissue patent; but the opinion of the court shows that in their view the enlargement was only in appearance and not real.

The invention was an improvement in the spring

appliances of wheel carriages. As shown in the drawings, it contained two half elliptic springs (one at each side of the body) and the rear ends of these side springs were connected with radial arms secured to one rock-shaft or rock-rod (called in the reissue patent the connecting rod B) while the front ends of the same two side springs were connected with radial arms secured to a corresponding rock-shaft (called the connecting rod B′ in the reissue patent). The rear rock-shaft or rock-rod was crosswise of the springs and parallel with and secured to the rear axle, while the front rock-shaft or rock-rod was parallel with and secured to the bolster over the fore axle.

The claim of the original patent contained the restriction that the rock-rods or connecting rods should be "secured directly to the front and rear axles." This restriction was evidently erroneous because the front rock-rod was not secured to the front axle but to the bolster. The claim of the first reissue patent corrected this error by requiring that connecting rods be "secured directly to the hind axle and front bolster;" but in claim second of the second reissue to which the opinion of the court relates, this restriction was wholly omitted, as the language of the claim is:

"The combination of the connecting rods BB′, provided with arms at their ends, with the half elliptic springs AA′, substantially as and for the purpose set forth."

In this case there certainly appears to the mechanical engineer to be a substantial enlargement of the scope of the claim of the original patent and of the first reissue thereof. The opinion of the court, after admitting the change of the language of the claim by the omission of

the requirement of the claim of the first reissue, states:

"Whether this be an enlargement of the original claim or not, it is for substantially the same invention, and in view of the fact that the reissue was applied for as soon as the mistake was discovered, and before any rights in favor of third parties could be reasonably expected to have attached, or had in fact attached, we think this reissue is not open to the objections which have proved fatal to so many since the case of *Miller* v. *Bridgeport Brass Co.* 104 U. S. 350, 26 L. ed. 783, was decided."

After referring to the later decisions of the same court from *Miller* v. *Bridgeport Brass Co.* the opinion states:

"From this summary of the authorities it may be regarded as the settled rule of this court that the power to reissue may be exercised when the patent is inoperative by reason of the fact that the specification as originally drawn was defective or insufficient or the claims were narrower than the actual invention of the patentee, provided the error has arisen from inadvertence or mistake, and the patentee is guilty of no fraud or deception; but that such reissues are subject to the following qualifications:

"First, That it shall be for the same invention as the original patent, as such invention appears from the specification and claims of such original."

Topliff v. *Topliff*, 145 U. S. 170, 36 L. ed. 661.

The other two qualifications mentioned in the opinion are not quoted here as they have reference to the period during which a reissue may be applied for, and to the action of the Commissioner of Patents.

Upon considering the above quotations it appears that although the scope of the claim of the reissue pater'

appears to have been enlarged upon the reissue, yet the court reiterates the requirement that the invention claimed in the reissue shall be "for the same invention as the original patent as such invention appears from the *specification* and *claims* of such original." While, therefore, there is an apparent enlargement of the scope of the claim of the reissue, the court must have been of the opinion that there was no *actual* enlargement of scope beyond the *claim* of the original patent, because this is the only conclusion that is compatible with "the settled rule" above quoted; and when the opinion is viewed in the light of this "settled rule" the decision does not change the newer Supreme Court construction of the law of reissue to the effect that the invention claimed in a reissue to be "the same invention" mentioned in section 4916 must be the same as is described and *claimed* in the original patent.

It has been alleged that the opinion rendered in the Topliff case is an indication that the views of the present United States Supreme Court on reissues have been modified; this allegation being based upon the understanding that the claim of the Topliff reissue patent is broader in scope than that of the original patent. But any presumption of such indication is effectually nullified by the opinion of the court in next succeeding case of *Freeman* v. *Asmus*, 145 U. S. 226, 36 L. ed. 685.

In the latter case the invention in controversy was an improvement in blast furnaces for smelting iron ore; and in order that the decision may be appreciated it is necessary to give some idea of the nature of the invention. The interiors or cavities of blast furnaces have approximately the form of two superimposed truncated cones, the lower with the small end downward, and the

upper with the small end upward and with its large end joined to the large end of the lower cone. The lower portion of the lower cone is technically called "the hearth" of the furnace and the blast is introduced through nozzles (called "tuyeres") inserted in the walls of the hearth at a distance of from two to four feet above its bottom. The outer sides of the wall of this hearth are technically termed "breasts." In blast furnaces previous to the patented invention in suit there was at one side of the hearth an opening which extended horizontally outward in the form of a rectangular passage. This rectangular passage was called the "fore-hearth." Its outer end was closed by the "dam" which retained the molten iron, and the dam was fitted at one of its lower corners with an orifice called the "tapping-hole," which was stopped with a mixture of clay and sand while the smelting was going on, but was opened at certain periods of the day or "tapped" to permit the accumulated molten iron to escape. The inner end of the fore-hearth was bridged over by a part of the wall of the hearth (proper) above the wall of the fore-hearth, but the horizontal space between this bridge wall (called "the tymp") and "the dam" was left open when the furnace was constructed.

A blast furnace constructed on this plan is said to have an "open breast" at the side from which the molten iron is permitted to run out; while the other breasts of the hearth, at each of which there is nothing corresponding with the fore-hearth, but in which there is only the nozzle (the tuyere) for the blast, are termed "closed breasts."

While the blast was on such a furnace the open top of the fore-hearth between the "tymp" and the "dam"

was covered and closed by a layer or tamping of clay and sand surmounted by a heavy iron plate to prevent the blast from blowing out under the tymp. As the scoria or slag (technically called "cinder") formed by the combination of the earthly matters of the ore and coal with the flux used, accumulates rapidly in the process of smelting, it had to be permitted to flow out over the dam, and for this purpose the crust of tamping covering the fore-hearth was occasionally perforated or tapped.

After each casting of the molten iron, the iron plate over the fore-hearth was removed, the crust of tamping and any concretions of slag and the dead coals were detached and shoveled out, live coals were drawn forward into the fore-hearth, and the tamping and plate were replaced. But after the slag accumulated to about the height of the dam, which generally took place about an hour after casting, it became necessary to clean out the fore-hearth again in order to get the slag or cinder to flow freely through it and from it. This operation, technically called "raising cinder" and "working the furnace," was a very hot and laborious one, and sometimes it had to be repeated several times between successive tappings of the molten iron. Moreover, while it was in progress the blast had to be largely shut off from the furnace, thereby temporarily lessening or stopping the smelting operation.

The actual invention of Lürmann, the inventor of the reissue patent in suit, consisted of the entire suppression of the fore-hearth of the blast furnace, so that the side of the hearth from which the iron and slag were drawn out became a "closed breast" instead of an "open breast," and in the combination of the blast furnace having this closed breast with a device called "a water

cooled cinder block" inserted in the closed breast at the proper height for the flow of the slag or cinder; such water cooled cylinder block being substantially a short pipe having hollow walls or channels through which water was caused to circulate to keep it from being injured by the heat of the furnace. The through passage of this water cooled cinder block was closed by a plug and was opened when necessary to permit the cinder to flow out.

By this invention the places of tapping both molten iron and cinder were brought close to the cavity of the hearth proper of the furnace, so that they were in a hotter locality and not liable to become clogged, the fore-hearth was suppressed, and all the severe labor previously required in working the furnace and cleaning out the fore-hearth was dispensed with. Moreover, as the blast had to be shut off during working a furnace with an open breast, while by Lürmann's invention the blast could be kept on continuously between the castings and an additional blast nozzle or tuyere could be inserted in the new closed breast, the output of the furnace was materially increased. Lürmann's invention, therefore, was a most valuable one and made a revolution in the management of the blast furnace. It came into immediate use, and is universally used in the great blast furnaces of the present age.

Lürmann's original patent was issued November 5th, 1867. The application by his assignee (Asmus) for its reissue was filed November 3d, 1868, within one year of the issue of the original patent. In the original patent the cinder block is designated the slag discharge piece, but the device is the same as in the reissue. The claim of the reissue which was in suit is not found in the original patent and is as follows, viz:

"A blast furnace with a closed breast where the slag is discharged through an opening or openings cooled by water, substantially as set forth."

This claim might have been properly appended to the specification of the original patent because the drawing of that specification showed and the descriptive portion described a blast furnace with a closed breast, as well as the slag discharge piece forming the opening through which the slag was discharged, and also the cooling of the said opening by the circulation of water through the channels in the walls of the said slag discharge piece. It appeared from the oath of the assignee when making application for the reissue that Lürmann was the inventor of the invention claimed in the reissue; and it appeared from the opinion of the circuit judge that there was nothing set up by the defendant in the equity case in the circuit court to anticipate Lürmann in the invention of the subject-matter recited in the claim. Unfortunately however for the patentee, the specification of the reissue contains some interpolated descriptions of alternative constructions of some of the minor details of the blast furnace which are not found in the original patent. The scope of the new claim would have been precisely as broad without these interpolations as with them; but the fact of their interpolation is the basis of an objection of the Supreme Court to the reissue on the ground that the specification thereof contained new matter not found in the specification of the original patent.

The opinion of the Supreme Court states that: "the intention manifestly was to construe the first claim so as to cover any kind of blast furnace with a closed breast, having a slag discharge opening cooled in any

manner or to any extent by water. There is nothing in the original specification which indicates that any such claim was intended to be made in the original patent. On the contrary, the whole purport of that specification shows that it was intended to claim only a slag piece or cinder block constructed and attached in a specific manner, as is set forth in the statement of the attorney of Asmus, accompanying his application for the reissue."

The opinion of the Supreme Court then refers to the cases of *Mahn* v. *Harwood* and others following it, closing with the statement that "there is nothing inconsistent with the foregoing views in our decision in *Topliff* v. *Topliff*." *Freeman* v. *Asmus*, 145 U. S. 241, 36 L. ed. 691.

The foregoing examples are sufficient to show that the present construction of the law of reissue by the Supreme Court is at variance with that of the same court previous to about 1880 as referred to in § 83, *ante;* and that, whereas previous to about that date a patentee was permitted to claim in a reissue the real or actual invention made by him as demonstrated by a comparison of what he did at the date of his application for the original patent with the state of the art at the date of his invention, the present construction of the law substantially requires the claim or claims of a reissue patent to be no broader in scope than what is described and claimed in the original patent, however defective or insufficient the description or claims of the original patent may be to protect the real or entire invention which the inventor invented or discovered prior to his application for that patent, and notwithstanding the fact that the real invention made by the inventor is found shown

and described (although not claimed) in the drawings and description of the specification of the original patent, and is thereby disclosed to the public.

On the other hand, the same court has declared that "the law authorizes a reissue when the patentee has claimed too much so as to enable him to contract his claim." *Miller* v. *Bridgeport Brass Co.* 104 U. S. 350, 26 L. ed. 783.

Inasmuch as section 4916 (§ 80, *ante*) of the Patent Act requires that in every case provided for in it the new (reissue) patent shall be issued "for the same invention," the dictum of the court last above quoted, when taken in connection with that in the case of *James* v. *Campbell*, 104 U. S. 356, 26 L. ed. 786, and "the settled rule" set forth in the case of *Topliff* v. *Topliff* (previously quoted) necessarily involves the conclusion that, even when the claim of the reissue patent is less in scope than that of the original patent, the present United States Supreme Court regard the invention claimed in such reissue patent as "the same" as that "described and claimed in the original patent."

§ 87. New Legal Construction of the Statute of Reissue Incomprehensible to the Mechanic.

This new judicial construction of the law to the effect that when the scope of the claims is enlarged the reissue patent is *not* for "the same invention" as that for which the original patent was issued, while when the scope of the claims is reduced the reissue patent *is* "for the same invention" as that for which the original patent was issued, unsettled the well settled practice of the courts from the date of the earliest decision upon the validity of reissue patents, and rendered valueless an enormous

amount of patent property honestly acquired. It is possible that the correctness of the new view may commend itself to the mind trained in the subtleties of the law, but to the mind of a mechanic it is not comprehensible in view of the well known aphorism that "it is a bad rule which will not work both ways." To the mechanic, the practice under this view of the law appears analogous to the following: A man intends to sell and gives a deed for a piece of property which at its north side really measures 100 feet, but the measurement in the deed is by inadvertence, accident, or mistake, specified to be 80 feet, this error of the deed cannot be corrected, because if corrected the piece of property then specified in the reformed deed would not be "the same" as that for which the original deed was given; and this, notwithstanding the fact that the intent of the seller was to convey and the intent of the purchaser was to purchase the *entire* property which at the date of the transaction had its north side 100 feet broad. If however the piece of property really measures only 80 feet at its north side, but by inadvertence or mistake the measurement in the original deed is given as 100 feet, this error may be corrected, and the piece of property referred to in the reformed deed is still "the same" as that for which the original deed was given notwithstanding the difference in the specified measurement.

§ 88. Objections to an Unwarranted Restriction of the Claim of a Reissue Patent.

The view that the law restricts an inventor in a reissue to claims which are equal to or no greater in scope than the claims of the original patent, thereby debarring a a reissue with an enlarged claim to which the inventor

was justly entitled at the date of his application for the original patent, does not appear to be sound for the following reasons:

1. Because no language to that effect is found in the law.

2. Because if the view that the words "the same invention" mean the invention *claimed* in the original patent be correct, then a construction of the law which permits claims narrower in scope than those of the original patent to be made upon its reissue, but at the same time forbids the making of claims broader in scope, is not only inconsistent with that part of the law which specially permits the issue of a reissue patent "for the same invention" when the scope of the claim is reduced, but is illogical; it being plain that a thing which is smaller than another is no more the *same* as such other, than a thing which is larger than it; and it being also plain that if the claims in the reissue are to be for the *same* invention which is *claimed* in the original patent, then the scope of the claims cannot be either narrowed or enlarged by reissue, because in either case the invention so claimed would not be the *same* as that recited in the *claim* or *claims* of the original patent.

3. Because it involves the conclusion that the specification and claims of the original patent correctly describe and claim the real invention which the patentee invented or discovered, and that they cannot be "insufficient" by claiming less than the real invention, and that the patentee cannot make a mistake in the statement of invention made in his original specification; whereas the statute is specially provided for cases among others in which the patent is inoperative because the specification in either its description, drawing or claim, one or

more, is "defective or insufficient;" and authorizes the issue of a new patent with a "corrected specification" when such insufficiency has arisen from inadvertence, accident or mistake and without fraudulent or deceptive intention.

4. Because a legal construction of the language of the Act, restricting the scope of claims in a reissue to the scope of the claims of the original patent deprives the inventor of relief when his original patent is "inoperative" by reason of a specification "defective or insufficient," from an erroneous description or from claims "defective or insufficient," to protect against infringement the entire invention which he made or discovered before applying for a patent; the taking out of such an inoperative patent being the greatest "mistake" that can be committed.

5. Because to debar the patentee on a reissue from claims broader in scope than the claims or statement of invention given in the specification of the original patent, when his original application (description, drawing or model) shows that he had then described the subject matter of such broader claims, and when the patentee has sworn to their invention in his application for the reissue, and when the state of the art at the date of his original application shows he was then entitled to them, is under color of law to transform the defective claims or defective statement of invention of the patentees original patent into sophistical evidence that he did not invent that which the state of the art at the date of his original application shows he had then invented or discovered.

6. Because the said view is in conflict and inconsistent with the last clause of the same section (4916), which

in certain cases permits the insertion into the reissue of "new matter" which "was a part of the *original invention* and was omitted from the specification" [of the original patent] "by inadvertence, accident or mistake;" it being plain that if "new matter" is introduced into a reissue patent the invention set forth in it cannot be "the same" as was described and claimed in the original patent which did not contain this matter.

7. Because it is at variance with the practice of courts of equity in reforming instruments relating to other property.

§ 89. Understanding of the Law of Reissue by Mechanics.

The view of the mechanic and inventor as to the law of reissue has always been that the law gives the inventor the right to claim in a reissue *whatever he had a right to claim at the date of his original application in view of the state of the art at that date*, whether the scope of the reissue claim must for that purpose be broader or narrower than that of the original patent, and whether the statement of invention in the specification of the reissue be broader or narrower in scope than the statement in the specification of the original patent; provided however that the defect or insufficiency of the original patent has arisen from inadvertence, accident, or the mistake of himself or of his solicitor who solicited the patent, or of the Patent Office officials who granted it, and without fraudulent or deceptive intention; and provided further that the subject-matter of the enlarged claim is found in his model or sample filed in the Patent Office with the application for the original patent, or in the drawings of the original patent, or in the descriptive portion of the specification thereof; and provided lastly, that

when there is neither model nor drawing accompanying the application for the original patent, new matter or amendment may be introduced into the specification of the reissue patent upon proof satisfactory to the commissioner that the same was part of the original invention and was omitted from the specification by inadvertence, accident, or mistake.

§ 90. Grounds for the Understanding of the Mechanic.

This view of the law is founded upon what is believed to be a strict construction of the language of the Patent Act as a whole; the determination of what is meant by the words "the same invention" in section 4916, upon the subject of reissues, appearing plain upon a consideration of the preceding sections of the Act; and it being presumed that unless the word "invention" in any section is qualified (which is not the case in section 4916 relating to reissues) it means the same thing in one section as it does in the others.

Thus, section 4886 recites that—

"Any person who has invented or discovered any new and useful art, etc., may * * * obtain a patent therefor."

The language of the next section, 4887 is,—

"No person shall be debarred from receiving a patent for his invention or discovery," etc.

And the language of section 4888 is—

"Before any inventor or discoverer shall recive a patent for his invention or discovery, he shall make application therefor in writing," etc.

Lastly, section 4916 (on reissues) provides that—

"Whenever any patent is inoperative, etc., * * * the commissioner shall, on the surrender of such patent

and the payment of the duty required by law, cause a new patent for the same invention * * * to be issued * * * to the patentee."

With the light which the said earlier sections of the Patent Act shed upon section 4916, can there be a reasonable doubt that "the same invention" mentioned in section 4916 (relating to reissues) is the "invention or discovery" to which the preceding section 4887 and 4888 relate, and is the thing "invented or discovered," as recited in section 4886, before the application for the patent is made by filing it in the Patent Office? That "invention or discovery" is undoubtedly the one for which the inventor has the right under conditions prescribed in the law to "obtain a patent;" and having that right, it necessarily follows that the scope of the patent shall be commensurate with the invention or discovery "invented or discovered" by him previous to making his application for the patent. If the original patent falls short of this, or gives the inventor more than this, then in either case the inventor has not received a patent "for the same invention" which he "invented or discovered;" and which section 4886 states he "may obtain a patent" for; and in equity he is entitled to a reformation of the instrument (that is, the patent) so as to relieve him of the injury done him in case the patent is "inoperative" by reason of the description and claims of the specification being "defective or insufficient" to protect the entire invention, or is "invalid by reason of the patentee claiming as his own invention or discovery more than he had a right to claim as new."

Can there also be a reasonable doubt that the words "the same invention," as used in section 4916 relating to reissues, is the "invention or discovery" (recited in

sections 4887 and 4888) which the inventor "invented or discovered" (as recited in section 4886) *before he made application for his original patent*, as distinguished from the thing *erroneously described, or defectively or insufficiently claimed in the specification of his original patent* by inadvertence, accident, or mistake?

This construction of the law makes all the provisions of section 4916 harmonious and logical, because if the reissue patent is to be "for the same invention" which the patentee "invented or discovered" previous to making his application for the original patent, and which the patentee had the right to "make application" for and to "obtain," then so long as the reissue patent is issued for that invention it will be "for the same invention" specified in the Act, whether the scope of the reissue claims be enlarged, or be the same as in the original patent, or be reduced (when the patentee in the original patent has claimed "more than he had a right to claim as new"), or be enlarged by the making of amendments or the introduction of new matter, as provided in certain cases in the last clause of section 4916.

§ 91. Understanding of the Mechanic Same as Courts Prior to about 1878.

The foregoing construction of the words "the same invention" as used in the section relating to reissues appears to be that which was taken by the great expounents of the law who formed the United States Supreme Court prior to 1877, as well as by the judges of the United States circuit courts, as appears from the typical decisions referred to in § 83 and from numerous other cases.

In the case of *Grant* v. *Raymond*, the Chief Justice (Marshall) used the following language: "But the new"

[reissue] "patent and the proceedings on which it issues have relation to the *original transaction.*" *Grant* v. *Raymond*, 31 U. S. 6 Pet. 218, 8 L. ed. 376. He does not say the *claim of the original patent, or the statement of invention made therein.**

§ 92. Fraudulent Reissues.

Cases have undoubtedly occurred in which the claims of a reissue patent have been broadened beyond the scope of the original invention made or discovered by the patentee. Such reissues are fraudulent, and as the courts not only have the power to declare them as such, but have frequently exercised that power, and no doubt will

*See also: *Stimpson* v. *West Chester R. Co.*, 45 U. S. 4 How. 380, 11 L. ed. 1020; *Wilson* v. *Rousseau*, 45 U. S. 4 How. 646, 11 L. ed. 1141; *O'Reilly* v. *Morse*, 56 U. S. 15 How. 62, 14 L. ed. 601; *Battin* v. *Taggert*, 58 U. S. 17 How. 74, 15 L. ed. 37; *Gibson* v. *Harris*, 1 Blatchf. 167 (Nelson); *Potter* v. *Holland*, 4 Blatchf. 238 (Ingersoll); *Hussey* v. *Bradley*, 5 Blatchf. 134 (Hall); *Goodyear* v. *Wait*, 5 Blatchf. 468 (Nelson); *Blake* v. *Stafford*, 6 Blatchf. 195 (Shipman); *Morris* v. *Royer*, 2 Bond, 66 (Leavitt); *Providence Rubber Co.* v. *Goodyear*, 76 U. S. 9 Wall. 788, 19 L. ed. 566; *Seymour* v. *Osborne*, 78 U. S. 11 Wall. 516, 20 L. ed. 33; *Jordon* v. *Dobson*, 2 Abb. U. S. 398 (Strong); *Woodward* v. *Dinsmore*, 4 Fish. Pat. Cas. 163 (Giles); *Parham* v. *American Buttonhole, O. & S. M. Co.*, 4 Fish. Pat. Cas. 468 (McKennan); *Bailey Washing & W. Mach. Co.* v. *Lincoln*, 4 Fish. Pat. Cas. 379 (Lowell); *Seymour* v. *Marsh*, 9 Phila. C. C. 380 (McKennan); *Wheeler* v. *Clipper Mower & Reaper Co.*, 10 Blatchf. 181 (Woodruff); *Black* v. *Thorne*, 10 Blatchf. 66 (Blatchford); *Dorsey Harvester R. R. Co.* v. *Marsh*, 6 Fish. Pat. Cas. 387 (McKennan); *Eickemeyer Hat Blocking Mach. Co.* v. *Pearce*, 10 Blatchf. 403 (Blatchford); *Bantz* v. *Elsas*, 1 Bann. & Ard. 351 (Swing); *Reedy* v. *Scott*, 90 U. S. 23 Wall. 352, 23 L. ed. 109; *Westinghouse* v. *Gardner & Ranson Air-Brake Co.*, 2 Bann. & Ard. 55 (Swayne & Walker); *Calkins* v. *Bertraud*, 6 Biss. 494 (Blodgett); *Marsh* v. *Seymour*, 97 U. S. 348, 24 L. ed. 963.

always exercise that power when the occasion requires, it is not perceived that the fact of such occasional frauds should deprive honest patentees of a right which is not only plainly given them by the statute, but is also due them independently of the statute as a matter of equity.

§ 98. Period Allowed for a Reissue.

As to the period in the term of the patent at which a reissue may be legally applied for and received, the statute (§ 4916) has the following language: "*Whenever* any patent is inoperative or invalid * * * ." It is worthy of notice that this word "whenever" occurs in the first Patent Act on the subject (Act of 1832, § 3), and occurs also in every subsequent Act (Act 1836, § 13; 1870, § 53) up to and including the Act now in force. The same word "whenever" also occurs in the sections relating to the filing of disclaimers to such things as may be claimed in a patent but which the patentee or his assignee may not choose to claim after his patent has been issued and in force.

The common meaning of the word "whenever" is "at whatever time" or "if at any time," and when applied to disclaimers it has always been held that it gives the patentee or his assignee the right to file a disclaimer at any time during the term of the patent, even after a suit under it has been commenced. This common meaning of the term "whenever" also was the one held by the courts in their decisions upon reissue patents prior to about 1877. Thus in the case of the Woodworth Planing Machine, the original patent was granted the 27th of December, 1828, for fourteen years. The term of this patent was extended twice, so that it remained in force for twenty-eight years. On the 8th day of July, 1845, a re-

issue patent for the same invention (with broader or enlarged claims) was obtained by the administrator of the original patentee. This reissue, therefore, took place nearly *seventeen years* after the date of the original patent. The reissue was declared to be valid by the Supreme Court. *Wilson* v. *Rousseau*, 45 U. S. 4 How. 646, 11 L. ed. 1141.

In the case of the Battin Coal Breaker invention the original patent was dated the 6th October, 1843. On the 4th September, 1849, the patentee took out a reissue patent with broader or enlarged claims for the same invention. This reissue, therefore, took place *six years* after the date of the original patent. The reissue was declared valid by the Supreme Court. *Battin* v. *Taggert*, 58 U. S. 17 How. 74, 15 L. ed. 37.

In the case of Goodyear's rubber vulcanizing invention the original patent was dated the 15th of June, 1844. The term of the patent was extended and a reissue in two divisions with enlarged claims was taken out by the executor of the inventor on the 20th November, 1860. This reissue, therefore, took place *sixteen years* after the date of the original patent. The reissue was declared valid by the Supreme Court. *Providence Rubber Co.* v. *Goodyear*, 76 U. S. 9 Wall. 788, 19 L. ed. 566.

Many similar cases occurred in the United States circuit courts.

§ 94. Period Allowed for Reissue by New Legal Construction.

About 1879 a new departure in the matter of the extent of the period permitted for reissues, as well as in the matter of the invention claimable in a reissue, was taken by the United States Supreme Court. Thus in one case that court enunciated the dictum—

"The only mistake suggested is that the claim was not as broad as it might have been. This mistake, if it was a mistake, was apparent upon the first inspection of the patent, and if any correction was desired, it should have been applied for immediately." *Miller* v. *Bridgeport Brass Co.*, 104 U. S. 350, 26 L. ed. 783.

This same doctrine was affirmed in the cases of *Matthews* v. *Boston Mach. Co.*, 105 U. S. 54, 26 L. ed. 1022, and of *Bantz* v. *Frantz*, 105 U. S. 160, 26 L. ed. 1013.

§ 95. View of the Mechanic as to the New Construction of the Period Allowed for Reissue.

To the inventor and mechanic this fabrication of law by judicial construction, when there is no language in the statute to justify it, appears to be not only unwarranted but is absurd in view of the following considerations:

1. An inventor undoubtedly knows the physical thing which he has produced or discovered, whether it be an art, a manufacture, or a composition of matter; but he never knows what particular matter or matters, part, improvement, or combination, in any one of those subjects produced by him is new and is his legal invention or discovery in view of the state of the art at the date his invention or discovery is produced. He cannot know this, because such knowledge would involve a knowledge of the entire history of inventions of the same class not only in the United States, but also in every foreign country. Even skilled experts, whose labors are restricted to the investigation of particular classes of inventions, often fail in this respect as is proved by the fact that even after the claims to an invention have passed the scrutiny of the Examiners in the Patent Office,

who individually confine their entire work to one narrow class of inventions, one of the commonest and most successful defenses against an action under the patent is that the invention was not new, some old matter which has escaped the attention of the examiner in the Patent Office having been discovered.

2. An inventor is with but few exceptions a man ignorant of the legal language in which an invention must be described and defined in the specification of a patent. Nor does he apprehend the legal signification of the language in which his invention is described and claimed in his patent. Even the judges of the United States courts, with all their training, experience, and learning, and with the aid afforded them by the arguments of counsel, and the testimony of skilled experts, frequently differ as to the legal construction of the claims and specifications of patents. How then can an inventor, who as a practically universal rule has no knowledge of such matters, be expected to discover a mistake "upon the first inspection of the patent," "as soon as that document is taken out of its envelope and opened."

3. What the real legal invention is in an art, machine, manufacture, or composition of matter, is often one of the most difficult of all things to be found out; and often it is not apprehended until years have elapsed after the grant of the patent, as was the fact in the Goodyear case and also in the Woodworth planing machine case (§§ 83 and 93).

4. As long as no infringement of an invention is brought to the knowledge of the patentee he naturally supposes that his patent is operative and sufficient to protect him in the use of the full invention which he made or discovered; and, *as a general rule, it is* only

when he finds that his art, machine, manufacture, or composition is produced by some unauthorized party that any doubt arises in his mind as to the operativeness and sufficiency of his specification.

§ 96. Actual Invention Rarely set forth Correctly in an Original Patent.

With those who have had experience in the methods in which applications for patents are prepared and acted upon in the Patent Office, the general understanding is that the real legal invention made by an inventor is rarely set forth in his original patent:

1. Because a majority of the specifications of patents are prepared by persons who have had no experience in the courts and therefore do not appreciate the necessity of the utmost care in doing the work; and who, if able to determine what the real legal invention is, generally do the work of preparing an application for so small a compensation that they cannot afford to expend the time and labor required to ascertain it.

2. Because the practice of the majority of the examiners of the Patent Office for many years has been never to grant a claim broad in its scope if by repeated rejections they can get an inventor or his solicitor to take a narrow claim; and as many solicitors receive a fixed sum for soliciting a patent, it is the policy of many of them to take any claims they can get through the Patent Office with the least expenditure of time and labor, whether such claims cover the real invention or not.

§ 97. Effect of Value of Invention upon the Necessity for Reissue.

The great majority of patented inventions are of such small practical value that they are rarely used by others

than their inventors, and there is no temptation to manufacturers to use them in preference to inventions which have become public property. With patents for such inventions of small value it is practically immaterial whether the claims are too narrow or not, and reissues of them are not sought for. But when the invention is really valuable the general rule is that the patent is issued with claims that are not broad enough to fully protect it, and the patent is inoperative to protect the full invention "by reason of a defective or insufficient specification." Consequently, a reissue for the enlargement of the claims is the general rule in cases of patents for inventions sufficiently valuable to justify the cost of legal proceedings for their enforcement.

§ 98. Injustice of Restriction to a Fixed Period for Reissue.

Under the above circumstances to restrict a patentee in every case to a certain period in which an application for a reissue can be filed is unreasonable and would do him great injury and injustice.

§ 99. Doctrine of Dedication to the Public for Part of full Invention not Claimed in Original Patent.

It has been held by the Supreme Court of late years that a patentee who from any inadvertence, accident or mistake whatever, failed to claim his full invention in his original patent, thereby dedicated to the public whatever he left unclaimed; the language of the Court being as follows:

"But it must be remembered that the claim of a specific device or combination, and an omission to claim other devices or combinations apparent on the face of

the patent, are, in law, a dedication to the public of that which is not claimed. It is a declaration that that which is not claimed is either not the patentee's invention, or, if his, he dedicates it to the public." *Miller* v. *Bridgeport Brass Co.*, 104 U. S. 352, 26 L. ed. 784.

This view was subsequently affirmed by a majority of the court, in the following language:

"The taking out of a patent which has (as the law requires it to have) a specific claim, is notice to all the world, of the most public and solemn kind, that all those parts of the art, machine, or manufacture set out and described in the specification and not embraced in such specific claim, are not claimed by the patentee,—at least not claimed in and by that patent. If he has a distinct patent for other parts, or has made application therefor, or has reserved the right to make such application, that is another matter, not affecting the patent in question. But, so far as that patent is concerned, the claim actually made operates in law as a disclaimer of what is not claimed; and of all this the law charges the patentee with the fullest notice.

"Then, what is the situation? The public is notified and informed by the most solemn act on the part of the patentee, that his claim to invention is for such and such an element or combination and for nothing more. Of course, what is not claimed is public property. The presumption is, and such is generally the fact, that what is not claimed was not invented by the patentee, but was known and used before he made his invention. But, whether so or not, his own act has made it public property if it was not so before." *Mahn* v. *Harwood*, 112 U. S. 361, 28 L. ed. 668.

§ 100. Dedication to Public of Unclaimed Part of Invention of Original Patent not Recognized by Earlier Decisions.

To the inventor and mechanical engineer these late dicta of the United States Supreme Court as to a dedication to the public of the parts of an invention not claimed in an original patent, are remarkable in view of the earlier dicta by the same court. Thus, the question of the right of the public, after the reissue of a patent with corrected claims, to use so much of the invention as was not claimed in the original patent by inadvertence, accident or mistake, was distinctly raised before the first statute on reissues was passed. The Chief Justice (Marshall) in delivering the opinion of the court then used the following language:

"It has been urged that the public was put into possession of the machine by the open sale and use of it under the defective specification, and cannot be deprived of it by the grant of a new patent. The machine is no longer the subject of a patent. This would be perfectly true, if the second patent [the reissue] could be considered as independent of the first. But it is in no respect so considered. The communication of the discovery to the public has been made in pursuance of law, with the intent to exercise a privilege which is the consideration paid by the public for the future use of the machine. If, by an innocent mistake, the instrument introduced to secure this privilege fails in its object, the public ought not to avail itself of this mistake, and to appropriate the discovery without paying the stipulated consideration. The attempt would be disreputable in an individual, and a court of equity might interpose to restrain him."

Grant v. *Raymond*, 31 U. S. 6 Pet. 244, 8 L. ed. 385.

After the enactment of the first statute on reissue, the above view was affirmed. Thus, in the case of *Battin* v. *Taggert*, the original patent was taken out October 6, 1843. The reissue patent was dated September 4, 1849. In a suit under the latter it was contended on the part of the defendant that whatever was not claimed in the original patent was dedicated to the public and could not be reclaimed by a reissue of the patent. The circuit judge charged the jury to this effect and instructed them to find a verdict for the defendant. The case was appealed to the United States Supreme Court, which in commenting upon the charge of the circuit judge states it is follows:

"It is said that the present defendants are using the apparatus described in this reissued patent and that they should be mulcted in damages, accordingly. But there are two legal positions, of a general character, which appear to me to bar the plaintiff's right to recovery. They are these:

"1. That a description, by the applicant for a patent, of a machine, or a part of a machine in his specification, unaccompanied by notice that he has rights in it as inventor, or that he desires to secure title to it as a patentee, is a dedication of it to the public.

"2. That such a dedication cannot be revoked after the machine has passed into public use, either by surrender and reissue, or otherwise."

On these points the Supreme Court said:

"The above instructions, we think, were erroneous."

The court then referred to the previous cases of *Grant* v. *Raymond*, and *Shaw* v. *Cooper*, as sustaining this position, and added:

"By the defects provided for in the statute, nothing passes to the public from the specifications or claims, within the scope of the patentee's invention."

Battin v. *Taggert*, 58 U. S. 17 How. 77, 83, 15 L. ed. 378.

This decision was rendered when Taney, and McLean, and Nelson, and Grier, all of whom had had a large experience in patent causes, and of whose ability as jurists there can be no doubt, were members of the court.

§ 101. Reissue must be Applied for within a Reasonable Period.

Whatever be the time in the term of a patent at which a reissue with either an enlarged or a reduced claim is found necessary to protect the invention made by the patentee prior to the date of application of his original patent which may be inoperative to protect the full invention, it has been always decided that the application for such a reissue must be made within a reasonable period; and the question arises what such reasonable period should be. In the case of *Miller* v. *Bridgeport Brass Co.*, 104 U. S. 350, 26 L. ed. 783, the Supreme Court enunciated the dictum that "when if a claim is too narrow—that is, if it does not contain all that the patentee is entitled to,—the defect is apparent on the face of the patent and can be discovered as soon as that document is taken out of its envelope and opened, there can be no valid excuse for delay in asking to have it corrected." A dictum which we have attempted to show (§ 93 and § 95) goes beyond the statute, is unreasonable, inequitable to the inventor, and also contrary to the decisions of the same court when its judges were at least as able as those who concurred in the dictum.

It was intimated in the same decision (*Miller* v. *Bridgeport Brass Co.*) that when a patentee found a reissue with an enlarged claim to be necessary to protect his real invention, not more than two years should elapse between the grant of the original patent and the application for such a reissue; this intimation being based upon the theory that failure to either describe or make a claim to the full invention amounted to a public disclaimer of the unclaimed portion, and that the case was analogous to that of an inventor who permits his invention to go into public use for two years previous to filing an application for a patent and thereby forfeits his right to a patent.

This suggestion of a period of two years was set forth more strongly in the case of *Ives* v. *Sargent*, 119 U. S. 652, 30 L. ed. 544, coupled, however, with an intimation that if the delay to apply for a reissue exceeded two years, it might not render the reissue void, provided an excuse satisfactory to the court should be proved. This same view is set forth in the opinion given in the case of *Topliff* v. *Topliff*, 145 U. S. 156, 36 L. ed. 658, on the subject of the qualifications to which reissues are subject; viz:

"Second. That due diligence must be exercised in discovering the mistake in the original patent, and that, if it be sought for the purpose of enlarging the claim, the lapse of two years will ordinarily, though not always, be treated as evidence of an abandonment of the new matter to the public to the same extent that a failure by the inventor to apply for a patent within two years of a public use or sale of his invention is regarded by the statute as conclusive evidence of an abandonment of the patent to the public."

But the court, when acting upon other cases, has not given a patentee even this period of two years from the date of the original patent to enlarge his claims by reissue so as to protect his real invention, for in the case of *Coon* v. *Wilson*, 113 U. S. 268, 28 L. ed. 963, a reissue with an enlarged claim was held to be void, although the application for the reissue was filed *less than four months* after the issue of the original patent; and in the case of *Yale Lock Mfg. Co.* v. *Berkshire Nat. Bank*, 135 U. S. 342, 34 L. ed. 168, the reissue with an enlarged claim was held to be void, although the application for the reissue was filed *only thirteen days* after the issue of the original patent.

These late decisions of the Supreme Court as to the period within which a reissue with an enlarged claim should be applied for are not only at variance with the earlier decisions of the same court as we have previously shown (§ 93), but are in conflict with the reasonable dictum of a former Chief Justice (Taney) of the same court, who, while holding that a patentee should apply within a reasonable period for the reissue of a patent that was defective by an error which arose from inadvertence, accident, or mistake, also held that the period should be "within a reasonable time *after he discovered it.*" *Knight* v. *Baltimore & O. R. Co.*, Taney, 106.

§ 102. Reasonable Period for Reissue.

It is no doubt in accordance with equitable considerations that a patentee who *knowingly* permits others to use a part of his original invention which has not been claimed in his original patent, and does not apply for a reissue within a reasonable period after such knowledge has come to him, should be held to have forfeited his

right to a reissue with an enlarged claim covering the part so unclaimed in the original patent. But the question still remains, what is such reasonable period? The law (§ 4886) as to the effect of a public use of an invention before the application for a patent is filed, fixes the period within which the application must be filed at not exceeding two years from *the first public use.* By analogy it may seem reasonable to the courts that a period of two years would be a reasonable period within which a reissue with an enlarged claim must be applied for; but if that is to be the period, it should not date from the date of issue of the original patent, but, like that of public use before the application for the original patent, should date from the first public use by an unauthorized party of the unclaimed part of the invention of the patentee subsequently grasped by the enlarged claims of the reissue. Such first public use by another party might happen years after the grant of the original patent, and it is not at all likely that it would occur to any patentee that his patent was inoperative to protect his whole real invention until such public use of it was made by another.

To fix the period even at two years from the date of first public use by a party unauthorized by the patentee would in many cases be unjust to the latter, because the best counsel he can employ may advise him that his original claim is operative and sufficient without reissue; and yet the court may take a contrary view; so that the patentee may not be able to ascertain whether a reissue with an enlarged claim is or is not required to make his patent operative to protect his full invention until after an action under the patent has been had and a decision rendered by the court of last resort.

§ 103. Reasonable Period for Reissue with Reduced Claims.

What would be a reasonable period within which an application must be filed for the reissue of a patent with an enlarged claim is not necessarily reasonable for a reissue with a reduced claim; because in the latter case it is as a general rule impracticable to know whether the claims of the original patent are or are not too broad in scope until either a suit under it has been prosecuted and evidence has been put in as to the previous state of the art, or often until a decision has been rendered by a court of last resort, because the patentee and his counsel may be of the opinion that the claim when properly construed is not too large in scope, while the court may decide to the contrary.

In the case of a disclaimer it has been held that a disclaimer applies to a cause in suit, even if filed after all the testimony in such suit has been taken, and that the suit may be proceeded with (*Tuck* v. *Bramhill*, 6 Blatchf. 95); and although a patent cannot be reissued during the pendency of a suit, it certainly would not be reasonable that a patentee should be expected to reduce the scope of his claims until a reasonable period after it has been shown that his original claims are too broad and include more than he invented. What such reasonable period may be must depend upon the circumstances of each particular case, and cannot equitably be fixed by rule.

§ 104. Equitable Right of a Manufacturer before Reissue to Continue to Manufacture Subsequently.

It has been urged that when a patentee has failed to claim in his original patent the full invention which he made, and when another party, unauthorized by the

patentee prior to the reissue of the patent with an enlarged claim, has engaged in the manufacture of articles containing only the part of the invention unclaimed in the original patent but reclaimed in the reissue, it is not equitable that such other party should have his business stopped by the reissue, and that the reissue with the enlarged claim should be void because it was delayed until after such other party commenced manufacturing. This objection is in substance the same as the proposition that the part of the invention unclaimed in the original patent is dedicated to the public; but assuming that the proposition is equitable as respects the party who has *innocently* engaged in the manufacture prior to the reissue, does it follow that it is equitable to the patentee as respects the rest of the public? We think that it should not be so held. When an inventor permits another party to use his invention prior to filing his application for a patent (that is for the original patent) it has been held that such permit amounts in substance to a license to such party, permitting him to continue to use the invention subsequent to the grant of the patent. *McClurg* v. *Kingsland*, 42 U. S. 1 How. 202, 11 L. ed. 102. In like manner, it would appear to be equitable that a patentee who by delay in applying for a reissue with an enlarged claim permits another party to engage *innocently* in the manufacture of an article which does not infringe the original patent, but embodies only the part of the invention unclaimed thereby in and subsequently grasped by the enlarged claim of the reissue, should be held to have licensed such other party to manufacture, use and vend for use the unclaimed part of the invention, and to continue to do so after the reissue. But as respects all other parties, the reissue

patent should be held operative and valid. Such a construction of the law would be equitable to the patentee as well as to the party who has engaged innocently in the manufacture of the part unclaimed in the original patent previous to the filing of the application for the reissue.

§ 105. Frequent Course of Infringing Manufacturers.

The words "engaged innocently" in the last preceding section have been used advisedly, because it rarely happens that such is the fact, as the following is a very common case: A patentee of a really valuable invention takes out his patent and, often with great difficulty, gets it into use, and proves it to be of great practical value so that it attracts the attention of manufacturers of articles of the same class. Some one of these, perceiving that a large profit can be had from the manufacture, lays the patent before his counsel and expert for the purpose of ascertaining whether he can possibly manufacture a rival article possessing the valuable qualities of the patented one without infringing the claims of the original patent, which frequently are inoperative to protect the full invention made by the patentee. If the report of the counsel and expert are favorable, the manufacturer at once engages in the manufacture, trusting to the later practice of the United States Supreme Court to declare a reissue of the patent with an enlarged claim invalid, although such claim covers as a matter of fact no more than exists and was new in the article described, or represented in the drawings or model or sample of the original patent when compared with the state of the art at the date of the application therfore. It can hardly be said that the manufacturer who persues

this course has become "engaged innocently" in the manufacture. Does he not rather fall within the purview of the opinion of the Supreme Court which we have previously quoted in § 100, and which for convenience of reference is now repeated;

"If by an innocent mistake, the instrument introduced to secure this privilege fails in its object, the public ought not to avail itself of this mistake and to appropriate the discovery without paying the stipulated consideration. The attempt would be disreputable in the individual, and a court of equity might interpose to restrain him."

Grant v. *Raymond*, 31 U. S. 6 Pet. 244, 8 L. ed. 385.

In view of this dictum is it not equitable that the burden of proof that the defendant has innocently infringed should lay upon him?

§ 106. Equitable Construction of Law of Reissue.

From the considerations previously set forth it would appear to be but just to the inventor and patentee that the construction of the law of reissue should be substantially as follows:

1. That a patentee who holds a patent that is inoperative by reason of a specification defective or insufficient to protect the full real invention made by him previous to the date of filing his application for the original patent, or who holds a patent that is invalid by reason of his claiming as his own invention or discovery more than he had a right to claim as new, may legally apply for a reissue thereof with either an enlarged claim (in the former case) or with a reduced claim (in the latter case), and at any time within the term of the patent, provided the error has arisen by either inadvertence, accident, or

mistake and without any fraudulent or deceptive intention; and provided further that the delay in making the application for the reissue is not unreasonable under the circumstances of the particular case.

2. That the invention described and claimed in the reissue of the original patent is not to be restricted to merely the same invention which is *claimed* in the original patent, or even to identically the same invention which is set forth in the descriptive text of that patent, because either or both may be defective or insufficient; but is to be the same invention which the patentee invented or discovered as provided in section 4886 of the patent law as the condition precedent to obtaining the original patent.

3. That if the thing correctly described and claimed in the reissue patent is found described in the descriptive text of the original patent, or is represented in the drawings thereof, or is embodied in the model or in the sample which the patentee filed in the Patent Office with his application for the original patent, either fact is conclusive evidence that the thing so claimed in the reissue is "the same invention" specified in the statute for which the reissue may be legally granted; provided it was new as respects the state of the art, and was original with the patentee, at the date of filing his application for the original patent.

4. That the provision of the statute prohibiting the introduction of "new matter" into the corrected specification of the reissue does not prohibit the introduction of matter which was omitted from the descriptive text, or from the claims of the original specification, or from the drawings, by inadvertence, accident, or mistake, and without any fraudulent or deceptive intention, when

such matter is found in either the model or sample, or in the drawings, or in the descriptive text of the original patent or of the application therefor on file in the Patent Office; but prohibits only the introduction of matter which is not found in substance in any one of these at the date of the original application, and which in such case is to be construed under the statute as not forming part of the original invention or discovery at that date.

5. That, in accordance with the last clause of § 4916 of the Patent Law, matter new as compared with the specification and claims of the original patent or amendatory thereto may be introduced into the corrected specification of the reissue of any other than a machine patent when there was neither model nor drawing filed in the Patent Office with the application for such other patent, "upon proof satisfactory to the Commissioner that such new matter or amendment was part of the original invention, and was omitted from the specification by inadvertence, accident or mistake as aforesaid."

6. That the fact that an original patent is operative to the extent of what is described or claimed therein, is not satisfactory evidence that the patent is not inoperative by reason of a defective or insufficient specification to protect the full invention made by the patentee and which he intended to patent, and which he has a legal right to describe and claim in the corrected specification of the reissue; because it does not follow that when a patent is operative to protect a part of an invention, it is not inoperative to protect the entire invention.

7. That in accordance with the earlier decisions of the United States Supreme Court, the fact that a patentee has failed to claim in his original patent a material part of his real invention by reason of inadvertence, accident,

or mistake, and without any fraudulent or deceptive intention, is not a dedication of the unclaimed part to the public, which acts as an estoppel to the reclamation of such material part by a reissue.

8. That the fact that some unlicensed party has engaged previous to the reissue of a patent in the manufacture of things embodying the part of an invention unclaimed in the original patent but subsequently claimed in the reissue of it, does not of itself render the reissue invalid, and is not conclusive evidence that there is an unreasonable delay in applying for the reissue.

9. That if equity requires that a party who has engaged innocently, before the application for a reissue, in the manufacture of things embodying only the part of the invention unclaimed in the original patent but subsequently claimed in the reissue, should be permitted to continue the manufacture of the same articles subsequent to the reissue, then such party should be deemed to have acquired by reason of the delay of the patentee to reissue an equitable license to continue to make, use, and vend to be used the same articles after the grant of the reissue. But the fact of such acquirement of an equitable license by such innocent party does not apply to nor inure to the benefit of any other party who engages in such manufacture subsequent to the date of application for the reissue and who infringes any one of its claims.

10. That when claims and statements of invention are made in a reissue patent which are broader in scope than those made in the original patent, the fact that any claims, or any statements of invention, or both, of the original patent recite only a part of what is claimed in the reissue should not be construed into evidence that the patentee intended to patent no more than what is so

claimed or set forth in the original, provided the inventor has sworn to the correctness of the reissue. On the contrary, the inventor's oath to the application for reissue should be considered as prima facie evidence of the correctness of the claims and statements of invention set forth therein, and the burden of proof to the contrary should lay upon the defendant in a suit.

As to this last proposition it is a fact well known to all who act as solicitors of patents that an inventor always intends to claim in his original patent everything that is new in what he has done in view of the state of the art at the date of his invention. To presume that an inventor who has taken out a reissue with broader claims than existed in his original patent did not so intend at the time of his application for the latter, and that he intended by his original patent to dedicate the unclaimed part of his real invention to the public, is to presume that every such inventor (using the classic language of the workshop) "knew himself," at the date of his original application, "to be a born fool," who voluntarily abandoned that which the law gave him the right to claim for himself; a presumption which is irreconcilable with the universal laws of human nature and with common sense. That an inventor fails to claim in his original patent all that he had a right to, is a grievous error arising from mistake, either on his own part, or on the part of his solicitor, or on the part of the official of the Patent Office who may have refused to allow him claims commensurate with his invention; and inventors have universally believed that this is one of the errors which, when committed without fraudulent or deceptive intention, the statute of reissue enables him to correct.

E. Ewart