

OMISSION OF OATH UNDER SEC. 6. ACT OF 1836-- FRAUD IN OBTAINING THE EXTENSION-- THIRD PARTIES CANNOT TAKE ADVANTAGE OF SAME-- LAW OF COMBINATIONS--WHAT WILL INFRINGE A COMBINATION CLAIM.

We give below the most valuable portions of a decision lately made by Judge Clark in the New Hampshire District, in the suit in equity, George Crompton vs. The Belknap Mills et al.

The respondent objects to the Marshall Patent, of December 11, 1849, that the invention was neither new nor useful, and that the patentee did not, before the granting and issuing of the letters to him, take the oath prescribed by section 6th, of the act of July 4, 1836, that he verily believed he was the original inventor or discoverer of the art, machine, etc., for which he solicited a patent.

A patent is a contract, prima facie evidence that the patentee has made the invention. There is, in this case, no sufficient evidence to overcome that presumption, or prima facie case.

There is evidence that "open-shed" fancy looms were used prior to Marshall's invention, but not involving the combination of Marshall. His invention must, therefore, be taken to be new. Precisely how useful it may be, the court have no means to decide; but that it is sufficiently useful to support a patent, we have no doubt. Other looms may have been preferred by different persons, or may have found a ready sale; but that good cloth can be woven by Marshall's loom and invention there is sufficient evidence.

To warrant a patent, the invention must be useful--that is, capable of some beneficial use, in contradistinction to what is pernicious, or altogether worthless. These objections to the patent cannot therefore avail. Nor can, on the other, the oath required by the 6th section of the act of 1836 be taken, for two reasons.

1st. We are not satisfied the oath was not taken. The letters patent recite that it was. The respondent finds, among the papers on file in the case in the Patent Office, a blank copy of the oath, with the jurat, not signed by any magistrate, and hence he argues the oath was not taken. But the oath may have been taken for all that, and this negative testimony cannot overcome the direct recital of the letters patent that the oath was taken; or the presumption that the requirements of the law were complied with in issuing the patent. But suppose it were so. Suppose the oath was not taken, would the patent be void on that account? It was held otherwise by Judge Justice in the case of Whittemore vs. Cutter, 1 Gal. 429. The taking of the oath, though to be done prior to the granting of the patent, is not a condition precedent, failing which the patent must fail. It is the evidence required to be furnished to the Patent Office, that the applicant verily believes he is the original and first inventor of the art, etc. If he take this oath, and it turns out that he was not the first inventor or discoverer, his patent is void. So, if he do not take it, and still he is the first inventor or discoverer, the patent will be supported. It is prima facie evidence of the novelty and originality of the invention until the contrary appear.

So the act says, on payment of the duty--that is, fees--the commissioner shall make an examination, and if the invention should be found useful, and important, and hence he argues the oath was not taken. But the oath may have been taken for all that, and this negative testimony cannot overcome the direct recital of the letters patent that the oath was taken; or the presumption that the requirements of the law were complied with in issuing the patent. But suppose it were so. Suppose the oath was not taken, would the patent be void on that account? It was held otherwise by Judge Justice in the case of Whittemore vs. Cutter, 1 Gal. 429. The taking of the oath, though to be done prior to the granting of the patent, is not a condition precedent, failing which the patent must fail. It is the evidence required to be furnished to the Patent Office, that the applicant verily believes he is the original and first inventor of the art, etc. If he take this oath, and it turns out that he was not the first inventor or discoverer, his patent is void. So, if he do not take it, and still he is the first inventor or discoverer, the patent will be supported. It is prima facie evidence of the novelty and originality of the invention until the contrary appear.

The next objection is to the reissued patent, and they are two. 1st. That the original patent was void, and the reissue was therefore so; and 2d. That the reissue was not for the same invention as the original.

The first of these objections has already been disposed of. It was maintained in the argument, that the original patent was void for want of the proper oath, and that the defect could not be cured by the reissue. But, whether the oath was taken or not, we are of the opinion, as already expressed, that an omission would not invalidate the patent, nor would it affect the reissue. The second objection to the reissue is a more serious one, and for its proper determination requires a careful examination and comparison of the original patent to Marshall, and the reissue to Crompton.

We think that substantially the same invention is described in the two patents.

But if it should be held that the original patent to Marshall, and the reissue to Crompton, assigner, were valid, it is contended that the extension to Marshall, was not, for three reasons, to wit:

- 1. That as Marshall never had any interest in the reissued patent, it could not be extended to him.
2. That no sufficient notice was given to the public of the application for the extension of the patent; and
3. That the extension was obtained by fraud.

To the first objection, to wit, "that as Marshall never had any interest in the reissued patent, it could not be extended to him," it is a full answer, that, in judgment of law, the reissue is only a continuation of the original patent. So, that in Bowman, 2 Wallace, 484, and as Marshall was the original patentee, the extension was legally and properly to him. The extension, under the statute, to the assignees and grantees to the extent of their respective interests.

The second objection is that there was no notice ever ordered, or given of any application to extend the reissued patent. There was of the application to extend the original patent, and the objection stands upon the supposition, or idea, that they are two distinct patents, while in judgment of law they are one. If the reissue was only a continuation of the original patent, then a notice to extend the original would seem to have been sufficient.

Again, under the act of 1836, the Secretary of State, the Commissioner of Patents, and the Secretary of the Treasury were a board of commissioners to "hear and decide upon the evidence produced before them, both for and against the extension." It has been held that the functions of this board were judicial, and that their judgment settled conclusively all questions of notice.

The statute of May 27, 1848, 9 Statutes at Large, 231, section 1, provided that the extended patents then vested in the board of commissioners "Should be vested solely in the Commissioner of Patents; and in Clum vs. Brewer, 2 Curtis, 506, it was held, that the act of the commissioner in extending a patent was conclusive of the facts, which he is required to find, in order to grant such extension, in the absence of fraud, or excess of jurisdiction. But here, thirdly, it is said, that the extension was procured by fraud. We do not, however, think this objection is open to this respondent. He stands before the court, accused of infringing the complainant's patent. He may, undoubtedly, show that the invention claimed by the complainant was not new, or useful, or that it had been dedicated to the public, or that there was no sufficient specification or description, and so that there was no act of infringement for which he should answer, but we think he cannot attack the granting and validity of the patent in this collateral manner.

If there was fraud practiced in obtaining the patent, that is a matter between the Patent Office and the patentee; and can, perhaps, be inquired into by some proper proceeding of the officers of the Government to vacate the patent. But this point, in a judgment, it must be respected, and enforced, until reversed or annulled by some proceedings directly for that purpose. It is not exposed to the attacks of strangers or third persons for such reason.

The question then is, whether the Thomas loom, as it is called, infringes the Marshall patent as reissued and extended? The original patent to Marshall, December 11, 1849, claimed "the movable spring rests to hold the jacks on the heddle, the cam groove, the cam, the combination of the rotating, lifting, and depressing bars, so as to revolve, etc. As reissued to Crompton, the claim was for combining with the jacks and with the lifter and depresser and pattern chain, or any equivalent mechanism for determining the pattern, a mechanism for holding the jacks either in their elevated or depressed position, when not required to be operated, substantially and for the purpose specified.

The language is "a mechanism for holding the jacks." This is broad enough, upon its face, to cover any mechanism, and if it stood alone and unaided it would be so general and uncertain as to be entirely void, but in the specification the holding mechanism is described particularly and precisely, and the claim is limited by such specification. Here, then, are combined with one of the elements and substituted therefor another element, substantially different in construction and operation, but serving the same purpose; nor by any and every combination of the same elements, which may produce the same result, but only by the peculiar combination of the elements described, or one substantially the same.

The elements here combined are old, the patent is for the peculiar combination, and the doctrine of mechanical equivalents does not apply. The identity or diversity of two machines depends, not upon the employment of the same elements or powers of mechanics, but upon producing the given effect by substantially the same mode of operation, or substantially the same combination of powers.

Following these principles and adjudications, we proceed to the examination and comparison of the Marshall and the Thomas looms. In both we find, substantially, the same jacks, differing in form, but performing substantially the same office. In both we find, substantially, the same elevator and depresser; arranged in the Marshall loom in a rotating, endless chain, so that the same bar in going up is an elevator, but in rotation or revolution, going down, becomes a depresser.

These three elements are substantially the same, but when we come to the holding mechanism we find a marked and substantial difference in the two machines. In the argument of the respondent's counsel, it was contended, that the holding mechanism of the Marshall loom was not only "a series of horizontal spring latches, or catches," and the shoulders of the two prongs of the jacks; but that it included the connecting mechanism of the jacks with the heddle lever, the pattern mechanism, and the "evener." Now, although it be true that the connecting mechanism in the Marshall mechanism of the jacks hold the jacks securely upon the spring latches, as upon a seat, until they are forced or allowed to come off by the pattern mechanism, and although in the operation of the machine there is a point of time after the jacks are forced off the springs, when the heddle levers are firmly held by the evener, so that the jacks cannot move, nor the sheds close, until allowed to do so by the removal of the evener, yet we have considered the holding mechanism to be as described in the patent, to wit, the series of horizontal spring latches or catches, and the notches on the prongs of the jacks, and still we find the holding mechanism of the two machines to be substantially different.

In the Marshall machine, the elevator carries upward a particular jack, the beveled face on the projecting notch on the prong of the jack meets the beveled face of the spring, presses it back, and passes it. Then the spring flies out under the shoulder of the jack and the jack rests upon it, in a manner similar to a window sash raised and resting on the old and familiar window spring. Here it sits or is held until the pattern mechanism forces it off the spring and allows it to descend. When a jack is carried down by the depresser, it is held by a similar spring, being kept on its seat by the pattern mechanism, until allowed to be drawn off by the oblique connecting mechanism.

Now in the Thomas loom there is a very different mechanism or device. There is a jack which is carried up and down by an elevator and depresser. On one side of the jack there is a gearing connecting it with an operating sector. As the jack goes up and down, it rolls or rocks this sector for-

ward and backward as if you should turn a wheel part of the way round, say one fourth, and then bring it back again, and so continue.

In or near this circumference of this sector, there is a cam groove, and playing in this cam groove, forward and backward, as the sector moves, a projecting stud or friction roller connected with an arm of the heddle lever. This heddle lever rocks upon its fulcrum, and as the arm, guided and controlled by the projecting stud in the cam groove, is carried upward or downward by the cam groove, the end of the rocking heddle lever are carried backward and forward, elevating or depressing, or holding stationary the harnesses. In the one end of the cam groove is a concentric trichite to which the projecting stud or roller falls, which it is contended by the complainant's counsel is a substitute for the spring latch or catch of the Marshall loom; why wear of the opinion is not so; but that the whole cam groove, of which the concentric trichite makes a part, is more correctly a substitute for the cam; and that this device of the Thomas loom much more resembles in principle and operation the old Middlesex cam loom than it does the Marshall loom. It cannot be concealed that the Marshall and the Thomas holding devices are the same, because the operation in both cases is performed by a surface of metal passing under the heddle lever, and that therefore the one infringes the other. In the old Middlesex cam loom one surface passed over another, to wit, over the cam, and was elevated, depressed, or held stationary by it; yet it was very different from the Marshall device. We cannot give the Marshall holding device any such latitude of construction.

Thus also in the Thomas loom a brake connected and operating upon the periphery of the sector, retarding, regulating, and governing its motion. And whether we regard this brake as a part of the holding mechanism or not, we think and conclude that these two elements are substantially different, and that one is not a well-known substitute for the other.

We now come to the last element or device, to wit, the pattern mechanism. Had the pattern of Marshall not been surrendered, and a new one formed by the complainant, we should have no objection to the operation between the holding mechanism of the two looms; but that patent having been surrendered, and a new one issued, claiming a combination of elements, that new one is liable to be avoided, by showing that the Thomas loom uses a substantially different element from any one of those combined.

To return to the pattern devices. These two mechanisms or devices are very different in their construction and in their operation. H. B. Renwick, one of the complainant's experts, says: "I think the pattern chain in model B" (the Thomas loom) "is, considered by itself, a substantially different species of pattern chain from that specially described and represented in the drawing of the Marshall reissue, and differing from it in the fact that it requires motion in two directions in order to cause it to operate on the jacks, while the chain represented in the drawings of Marshall requires motion only in one direction." Precisely in the sense mentioned by this expert we are now considering these two devices or mechanisms, that is, by themselves; and in that view they are substantially different, in principle, construction, and operation. But if we consider them in regard to the functions they perform, we shall find no great or substantial difference. Both select the jacks to be operated, but the pattern chain, in addition to this, in the Marshall loom, forces the jacks of the upper series of spring catches, and holds them on to the lower series, in both instances in opposition to the force supplied by the oblique connection of the jacks with the heddle levers. Both these devices are said to be old. That is true in a limited sense. The chain of the Marshall loom is a well-known substitute in the fundamental principle. It is that of the Jacquard pattern; but Thomas has made two improvements upon it, which are not old. They are also said to be well-known substitutes for one another; but it is very evident, both from the testimony of the experts, and an examination of the machines, that, though the Marshall pattern mechanism might be applied to the functions they perform, we shall find no great or substantial difference. The Thomas pattern mechanism to the Marshall loom, with its present method of holding the jacks. Can one device be said to be a well-known substitute for another which cannot be used for it? Thus much for the elements of the Marshall combination. We now pass to the combination itself. Is the combination in the two machines substantially the same? It may be said that the elements are not the same, as gold and copper, and silver and copper, are not the same combination as silver and copper. But the inquiry is to another point. Is the method or manner of the combination the same? We think not. Indeed, there seems to be as wide and substantial a difference in the mode of combination as in the things combined. Take, for instance, the combination of the jacks with the holding mechanism in the Marshall loom. The jacks are held upon the upper series of spring catches, and directed to the connection of the jacks with the upper lever, and lower, the protuberances upon the prongs of the jacks are held upon the upper series of spring catches. There is no such connection, device, or office performed, or combination that we can discover in the Thomas loom.

Again, take the combination of the pattern mechanism in the Marshall loom. It is a mechanism which has the protuberances of the jacks upon the lower series of spring catches, there performing substantially the same office that the oblique connection of the jacks with the heddle levers does in regard to the upper catches. There is nothing like this in the Thomas loom.

Again, take the combination of the holding mechanism with the pattern mechanism in the Marshall loom. There is a substantial difference in combination, or mode of combination, in the two looms. In the Marshall loom the jacks are combined with the holding catches, by their oblique connection with the heddle levers, keeping the jacks seated upon the upper catches, until forced off by the pattern cams, and pulling the jacks of the lower catches when not held on by the cams. Is there any such arrangement in the Thomas loom? We do not find, nor anything nearly approaching it. In the Thomas loom the jack is connected with the "evener" sector by a gearing, rocking the sector backward and forward as the jack goes up and down. In the circumference of this sector is a cam groove, or slot; in this groove plays a stud or friction wheel attached to an arm of the heddle lever.

This stud is guided and held by the cam slot, thus elevating, depressing, or holding the heddle lever as it comes into one or the other part of the slot. The pattern mechanism has nothing whatever to do with this holding, elevating, or depressing, further than to select the particular jack. We leave out of this combination the brake purposely, though that device in the Thomas loom, and the "evener" in the Marshall, play very important parts, both in holding the shed open, and in preventing its closing too quickly.

We might pursue this examination and comparison further, but have gone far enough to warrant the conclusion to which we have come, that the respondents have not infringed the complainant's reissued patent. To constitute an infringement of a patent for a combination, the defendant must have used the same combination, constructed and operated substantially in the same way.

A patent for a combination is not infringed unless all the essential parts of it are substantially imitated. The patentee of a combination cannot treat another as infringer, who has improved the original machine, by the use of a substantially different combination, though it produce the same result.

A patent for a combination of three distinct things is not infringed by combining two of them with a third, which is substantially different from the third element described in the specification.

In Morris vs. Barrett, 1 Fish, 461, it was held, that in an action for an infringement, the machines themselves, as shown by the models, were evidence entitled to the highest credit.

We have examined the models in this case very carefully and repeatedly, and they have very materially aided us in coming to a satisfactory conclusion; particularly in determining how much weight was to be given to the opinions and explanations of the experts, two of which appeared on each side, speaking with equal confidence and apparent intelligence in opposite directions.

The complainant's bill must be dismissed with cost. B. R. CURTIS & CAUSTEN BROWN, for Complainant. T. A. JENCKES & JOSHUA D. BALL, for Defendants.

MANUFACTURING, MINING, AND RAILROAD ITEMS.

The first annual fair of the Lake Shore Grape Growers' Association will be held at Erie on Friday and Saturday, October 15 and 16.

The Titusville Herald says that the petroleum production for August was considerably increased by the opening of the new wells.

The Central Park Commissioners have defined the lines and filed the maps for the widening of Broadway from Thirty-second street to Fifty-ninth street.

The mean rate of discharge of the Mississippi into the Gulf of Mexico is upwards of thirty-eight million six hundred thousand pounds of water per second.

A new granite quarry has been opened in Jamesport, Washington county, Maine. The stone has a beautiful pink color, which, if durable, will render the stone very valuable for building purposes.

Twenty-two States were represented at the meeting of the American Pomological Society, at Philadelphia. The exhibition of fruit was very attractive and comprised a great number of specimens.

About 100 feet of embankment of the Erie Canal at Pool's Brook, near Kirkville, were carried out on the 21st of September, and the flood covered the Central Railroad track, temporarily suspending travel. One track is now in use. It will require several days to repair the break.

A huge chimney has been completed at the Earl of Dudley's estate at Coneygrove Works, near Dudley, England. Special arrangements for the consumption of fuel necessitated the carrying of the stack to a height of 190 feet. It is strengthened by iron-work for a distance of 100 feet above the ground.

The Croton Water Works in process of erection at High Bridge are now well advanced, and by next spring the inhabitants of Washington Heights are promised all the water they want. The reservoir is nearly completed, requiring only some grading of its banks, coping, and further work on the western gate.

Herr Krupp must look to his laurels. A larger block of steel than has ever issued from his works is now in progress of casting at Osnabruck. It weighs 200 tons, whereas the block with which Krupp astonished the world at the Great Exhibition of 1862 weighed only twenty, but he has surpassed this feat in later years.

Dr. Koller recommends concentrated glycerin as a substitute for spirits of wine for the preservation of zoological and anatomical preparations, on

the ground that it is not liable to evaporation, that it is not combustible, and that moreover, it preserves better the natural color of various preparations usually kept and preserved in spirits of wine.

The contractor for the erection of the railroad bridge over the Missouri river, which is intended to connect the Missouri and Iowa railroads directly with the Union Pacific is said to have received notice from the Irish laborers of that locality that he will not be allowed to employ Chinamen on the work. He has, nevertheless, made contracts in California to obtain Chinese laborers, and he intends to bring them to Omaha soon. It is very probable that we shall soon hear of some fighting.

M. Pollack, of Boutzen, Saxony, states that he has used for several years, a paste made of pure oxide of lead, litharge, and concentrated glycerin, as a cement to fasten stone to stone, and iron to iron. This mixture hardens rapidly, is insoluble in acids (unless quite concentrated), and is not affected by heat. He used it successfully in joining different portions of a fly wheel; and when used as a cement for stone, it was found easier to break the stone than effect a separation at the joint.

As a new method of fusing difficultly decomposable minerals, it is recommended that 1 part of the mineral, previously very finely powdered, should be mixed with 3 parts of fluoride of sodium, and that this mixture, after having been placed in a platinum crucible, should be covered with 12 parts of powdered bisulphate of potassa. Chrome iron ore, hard hematite, tin ores, and rutile corundum, and the like, are very readily brought to fusion and disintegrated by this flux, even with no more heat than that obtained by a good Bunsen gas-burner.

The Shipping and Commercial List, of New York, in alluding to the amounts paid to passengers by the different railroad companies as compensation for damages, says that probably not one of all the accidents which inflicted the injuries that had to be paid for was the result of a natural cause. Most of them were attributed by the verdict of the coroners' juries to broken rails or the carelessness of employes. Experts have declared that accidents from broken rails would be practically done away with, were the rails made in two or three continuous parts, and the expense of this in the manufacture could not be great.

In the year 1868 there were 3,991 applications for letters patent filed in the British Patent Office. The stamp duties received in respect of patents amounted to 119,271 pounds. After deducting expenditure, there is a considerable yearly surplus income; and the aggregate surplus from 1852 to the end of last year exceeds 736,000 pounds. The Commissioners complain of the insufficiency of the building for the requirements of the office. Complete sets of the Commissioners of Patents' publications--each set including more than 2,500 volumes--have been presented to the most important towns in the kingdom, to be accessible to the public free of charge.

M. Reinsch, having experimented with various salts in order to determine which was best suited to prevent timber bursting into flame has come to the conclusion that impregnating timber with a strong solution of rock salt is as good (if not a better) preservative against its bursting into flame, as water-glass (silicate of soda). Rock salt costs much less than water-glass, and it has also the effect of keeping the timber free from dry-rot and noxious insects. He also says that the use of a solution of salt in extinguishing a fire with fire-engines would be very effective, but it is questionable whether the engines would not soon become worthless from the effect of the salt.

The recent terrible coal-mine accident at Avondale, says the Easton Free Press, calls to mind a former great accident in Pennsylvania mines, which occurred in Carbonate in 1850. A large mine caved in, destroying over a hundred lives, and ruining the mine. When the cave-in occurred the pressure of air from the falling mass was so great that it blew a boy and a mule an eighth of a mile out of the narrow entrance to the mine. A few of those entombed worked their way out through all the dangers of fire-damp and foul air, but the most of them perished by starvation, or fell a prey to the rats, which in coal-mines grow to an enormous size. One man was seven days in digging his way to the surface.

A bituminous composition, which may be used in the shape of bricks or as a coating on any desired foundation, has been invented, and is said to be suitable for the bottoms of reservoirs, for pavements of streets and terraces, and many other applications. It is composed of the following ingredients in the proportions stated: For every 100 pounds weight of bitumen--sulphur, 37 1/2 lbs; gallipot (or in case of necessity colophony), 25 lbs; lamp-black, 12 1/2 lbs; sand, 25 lbs = 100 lbs. For bitumen to be applied on wood the quantity of sand may be reduced by about 5 lbs weight, and it is preferable that the wood be rough. In preparing this bitumen the sulphur must first be thoroughly melted in a sheet iron caldron or in an earthenware pot; the gallipot is then added, and when this is almost entirely melted the lampblack is introduced, and, lastly, the sand. The whole is carefully mixed over a moderate fire.

A charcoal flower-pot has been patented in England. The charcoal is molded into the approved form in such a manner that its peculiar porosity may be in no way interfered with. By this means, not only is the oxygen of the air allowed free access to the soil within the flower-pot, but the water with which the soil is moistened is, by the filtering and purifying powers of the carbon, deprived of all those "hard" qualities which are known to be so deleterious to the growth of plants. Further, the sulphurous vapors, which are usually present in the atmosphere of large towns, and constitute the principal reason why floriculture is attended with so much difficulty in all cities heated with coal and lighted with gas, are, by the use of the charcoal flower-pot, fixed in the pores of the carbonaceous sponge. Hence, not only are pure air and pure water insured to the plant; but, all noxious vapors being removed, it follows that a healthy and vigorous growth and luxuriant development cannot but ensue.

NEW PUBLICATIONS.

MAN IN GENESIS AND GEOLOGY; or, the Biblical Account of Man's Creation, Tested by Scientific Theories of his Origin and Antiquity. By Joseph P. Thompson, D.D., LL.D. New York: Samuel R. Wells, Publisher, 389 Broadway.

The kind of discussion contained in this book is of very little interest to us, and we regard it as of very little value to the world. The statement made in the first paragraph of the preface begs every disputed question at the very threshold of the book. This statement is in the words of the author as follows: "No fact declared by science can be accepted as true if it conflicts with any statement of the Bible." That an author starting with such a proposition could ever arrive at truth is morally impossible. Therefore it is not surprising that the book instead of being a candid research after truth, is a weak attempt to make all known facts coincide with the writer's interpretation of the Scriptures. Not that the facts of science necessarily conflict with the Mosaic record. All we can say is, that in some cases they seem to conflict with our understanding of that record. But to start out properly in a search for truth, one must divest himself of preconceived notions--a standard of canon to which the author of this book has been evidently unable to attain.

THE METALLURGY OF IRON AND STEEL, Theoretical and Practical, in all its Branches, with Special Reference to American Materials and Processes. By H. S. Osborn, LL.D., Professor of Mining and Metallurgy in Lafayette College, Easton, Pa. Illustrated by 230 Engravings on Wood, and 6 Folding Plates. Philadelphia: Henry Carey Baird, Industrial Publisher, 406 Walnut street. London: Trubner & Co.

This is a voluminous and exhaustive treatise, rivaling in extent the celebrated work of Crookes and Röhrig on the same subject, but having, as stated in the title, more especial reference to American materials and processes. We will give a review of this important work as soon as we have time to give it the examination it merits.

We are also in receipt of the Annual Report of the State Engineer and Surveyor on the Canals of New York, for the Year 1868, and also the State Engineer's Report on Railroads for the same year; able documents containing much information, abstracts of which we will lay before our readers in due time.

Facts for the Ladies.

This is to certify that I bought a Wheeler & Wilson Sewing Machine, March 7, 1859, and it has been used with entire satisfaction by my daughter, who was afflicted with spine disease. It proved the best doctor I ever employed, for she not only regained her health, but has earned a living with it for herself and me ever since. Mrs. M. B. BALL. New York, Nov. 29, 1868.

Business and Personal.

The Charge for Insertion under this head is One Dollar a Line. If the Notices exceed Four Lines, One Dollar and a Half per line will be charged.

Wanted by a business man—The agency, in Portland, of some useful invention. Address J. W. Lucas, Portland, Me.

Metallic Letters to put on Patterns; also, for numbering street doors and church pews. Allen & Brim, Seneca Falls, N. Y.

Lubricator for loose pulleys, in general use. Satisfaction guaranteed. The patent for sale. Address Box 31, 648 Broadway, New York.

Wanted.—Builders of Hoisting Machinery, suitable for a five-story factory, to send their descriptive circulars and price lists to S. N. Brown & Co., Dayton, Ohio.

The great scarcity of water in our large cities is mainly caused by the enormous quantity wasted, which can be prevented by using the Boston Safety Faucet (self-closing), the saving of water in one building in this city being over 200,000 gallons in three months. For sale by Joseph Zane & Co., 81 Sudbury st., Boston, Mass.

A Rare Chance. Terms Reasonable.—Foundry and Machine Shop to Lease, for a term of years, in Galveston, Texas, the best location in the South. Address M. L. Parry, Galveston, Texas.

Union Arm Chairs, for hotels, offices, piazzas, and all places. Best in market. Made upon honor. Send for circular. F. A. Sinclair, Mottville, N. Y.

Manufacturers of Power Hoisting Machines send price list and circular to Cooper, Jones & Cadbury, Philadelphia.

Business Opening. For Sale—Lease, machinery, etc., of a metal-perforating and gas-burner business, long established, in this city. Several valuable patents go with the business. Apply to C. Sullivan, administrator, 119 Broadway, New York, Room 19.

Wanted—Partner with capital to help patent and bring out two inventions:—Heater for Feed-water to Boilers, and improvement in Driving Pulleys. Address Box 238, Tidoute, Pa.

Koch's Patent on shelving for stores is offered for sale—entire or State Rights. See illustrated description, Vol. XXI. No. 14, Scientific American, for particulars. Address Wm. & Geo. Koch, Cass Postoffice, Pa.

Wanted—A set of the best new machinery for converting standing trees into short, split firewood. W. H. H. Green, Jackson, Miss.

For Machine for cutting green corn for canning or drying, address F. Lewis or Isaac McLeilan, Gorham, Me.

To Manufacturers—For sale, a new 3-story stone building 60-ft. by 30-ft., with never-failing water-power. Facilities for shipping unsurpassed. Inquire of F. A. Sinclair, Mottville, Onondaga Co., N. Y.

Clothes Wringers of all kinds repaired or taken in part pay for the "Universal," which is warranted durable. R. C. Browning, Agent, 32 Courtlandt st., New York.

Wanted—Manager.—Wanted immediately, a manager for a Tube Works. Must understand the business thoroughly, and be capable of managing a large number of employees. References will be required. Address, stating where last employed. Lock Box 142, Pittsburgh, Pa.

Hot Pressed Wrought Iron Nuts, of all sizes, manufactured and for sale at moderate prices by J. H. Sternbergh, Reading, Pa.

For Sale—Cotton Planter.—The entire right of the King Cotton Planter—the only successful in use. Have been worked since the war, and given universal satisfaction. The machine is simple, strong, and can be built cheaply. Will sell at a low figure. Reason for disposing of it is want of time to give it proper attention. Address S. N. Brown & Co., Dayton, O.

Vols., Nos., and Sets of Scientific American for sale. Address Theo. Tusch, No. 37 Park Row, New York city.

Cold Rolled—Shafting, piston rods, pump rods, Collins patent double compression couplings, manufactured by Jones & Laughlins, Pittsburgh, Pa.

Automatic Lathes, for spools and tassel molds, made by H. H. Frary, Jonesville, Vt.

If you want the real oak-tanned leather-belting, C. W. Army manufactures it. See advertisement.

Peck's patent drop press. For circulars, address the sole manufacturers, Milo Peck & Co., New Haven, Ct.

Wanted—A contract for the manufacture of specialties, either hardware or tools. C. N. Trump, Machinist, Portchester, N. Y.

Man'rs of grain-cleaning machinery and others can have sheet zinc perforated at 2c. per sq. ft. R. Aitchison & Co., 845 State st., Chicago.

Wanted—To communicate with any party who has a practical knowledge of building and running a powder mill. Address "W," P. O. Box 5,692, New York city.

Send for a circular on the uses of Soluble Glass, or Silicates of Soda and Potash, fire and water-proof. Manufactured by L. & J. W. Feuchtwanger, Chemists and Drug Importers, 55 Cedar st., New York.

S. S. Pollard's celebrated Mill Picks, 137 Raymond st., Brooklyn.

Mill-stone dressing diamond machine, simple, effective, durable. Also, Glazier's diamonds. John Dickinson, 64 Nassau st., New York.

Leschot's Patent Diamond-pointed Steam Drills save, on the average, fifty per cent of the cost of rock drilling. Manufactured only by Severance & Holt, 16 Wall st., New York.

For solid wrought-iron beams, etc., see advertisement. Address Union Iron Mills, Pittsburgh, Pa., for lithograph, etc.

Machinists, boiler makers, tinnners, and workers of sheet metals read advertisement of the Parker Power Presses.

Diamond carbon, formed into wedge or other shapes for pointing and edging tools or cutters for drilling and working stone, etc. Send stamp for circular. John Dickinson, 64 Nassau st., New York.

For sale by State or County the Patent Right for the best Cultivator in use. For terms address Isalah Henton, Shelbyville, Ill.

Inventions Patented in England by Americans.

[Compiled from the "Journal of the Commissioners of Patents,"]

PROVISIONAL PROTECTION FOR SIX MONTHS.

2423.—FURNITURE CASTER.—J. L. Woolf, St. Louis, Mo. August 13, 1869.
2529.—MOTIVE POWER.—H. Call, Concord, N. H. August 25, 1869.
2514.—HULLING APPARATUS.—J. F. B. Marshall and A. Jones, Boston, Mass. August 27, 1869.

2,547.—APPARATUS FOR REFINING LARD, ETC.—C. J. Everett, Highwood Park, N. J. August 27, 1869.
2,553.—TREATING CONGLOMERATES OF CAST IRON, ETC.—T. S. Blair, Pittsburgh, Pa., and F. Ellerhausen, Ellerhouse, Nova Scotia. August 28, 1869.
2,569.—MACHINERY FOR MANUFACTURING NAILS, BRADS, ETC.—E. L. Brumage, Middletown, N. Y. August 30, 1869.
2,570.—FURNACE.—G. G. Clarkson and J. L. Paige, Rochester, N. Y. August 30, 1869.
2,577.—WASHING MACHINE.—J. J. Grant, Philadelphia, Pa. August 30, 1869.

Answers to Correspondents.

CORRESPONDENTS who expect to receive answers to their letters must, in all cases, sign their names. We have a right to know those who seek information from us; beside, as sometimes happens, we may prefer to address correspondents by mail.

SPECIAL NOTE.—This column is designed for the general interest and instruction of our readers, not for gratuitous replies to questions of a purely business or personal nature. We will publish such inquiries, however, when paid for as advertisements at \$1.00 a line, under the head of "Business and Personal."

All reference to back numbers should be by volume and page.

J. R. M., of Kansas.—To find the flow of water through a 2-inch orifice under a head of twenty-five feet, you must first determine the velocity of the flow per second, and multiply this by the area of the aperture. You will then have the theoretical flow per second, although this is subject to some variations consequent upon the shape of the aperture, and other considerations which must be taken into account. Assuming that the aperture is round and the diameter two inches, the velocity would be forty feet per second. The area of the port is 3.14 square inches, which, multiplied into the velocity per second in inches, will give the amount theoretically discharged in cubic inches, or 1507.20 cubic inches per second. Two thirds this will be the actual flow, or 1004.8 cubic inches per second, equal to 1.66 horse-power. To utilize this power economically we advise the employment of a small turbine. A good work for you to get on such subjects is "Silliman's Physics."

G. B. A., of Ohio.—Cotton cloth may be rendered nearly fire-proof by steeping it in a solution of alum and letting it dry. A better process is to starch it with starch mixed with phosphate of ammonia, a little more by weight of the salt than of the starch. Grind the dry starch and the salt together in a mortar, and then prepare the starch with the mixture in the usual way. After starching the cloth with this preparation, it should be rolled up in a dry cloth, and allowed to remain till nearly dry, and then ironed, using a little white wax to prevent the sticking of the iron.

H. B., of Tenn.—It takes just as much weight to pull down a balloon as it will carry up, and it is one of the most uneconomical of machines. It can only be advantageously employed where no other means of transportation are practicable. A balloon might be made to work in the manner you specify, and from the novelty of the thing passengers might be attracted. You are under a mistake as to the use of chairs on railroads. A rail placed on a tie without a chair, would soon be jammed down into the wood under heavy work. You should see and talk with some experienced railroad engineer.

J. F. J., of N. Y.—There is no doubt that the diving dress used by divers in submarine work, would have enabled people to have descended into the Avondale coal mine without danger of suffocation; but the dress is too weighty to be used in work unless partly sustained by the buoyant power of water. Besides the walls of a coal mine are very different things from water walls, and flexible pipes would stand a poor chance of maintaining their integrity in being sawed across their sharp angles.

G. L. B., of Mass.—The products of the combustion of all hydrocarbon oils are carbonic acid and water. The carbonic acid is formed by the chemical union of the carbon in the oil with the oxygen of the air, and the water is formed by the union of the hydrogen in the oil with the oxygen of the air. Ordinarily, the water, being converted by the heat into steam, escapes notice; but when a cold body, as a piece of iron, is held for a moment in the flame it condenses this steam and the water becomes visible. The theory of your friend is all wrong.

C. P. S. W., of N. C.—The white earth you send us is silicious lime, resulting from the remains of minute diatoms. Under the microscope the shells of the diatoms, covered with beautiful and delicate lines, are distinctly visible. We can have a sketch made of some of these shells, if you desire, at a charge of \$5. The earth will probably be useful as a polishing powder.

G., of Tenn.—The recipe for the hair composed of oxide of bismuth, spermaceti, and lard, recommended to you, will be as harmless as any other grease plaster provided the oxide of bismuth does not contain arsenic, with which it often is found mixed. As a hair renewer it is no better than barn yard manure or roadside mud.

J. S. C., of Me.—The sectional area of the horizontal flue leading from your boiler to the chimney, ought to be twenty-two inches in diameter instead of sixteen. No advantage would result from making the flues of chimneys taper towards the top. Horizontal flues ought to have from one fifth to one sixth more capacity than upright flues.

A. W., of N. Y.—We believe a fan to be a very uneconomical method of conveying the sawdust shavings, etc., from a mill to a fire room and cannot therefore advise it. We infer this from general principles, as we have not seen a fan used for that purpose. We are confident, however, that you will do better with the drag hitherto employed.

J. R. R., of Md.—We think salt as good as anything to pack eggs in for winter use. They should be kept in a dry cool room but not where they will freeze, and the package should be turned once a week to prevent the eggs from settling to one side of the shell.

J. L. R.—Nothing yet discovered is more effectual in retaining heat in vessels than thick coatings of loose felt. You can take a useful lesson from the Norwegian cooking apparatus, illustrated and described on page 161, current volume, of this paper.

S. S., of Conn.—You can use screws in making the model. The mineral you send appears to be mica schist, containing minute garnet specimens.

J. H. Keine.—We advise the use of plumbago (black lead) mixed with tallow for wooden cogs.

W. E. E., of R. I.—Ethereal phosphorus, so-called, is a simple solution of phosphorus in ether.

G. G. W., of Pa.—The information you seek will shortly appear in our columns.

Recent American and Foreign Patents.

Under this heading we shall publish weekly notes of some of the more prominent home and foreign patents.

COMBINED COTTON AND CORN PLANTER.—A. H. Wootton, Bartow, Ga.—This invention has for its object to furnish a simple, convenient, and effective machine, which shall be so constructed and arranged that it may be easily adjusted for use, for planting cotton seed or corn, as may be desired.

FRUIT JAR.—J. M. W. Kitchen, Brooklyn, N. Y.—This invention has for its object to improve the construction of fruit or preserve jars, so as to make them simpler in construction, and more convenient, reliable, and effective in use.

CURRY COMB.—John M. Baker, Marshfield, Ohio.—This invention has for its object to improve the construction of curry combs, so that when the

front teeth have become worn, the comb-plate may be reversed or turned half way around, causing the rear teeth to become the front ones, enabling the curry comb to be used much longer than it otherwise could be.

CORN HARVESTER.—John McLeish, Chicago, Ill.—This invention has for its object to furnish a simple, convenient, and effective machine, by means of which the corn stalks may be cut, the ears separated from the stalks and deposited in a suitable receptacle, and the stalks deposited in bundles or bunches upon the ground.

REVOLVING PLOW.—Wm. J. Dawson, Brookfield, Mo.—This invention has for its object to furnish a simple, convenient, and effective machine, by means of which cultivated land may be prepared for the reception of the seed thoroughly and well, and which may be operated with a comparatively light draft.

FIREPLACE HEATER.—R. D. McDonald, Jersey City, N. J.—This invention has for its object to furnish an improved open grate fireplace heater, which shall be so constructed and arranged as to utilize the heat that usually escapes into the chimney, economizing fuel and obtaining the advantages of a stove and open fire.

CHURNING MACHINE.—Samuel D. Lucas, Winterpock, Va.—This invention has for its object to furnish a simple and convenient churning apparatus, by means of which one or more churns may be operated at the same time, bringing the butter in a very short time and with a comparatively small amount of labor.

SICKLE GRINDER.—Henry Millard, York, N. Y.—This invention has for its object to furnish an improved machine for grinding, mowing, and reaping machine cutters, which shall be simple in construction, easily operated, and so arranged that the cutters may be ground all the way from point to heel.

REVOLVING DOUGH MIXER.—Thomas Holmes, Williamsburgh, N. Y.—This invention has for its object to improve the construction of the improved dough mixer, patented by the same inventor, June 15, 1869, and numbered 91,335, so as to make it simpler and less expensive in construction while doing its work equally well.

CULTIVATOR.—Isaac J. Morrow, Everton, Ind.—This invention has for its object to furnish an improved cultivator, which shall be so constructed and arranged that the amount of dirt allowed to pass to the plants may be conveniently controlled and regulated.

HAY AND GRAIN ELEVATOR.—John Dennis, Oswego, N. Y.—This invention has for its object to furnish an improved apparatus, by means of which an entire load of hay or grain may be raised to the upper part of a barn at one operation, thereby saving the labor and time required when it is pitched up or raised by the forkful.

COMBINED SOFA AND BED.—Wm. H. Schwalbe, New York city.—This invention has for its object to improve the construction of combined sofas and beds, so as to make them more convenient in use, and so as to better adapt them for use in the various places in which they may be required.

SPRING FOR WAGON TONGUES.—George Alexander, Romney, Ind.—This invention has for its object to furnish an improved attachment for the fore-part of a wagon gearing, by means of which the tongue may be supported at a greater or less elevation, as desired, so as to relieve the horses' necks from the weight of the tongue, and in a great measure protect them from the thrashing of the tongue when the wheels strike an obstruction.

COFFEEMILL.—Hermann von Holten, Hoboken, N. J.—This invention has for its object to furnish an improved coffeepot, which shall be so constructed and arranged as to force the boiling water through the compartment containing the ground coffee, which water extracts the strength from the coffee and flows thence into another compartment whence it is poured out for use.

PROCESS FOR PRESERVING EGGS.—John Longmaid, New York city.—This invention relates to a new and useful improvement in preserving eggs for market and use.

SEWING MACHINE.—M. C. Hawkins, Edinboro, Pa.—This invention consists in a novel manner of connecting the upper, or needle, with the lower, or shuttle shaft, by means of a pitman and loose crank, and in a novel manner of arranging and operating the take-up bar, and of combining it with the needle bar, so that it will operate in conjunction with the same.

ROCKING CARRIAGE.—A. Armando, New York city.—This invention relates to a new carriage, more particularly intended for children, and so constructed that it may be propelled by rocking motion, and that it will be rocked when propelled by other means.

RAILROAD STATION INDICATOR.—A. C. Rodgers, Fort Washington, Pa.—This invention relates to a new apparatus for displaying, within railroad cars, the name of the station which the car is approaching, or at which it has arrived. The invention consists of a system of levers and toothed wheels, by which intermittent rotary motion, in either direction, can be imparted to a drum, around which a belt or chain containing the names of the stations is placed. The apparatus is set in motion by a stop arranged on the track striking a lever suspended from the car.

SAFE.—Joseph P. White, Savannah, Ga.—This invention consists in constructing the safe of an inner thick and strong shell of metal, and an exterior thin shell made of chilled iron, and having on its interior surface flint, emery, or any other substance which in drilling will generate sparks of fire to explode powder, with which a space between the two shells is to be filled so as to blow off the outer shell, to create alarm and to disable the burglars.

WATER WHEEL.—W. E. Hill, Renovo, Pa.—This invention consists in an improved arrangement of buckets, designed to cause both a direct and reacting application of the water; that portion of the buckets designed for the reacting application of the water being made adjustable by the action of springs to vary the discharge orifices, as the volume of water or the resistance of the wheel changes. It also consists in an improved arrangement of the gates, and also in an arrangement for packing the joints between the wheel and the scroll.

COTTON PRESS.—C. J. Beasley, Petersburg, Va.—This invention relates to improvements in cotton presses, having for its object an improved arrangement of means whereby the follower may be worked, both up and down, by the same operating lever, working in the same way; also a simple arrangement for varying the leverage, as the force required is greater or less; also an improved arrangement of the follower to facilitate filling the case.

RAILROAD CAR.—Perry Prettyman, Paradise Spring Farm, Oregon.—This invention relates to improvements in railroad cars, the object of which is to prevent them from running or being thrown off the track from any cause. It consists in the application to the car trucks of auxiliary axles and wheels so arranged that the said wheels will be suspended between an inward projecting portion or flange of the top of the rail, and a corresponding widened portion of the bottom of the rail, the upper flange of the said rail serving by its action on the auxiliary wheels to hold the cars from running off, and the lower flange serving for the track of the said auxiliary wheels, which receive and support the cars of the main axle brake.

OPERATING CHURN DASHER.—William Kerr, Lassellsville, N. Y.—This invention relates to an improvement in the method of operating the dashers of butter churns of the old style, or where the dasher is attached to a rod or staff, and given a vertical reciprocating motion by hand, or by means of any other suitable power.

SELF-WINDING CLOTHES-LINE MACHINE.—W. A. Coventry, Paterson, N. J.—This invention relates to a new and useful improvement in an apparatus for automatically winding up a cord, or clothes-line.

SELF-CLOSING FAUCET.—A. Brinckmann, New York city.—This invention relates to a new faucet for water pipes and other purposes, which is to be self closing, so that no liquid can be lost by accidentally leaving the faucet open. The invention consists in attaching a weighted lever to the spigot of the faucet which lever will always automatically draw the faucet closed, and which will also serve as a handle for operating the faucet.

HORSE POWER.—C. L. Drury, Rockingham, Vt.—This invention relates to a new horse power of that class in which the animal moves on an inclined plane or disk, and the invention consists in the arrangement of devices for adjusting the position of said wheel and in the application of adjustable