

Scientific American

NEW YORK, NOVEMBER 24, 1849.

The Poetry of Discovery.

"New inventions are, as it were, new creations and imitations of God's own works."—Bacon.

Inventions are the poetry of physical science, and inventors are the poets. Between the bards of machinery and the bards of literature, there is a strong resemblance; in fact, the same spirit of inspiration dwells in both—they only strike different lyres. How often has the soul of the poet gushed out in burning strains, after listening to some plaintive melody, wild passing midnight wind, or the cadence of some distant water-fall; and from the falling of an apple, did not the soul of the great Newton grasp the realities of gravitation—that law which "binds the sweet influences of the Pleiades, and forms the bands of Orion." Who can tell of the dreamings—the wakeful nightly dreamings of inventors, their abstractions and enthusiastic reveries, to create some ballad or produce some epic in machinery. Every schoolboy knows the story of Archimedes—how he ran in nudity through the streets of Syracuse, at the discovery which he made to detect adulterated metals by the displacement of a few drops of water. All great inventors possess the faculty of imagination in a very high degree. Sir Samuel Morland indited songs and sang them with grace and feeling. Sir Humphrey Davy wooed the Muses before he experimented in gases and invented the safety lamp. Telford, the inventor of iron suspension bridges, penned some exquisite verses, and had a soul strung with music and poetry. Many men whose names stand high in the roll of physical discovery and mechanical invention, have been disciples of Homer, and often visited the shades of Parnassus. In the days of old, it seems, the Greeks believed in the close relationship of music and invention, for they tell us that one of their harpers made the very rocks forget their gravity, and dance in good order into the walls of Thebes, where they long remained as monuments of musical power. There are not a few also, who have heard of the good hearted Father Tournemine, who attempted to construct a machine in Paris, which, by the turning of a crank would play various tunes and allay the cravings of hunger without the expense of provisions, either in the shape of roast beef or plumb pudding.

In all ages poetry has had a wonderful influence upon the people of all nations. The Greeks rushed to victory chanting their wild songs, and the bards of Cambria awoke those strains which were the laws and precepts of that ancient people. Poetry opens up the fountains of the human heart, touches its well-spring of feeling. No wonder, then, that the Celtic chiefs proclaimed their wills through the voices of their harpers; and the prophets breathed their predictions in the loftiest poetic strains. Who can read Isaiah and Jeremiah and not feel the poetry of prophecy. As poetic prophecy has often foretold mighty revolutions among the nations of the earth, it might reasonably be expected that it would sometimes foretel revolutions in social life. This it truly does, but never to our knowledge have mankind looked to it for a prophetic description of those means whereby many such revolutions were to be brought about. The invention of printing, the steam engine, and other machines, have entirely revolutionized social life, but who has looked to poetic prophecy for its predictions about them? Among one of the most remarkable discoveries and inventions of the present day, is the Electric Telegraph. By it, friends can converse together, although separated by thousands of miles, and by it the motions of the heavenly bodies are noted, and intelligence of the same is communicated hundreds of miles by one astronomer to another, without the least perceptible down having fallen from the wings of Time. Surely this is a most wonderful invention, and we all know that it is but a few years old. But it may surprise our readers to know that the magnetic telegraph was distinctly described by

poetry hundreds of years before it was invented. It is stated in Vail's history of Telegraphs, that the first electric telegraph mentioned was that of a Mr. Lomond, in France, in 1787, who, with wires and an electric machine, communicated with a person in a neighboring chamber. But let us turn to a more ancient telegraph than this: "Strada, the Critic, in one of his profusions, in the person of Lucretius, gives an account of a chimerical correspondence between two friends by the help of a certain loadstone, which had such a virtue in it that if it touched two several needles, when one of the needles so touched began to move, the other, though at ever so great a distance, moved at the same time and in the same manner.

He tells us that the two friends, being each of them possessed of one of those needles, made a kind of dial plate, inscribing it with the four, and twenty letters, in the same manner as the hours of the day are marked on the ordinary dial-plate. They then fixed one of the needles, on each of these plates, in such a manner that it could move round without impediment, so as to touch any of the four and twenty letters. Upon their separating from each other into distant countries, they agreed to withdraw themselves punctually into their closets at a certain hour of the day, and to converse with one another by means of this new invention.

Accordingly, when some hundred miles asunder, each of them shut himself up in his closet at the time appointed, and immediately cast his eye upon the dial-plate. If he had a mind to write anything to his friend, he directed his needle to every letter that formed the words which he had occasion for making a little pause at the end of every word or sentence, to avoid confusion.

The friend, in the meanwhile, saw his own sympathetic needle moving itself to every letter which that of his correspondent pointed at. By this means they talked across whole continents, and conveyed their thoughts to one another in an instant, over cities or mountains, seas or deserts."

The above extract is taken from Addison's 119th paper, in the Guardian, which was published in July, 1713, and Strada died in 1649, exactly two hundred years ago. He was the author of Poetical Profusions, and teacher of Eloquence in Rome. Hitherto we have been talking about inventors being poets, but here is poetry becoming invention. Strada could not have described the signalling-magnetic telegraph more faithfully, if he had lived and examined that of Wheatstone in our own day. Was not this production of Strada the prophetic poetic invention of the Magnetic Telegraph? From this we learn that "coming events sometimes cast their shadows before," and as Strada's chimerical friends used no wires for their telegraph, may it not be possible that some inventors will yet discover the secret of dispensing with them altogether—this would be the greatest discovery of all.

The Law of Patents.

The Charleston, S. C., Mercury, of the 13th inst., says that we misunderstood the meaning of the two articles which were published in the Mercury, and part of which we copied into our columns, in relation to the conduct of the Federal Court in the case of Motte vs. Bennett, about the infringement of the Woodworth Patent. The MISTAKE was not intentional, as the Mercury gentlemanly premises. We agree with the Mercury on the point, that it is not the practice of the English Court of Chancery to grant perpetual injunctions when validity of the Patent, or infringement is denied. The Mercury states that it only referred to perpetual not interlocutory or provisional injunctions, which it states were always customary to be granted by the Court, until the question was tried at law. The following is the spirit of the article in the Mercury:

"The question before the Court, and the only one discussed by the defendant's counsel, and the only one reviewed by us, was as to a perpetual injunction—a final decree. It is this: Is it 'the course and practice of Courts of Equity' in England, in a patent case, where the defendant denies the validity of the patent or the fact of infringement, one or both, to

grant a perpetual injunction, and make a final decree, without a trial at law and the verdict of a Jury? Judge Wayne asserts the affirmative—we the negative. Judge Wayne says: 'The English Chancery will show that for more than eighty years, injunctions, both provisional and interlocutory, and perpetual, have been granted in the first instance in cases of copyrights and patents: and that when they have been perpetual in the first instance, they have been made so without the intervention of a jury to try the question of title or infringement.' We deny this altogether. The English Chancery shows nothing of the kind."

A number of cases are cited from the ablest English authority to prove Judge Wayne wrong, and it recommends Congress to purchase a few copies of Hindmarsh on Patents for the uses of the Judges of the Supreme Court. Were it not that there is so much about patents in this number we would publish the whole article. Next week, however, we will publish from a work by one of the best living English Patent Attorneys, the Practice of the English Courts, which will be found to accord exactly with the views of the Mercury.

Interesting Patent Cases.

MACHINE FOR MAKING LEAD PIPE.

On the 12th inst., in the U. S. District Court, New York, before Judge Nelson, a very important case was decided by a verdict in favor of the defendants. The case was an action for an infringement of a patent granted to B. Tatham, Jr., on Oct. 11, 1841, for improvements in the manufacture of lead pipe machinery. The defendants were Thomas O. Le Roy and David Smith, who were using a machine under a patent granted to Samuel G. Cornell, Aug. 21, 1847. The plaintiffs alleged that Cornell's improvements for which the patent was granted to him, consist of transpositions of the parts of their machines and were not substantially different from those described in their patent. The defendants alleged that their machine was not only substantially different from that of the plaintiffs, but possessed very great advantages over all lead pipe machines heretofore known. It appeared in evidence that the defendants, by employing one half of the pressure necessary to work the other machines, could make three times the quantity of lead pipe that could be made by any other method.

The trial occupied the court five days, and Judge Nelson, in charging the Jury, gave a very lucid and learned history of machinery for making lead pipe. Both the patents of plaintiff and defendants were for improvements on a machine invented by Thos. Burr, in 1820. This case has been the subject of litigation for a long time, and there was a great excitement created among our plumbers and those connected with the business. Attorneys of fame were employed on both sides. For the plaintiff, Messrs. Cutting, Staples and Goddard; for defendants, Messrs. Stoughton, Noyes and Harrington.

PLANING MACHINES.

On the 13th inst., before Judges Grier and Kane, U. S. Circuit Court, Philadelphia, the injunction granted against the machine of Barnum was dissolved upon the following conditions: 1st, That the injunction be dissolved, if defendant gives a bond in \$10,000, within ten days, to account for all profits. 2d, That the injunction shall stand if defendant does not give such security within ten days, and plaintiff within ten days thereafter give additional security to indemnify defendant.

The case now stands as it should have stood when application for an injunction was made. We took the ground "that no injunction should have been granted." Our opinions were founded upon our views of the Patent Laws, and a knowledge of the case. We were honestly sincere in all the remarks that we have made, and we view such questions, keeping individuals out of sight entirely, and look upon the case entirely on its own merits. We seldom are far wrong in our predictions—they are generally fulfilled. See our views on Patent Laws on page 46, this Vol., Sci. Am.

ELECTRIC TELEGRAPH CASE.

On the 24th of last month an injunction was to be moved for by the owners of Morse's Patent, to restrain the use of Bain's Electro-

Chemical Telegraph as an infringement of Morse's Patent. The parties were to be heard before Judge Munroe, at Frankfort, Ky., but the plaintiffs never argued the question, but abandoned the motion. We predicted that no injunction could be granted. We see that some papers have made a very serious charge against the Patent Office, in respect to Morse's Chemical Telegraph Patent, stating that as it was issued, it was very different from what it was when argued and decided upon by Judge Cranch.

We are very cautious about how we express ourselves in respect to patents. Our mind is perfectly unbiased, and we look only upon the just rights of every inventor. We therefore cannot endorse any of the insinuations against the Patent Office. We only call attention to the fact, in order to call out an explanation, if the charges are groundless, knowing that the public look to this paper as a vehicle for such information.

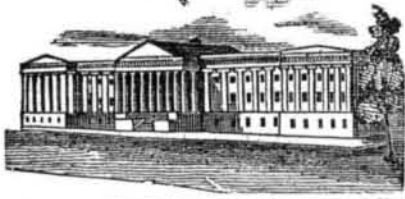
We have a few words of advice to give to patentees and the owners of patent rights. We believe that in a great number of cases the owners of certain patent rights have been weakly wise in prosecuting others, and many very selfishly tyrannical, in endeavoring to restrain the use of any machine in the line of their patents, whether, in their eyes an infringement or not, in order to keep the trade in their own hands. Some act upon the high-handed principle of frightening poor men out of their wits from using what they know is no infringement of their patents. We have faith to believe that justice will triumph ultimately over such men. The rights of one inventor, be he rich or poor, are just as good as those of another, and we often think that it would be far wiser for some patentees to give their money and energies to the fair competition of their patents in business, than to be eternally jabbering at law. We only speak of those inventions that are palpably different. We go for pursuing patent plunderers to the utmost extent of the law, "to hunt them up with hound and horn." In giving our opinions upon the Electro Chemical Telegraph, and the controversy between Morse and Bain, we will say that we have examined the drawings of both Telegraphs, and it is our opinion that however serious the former parties may be, yet we would say, it was not wisdom—it is not wisdom, to carry on a systematic prosecution. The beautiful Electro Magnet Telegraph of Morse is good against the world, and it will stand its own—and it would be policy, we think, to stand by it alone, for the claim of Prof. Morse's Chemical Telegraph, as published, would not operate at all—it claims the production of marks upon a conducting medium interposed between the broken parts of a galvanic circuit. Now no marks can be produced when the galvanic circuit is broken, it and the metallic circuit are two different things. It was a mistake, no doubt, in the person who made the claim. But why should these companies quarrel with the telegraph trade but in its infancy—they all will become wealthy—wealthy.

Depth of the Ocean.

We have received a number of communications on the depth of the ocean, its density, and the impossibility of leads sinking to the bottom, &c. They are all written in a friendly spirit, but we cannot publish them, because no new fact is brought forward, and we do not wish to publish assumptions for facts. One says that the great length of line would float the lead at a certain depth. This we do not doubt, but that is not a mathematical objection. Every body knows that a kite would not ascend if strung to a hawser. Another mentions the currents as a compressing force to prevent the lead from sinking. Well, we make no objections to that, only let us first know the depth, number, and velocity of these currents, and then we will be able to say more about them. The subject of currents is a branch of nautical science but in its infancy, thanks to Lieut. Murray for making it a science.

Communications.

We have not a few communications in our columns this week, of the right kind. Short clear and comprehensive. We believe that our correspondents in general understand the law of *multum in parvo*.



## LIST OF PATENTS CLAIMS

ISSUED FROM THE UNITED STATES PATENT OFFICE,

For the week ending November 13, 1849.

To James Anderson, of Louisville, Ky., for improvements in Hemp Machines.

What I claim therein as new and for which I desire to secure letters patent, is the combination of the grooved rollers, brake and scutchers, or scrapers substantially in the manner and for the purpose set forth.

I also claim the scrapers when employed with any other feeder that shall hold the material firmly while being scraped.

To Josiah B. Anderson, of New York, N. Y., for improvement in Pessaries.

What I claim is the attachment of two stems by hinges to a circular rim; and which two stems may be combined into one stem with two branches by means of a tube or socket, to be slid upon the lower end thereof in the manner herein before fully set forth.

To Charles C. Bier, of New York, N. Y., for improvement in Portable Water Closets.

What I claim therefore is the construction and use of the arrangement of levers (five) in combination with, and operated upon by, the foot and seat boards of a water closet, for the purpose of opening the pan, in the lower basin or traps of a water closet, and regulating the supply of water to the closet reservoir, also the construction and use of the levers (three others) and weighted lever, in combination with the foregoing arrangement of levers, and operated upon by the seat board, for continuing the operation of supplying the water to the basins from the closet reservoir.

To Thos. S. Bourshett, of Little Falls, N. Y., for improvement in cast-iron Car Wheels.

What I claim is the combination of the curved hollow arms with the hollow rim made semicircular on its inner part, and hollow curved hub enlarged and forming a continuation of the flaring of the inner ends of the arms for causing all the parts of the wheel to accommodate themselves to each other in shrinking or cooling, substantially in the manner and for the purpose herein set forth.

To M. C. Bryant, of Lowell, Mass., for improvement in binder pulleys for Belts and Brakes.

What I claim is, first, to communicate power to machines used for extracting liquids from other matter by means of a movable binder pulley and a slack belt, the binder pulley being pressed upon the belt by a shifting weight as herein described.

To Goldsmith Coffeen, of Warren Co., Ohio, for improvement in Ice Cream Freezers.

What I claim therein is freezing cream or other liquids by forcing through them currents of air chilled by passing them through chambers artificially cooled, substantially as set forth.

To Daniel Custer, of Southampton Township, Pa., for improvement in Seed Drills.

What I claim is the controlling of the springs by means of the ring in the manner and for the purpose herein set forth.

To Francis Degen, of New York, N. Y., for improvements in Curling Hat Brims.

I do not, herein, claim to have invented the steam heater, nor to be the first who has employed the shaping cloth with the spring and cord, nor do I claim to have invented any one of the mechanical parts described as used herein irrespective of the manner in which I have adapted, or combined them for these purposes, except the entire curler piece which I have been the first to invent and use. But I do claim as new, first, the exclusive application of a changeable curler or former piece that entirely surrounds the hat crown and acts on the whole of the brim, and the combination therewith of the pieces (two) the yoke, swinging standard, the cam and lever, to hold a hat in such a manner that the workman may iron and finish the curl on the edges of the brim, at one operation, effected substantially as described and shown.

Secondly, The combination with the foregoing parts of the winch the lines and hooks to draw or turn the cloth on and over the edges of the hat brim and turn the edges of the hat brim, over the edges of the curler piece and hold them there while the workman irons them so as to set them as described and shown.

Third, I claim the application of the metal cooler piece for the purpose of cooling the hat brim so rapidly that the brim shall not have time to warp or change the form previously given to it; the shape of such cooler being conformable to the size and shape of the hat brim so as to present an even bearing to the under side of the hat brim while cooling, substantially as described and shown.

To Thomas Finlay, of Cold Spring, N. Y., for improvement in regulators for Water Wheels, etc.

I do not claim the conical drums, endless belt and governor, these having been long known as a means of changing speed; but I claim the employment of these or analogous arrangements in connection with the loose cog wheel, herein described, as the means of causing the revolution of said cog wheel to exceed or fall short of the revolution of said water mill, or first mover, whenever such water mill or first mover, shall exceed or fall short of its speed.—The consequence of this variation, through the agency of the screw bolt, crank and movable plate (which parts I also claim in combination with those above mentioned), being either to enlarge or contract the jet apertures and thereby to increase or diminish the speed of such water mill or first mover in accordance with the necessities of the case, this I claim, arranged substantially as set forth not limiting myself to the particular form and connection of the individual parts whilst I attain the same end by analogous means.

To Chas. Hartshorne and Wm. B. Shaw, of Gardner, Me., for improvement in machinery for turning right and left lasts.

We do not claim to be the original inventors of the principle of cutting and turning lasts or other irregular formed bodies by means of a series of revolving cutters, guided by a pattern or models corresponding in form with the article to be cut or turned, as this principle is common property and has been for many years, but what we do claim as our own invention is, first, the mode of cutting a right and left last (or other article) simultaneously from a single reverse pattern and two blocks of wood, by the before described combination and arrangement of a reverse model tracer, wheel and single wheel of rotary cutters moving in opposite directions, the tracer wheel being in contact with the reverse model whilst the cutters turn between the two pieces of wood to be turned into a right and left last. The latter turning simultaneously in opposite directions inward or outward against the cutter wheel.

To J. B. Klein, of New York, N. Y., (Assignee of Chas. Hartung, of Beichlingen, Prussia,) for improved safety sliding breech fire arm.

What I claim is, first, the method of locking the breech pin when inserted to prevent it from turning by means of the sliding bar, substantially as described, and this I also claim in combination with both or either of the methods of securing the breech pin by the screw thread and the inclined face of the breech pin tube substantially as described.

Second, Combining with the sliding breech pin and the discharging punch which slides therein, or the carrier thereof, the spring catch for holding the punch back during the operation of loading substantially in the manner and for the purpose specified.

And I also claim this method of holding the discharging punch or the carrier thereof, with the trigger substantially in the manner and for the purpose specified.

Third, The combination of the sliding bar which locks and unlocks the breech pin with the catch of the breech pin, which holds and liberates the discharging punch, substantially in the manner and for the purpose specified.

To Lewis Little, of Troy, N. Y., for improved means of changing the combination in revolving tumbler locks.

What I claim is hanging the series of rotating tumblers in a hinge or vibrating frame their outer periphery being provided with cogs which gear into the cogs of the series of tumblers connected with the stationary lock plate,

so that when the said frame is elevated the tumblers of the other series will be free to turn in order to suit any variation in the set of the key.

To John Kellogg, of Madison, Ohio, for improvement in connecting Hubs to Axles.

What I claim is the introduction of the rod with the nib working into the cavity, in the manner and for the purpose herein set forth.

To Chas. Perley, of New York, N. Y., for improved method of fitting the heaving socket and head of windlasses.

I do not claim any of the parts herein described and shown, irrespective of the manner in which I have applied them. But I do claim as new and useful in effect, the application of the loss with the wrought metal band and square acting with the bush to connect the windlass head with the shaft and at the same time support the heaving socket and flanch in such a manner, that either the head or the heaving socket and flanch, or both can be immediately displaced when injured; the whole constructed and operating substantially as described and shown.

[The bosses with square and round parts are not claimed in themselves by Mr. Perley, but the combination and arrangement, so that either separately, or both parts, if injured, may be removed and replaced immediately by new parts.]

To Sylvanus Sawyer, of Templeton, Mass., for improvement in machinery for splitting and dressing Rattans.

What I claim is the principle and combination of the vibrating cutter, and guide; to use any number required to remove the whole surface of the cane or rattan, dividing the surface into any required number of strands.

To Chas. Slawson, of Norwich, N. Y., for improvement in Leather Dressing Machines.

What I claim is, first, the adjustable endless apron in combination with the scraper or extender, for the purpose and uses as herein described.

Second, The adjustable scraper or extender as described for the purposes and uses of leather dressing, as herein set forth.

To Ferdinand Zisemann, of St. Louis, Mo., for improvement in Brick Presses.

What I claim is, first, the combination of the revolving conical Duster with the rotating moulding and pressing wheels, constructed, arranged and operated in the manner and for the purpose herein set forth.

Second, I also claim the combination of the rotary toothed wheel, with the moulding wheel for driving the pistons to the bottom of the moulds, after the bricks are discharged therefrom, constructed, arranged, and operated in the manner and for the purpose herein described; said wheel being turned by the action of the moulding wheel in contact therewith, without the aid of any connecting cogged or band gearing.

Third, I also claim the manner of increasing the pressure on the clay whilst in the moulds, to form the brick, by diminishing the distance between the peripheries of the moulding and pressing wheels, by causing the pressing wheel to descend in the arc of a circle of a radius greater than the semi-diameter of the moulding wheel, the bearings or boxes of the axle of the pressing wheel, being secured to the parallel beams, whose outer ends are made to rise in the arc of a circle, concentric to the arc, by means of vertical screws, arranged to bear against the under sides of said beams, to raise or lower the pressing wheel, in order to increase or diminish the pressure on the bricks in the mould, as aforesaid.

## DESIGNS.

To Johnson & Cox, (Assignee of S. Clark,) of Troy, N. Y. Design for Stoves.

[There are three separate patents for different designs, by S. Clark, all assigned to the enterprising firm of Messrs. Johnson & Cox, of the above place. We would publish the claims, but as they refer, like all design claims, to the configuration, no idea of them could be obtained. We therefore only state that the patents were granted.]

The political parties of New York and Tennessee, are exactly balanced in their Legislatures, on joint ballot. The best and closest sitters will exhibit the best generalship.

## Planing Machine Patent Cases.

(Continued from page 71.)

JACOB P. WILSON vs. DANIAL BARNUM.—In Circuit Court U.S., Eastern District of Pennsylvania. Issued directed from Chancery.

The patent for this invention was first issued in 1828 to Mr. Woodworth, it has been renewed by the Patent Office, and afterwards by an act of Congress; and on the 8th of July, 1844, the original patent was surrendered on account of some alleged defects in the specification, and an amended patent issued. After having withstood twenty years of litigation, and received the sanction of Congress, the attempt to annul it, on the ground of the want of originality, should be considered hopeless, and be received with little favor by the court.

The issue submitted to you, therefore, is not to try whether W. Woodworth was the inventor of the machine described in the amended patent, but "whether the making, vending and using of either or both, separately or in combination, and if either, which of the machines of the defendant referred to in his answers in this cause, is, or is not an infringement of the amended letters patent granted to Wm. W. Woodworth, and set forth in complainant's answer (bill) in this cause."

A question of infringement is a question of fact; and it is for this reason that it is submitted to a jury as the most competent tribunal to settle such a question, but although a question of fact, and to be decided by comparison, it is often a most difficult one.

It may involve questions of science or of arts with which the court and jury are not familiar, and witnesses of knowledge and experience may differ in their opinions.

Principles of law may be involved, and a clear apprehension of them necessary to a correct conclusion.

In the statement of these principles, whether of mechanics or law, terms are often used which are vague, indefinite, or so difficult of definition, that their application to the facts may lead to erroneous conclusions, unless great care and discrimination be exercised. Hence the opposite conclusions which are often arrived at by men of equal knowledge, experience and skill, and thus it often assumes the appearance of a matter of opinion and not of fact.

In the application of the principles of law and mechanics, which complicate the question of fact, there is no one word which is used more vaguely, and more difficult of a definition of universal application, than the word "principle" itself. You have heard much of the "principle" of a machine both from witnesses and counsel. The word is most commonly used to signify elementary truth or established doctrines, when we speak of law or any other science. But when applied to a complex machine, whatever notion we may represent by the term, or whatever definition we may give of it in the abstract, will be found difficult of application in many instances in the concrete. While many minds will arrive at correct results by comparison of things in the concrete, they are incapable of analysing the process of reason, or explaining in abstract terms how they have arrived at the result. Another difficulty in the definition of this and other abstract terms is, that when defined, some of the terms of your definition are of the same subtle, slippery and indefinite meaning with the subject of the definition.

A learned judge, in speaking on this subject says: "The forms of the two machines differ but when at work, the principle is the same, that is, both have the same peculiar structure and constituent parts, which is the true legal meaning of the principle of a machine." (Per Justice Wayne, in Mott v. Burnit, quoting Burnit v. Hall, 1 Mason, 470.)

"The principle of a machine," says Mr. Justice Story, (1 Gallison, 458,) "is the modus operandi; the peculiar device or manner of producing any given effect. If the same effects are produced by two machines by the same mode of operation, the principles of each are the same. If the same effects are produced, but by combination of machinery operating substantially in different manner, the principles are different."

(To be Continued.)