THE FLOW OF SOLIDS AND ITS EFFECT UPON THE STRENGTH OF MATERIALS.

quack !" Then he ha has till the whole cabin rings again.

BY PROFESSOR R. H. THURSTON.

One of the most important properties of metals is that which has been carefully and skillfully investigated by M. Tresca, the distinguished "Sous-Drecteuri du Conservatoire des Arts et Métiers," and by him called the flow of solids. The important modification produced in the strength of materials by this action is not generally recognized, and has not been considered by standard authorities on this subject.

Professor Henry proved long ago that liquids, which were previously regarded by all, and which are still regarded by many, as destitute of all cohesion, are actually endowed with considerable attractive force, their molecules clinging to each other with a tenacity probably nearly, and perhaps quite, equal to that of ice. The total absence of the force of polarity, which gives the property of solidity, and the perfect freedom from true friction, observed in fluids, prevent the casual observer from detecting the existence of this attraction, and it can only be measured by ingenious artifice and skillfully conducted experiment. In solids, the force of polarity prevents the occurrence of such intermolecular movements, and enables cohesive force to be observed and appreciated; but it is evident that, so long as the power of changing interatomic distances by flow remains, the maximum cohesive resistance of the material cannot become measure of its tenacity.

It has recently been found that any distribution of material which aids polarity in resisting the tendency of particles to slide among each other, under the action of any straining force, causes a power of resisting external forces to become evident, higher than is noted where the form is such as to permit flow. The real resistance to fracture offered by any piece, as a bolt, for example, is determined by the relative and absolute values of cohesive force and polarity, and the form of the piece, and is not, as has been so generally supposed, a simple measure of the cohesive strength of the substance.

It was shown sometime since, in an illustrated article published in the Railroad Gazette*, that a piece of boiler plate having rivet holes, whether punched or carefully drilled, was actually weaker per square inch of breaking section than when solid. It has long been known to engineers that short specimens of materia's, subjected to test in the standard form of testing machine, exhibited higher tenacity than long specimens of the same material with a uniform cross section. This phenomenon has recently been studied by Mr. C. B. Richards, at Hartford[†], and by Commander Beardslee at the Washington Navy Yard, and the results obtained are very similar.

The standard short specimen gives, almost uniformly, about twenty per cent higher resistance to fracture by tensile force than the long specimen, which has a uniform cross section for a length of several times its diameter.

A metal which exhibits a tenacity of 60,000 pounds per square inch when tested in the first form, the minimum area occurring at a single point, will usually resist with a force of but about 50,000 pounds when tested in the form of a long bolt. It is therefore very important to know in what form a specimen of metal has been tested when its so-called tenacity is stated.

The majority of experiments hitherto made and quoted in books and periodicals have been made with short specimens. We are consequently very liable to be led to expect more of our materials than they are really capable of sustaining.

It may be inferred, from what is above stated, that, in construction, we should always be careful to design the parts exposed to strain in such manner that their form should aid in giving resisting power by preventing, as far as may be, a flow of particles and consequent stretch or distortion. This is correct when dead loads are to be carried.

Another inference would be that one large piece is less liable to yield under the attacking force than several small ones of equal total section. It is, however, to be remembered that small pieces are usually better worked and are less affected by internal strain than are large piecos. This is particularly the case with iron and steel, which are far more liable to this last kind of fault than are the other metals. Where the piece is to resist blows, or to sustain live loads, it need hardly be said, it should never be given a contracted section if it can possibly be avoided. Since the damaging effect of a blow is measured by the product obtained by multiplying the weight of the striking body into the hight from which its fall would have given it its striking velocity, and since the resisting power of the piece receiving the blow is measured by the product of the strength of the material into about two thirds the distance it will stretch before breaking, it is seen that the proper method of forming the resisting piece is that which gives it the best opportunity to stretch to a maximum extent before breaking. This is done by making the greatest possible length of uniform section and seeing that all other portions are somewhat larger.

long bolts, which are used as braces, of uniform sectional area from end to end, except at the very extremities, which are upset for a distance equal to the required length of thread to be cut on them, and this enlarged portion at each end is given such size that the diameter at the bottom of the thread, when cut, shall be somewhat greater than that of the body of the rod.

The amount of flow of the metal is determined by the character of the metal. Hard wrought iron and tool steels, for example, exhibit it less, and are consequently more ductile and resilient, than soft iron and low steels, while the latter are weaker metals than the former. Cast iron is both weak and non-resilient, and is therefore not well fitted to sustain either dead or live loads. The harder metals are not less affected by shape, in their power of resisting shock, than are the softer grades, and where it becomes necessary or advisable to make use of them under such circumstances, the same care should be taken to avoid concentrating the straining action on a short portion, or upon a single plane of cross section.

It often happens in, designing machinery, that pieces are necessarily made of such shape as to be liable to injury from the cause here considered. Should this danger appear serious, the designer might be justified in changing his whole plan to avoid such risk.

A connecting rod, as usually made, is an illustration of a piece unfitted by its shape to bear a blow. The less the taper of the rod, the less is its liability to yield to shock. To secure in any given case a form of rod that shall best combine power of resisting shock with maximum endurance under heavy strain is often an important problem. The spring of the rod will often take up excessive strains, due to accidental and excessive blows caused by the piston striking upon water in the cylinder or by other exceptional occurrences.

The body of a piston rod being of uniform section, it is well fitted to meet either static or dynamic compressive stress, but it is so seriously weakened at each end by the taper given it in fitting it to piston and crosshead, and by the slots cut through it, that it is usually quite unfit to offer maximum resistance to shock in tension.

To resist perfectly steady strain, therefore, and to carry dead loads, we should always select the strongest material, rather avoiding ductility, and, where the minimum section occurs, make that as short as possible and of such form as shall best resist flow and change of shape.

To resist percussive action and to sustain live loads, we should select that material which is at once the strongest and most ductile, avoid brittleness as certain to produce danger, and make the piece of such form as shall allow the greatest possible stretch lefore breaking.

Where two materials have products of strength into elongation which have the same magnitude we would select the most tenacious. Where two materials are equal in other respects, we would select that which has least density, since it is less likely to produce a concentration of the effect of the shock near the point at which the blow is struck. STEVENS INSTITUTE OF TECHNOLOGY.

Plant Trees.

Mr. Reuben Shelmandine, of Jefferson, N. Y., is evidently a philanthropist, and he proves his love for mankind in general by issuing a proclamation to farmers. Why he should embody a number of very useful hints about transplanting trees in this highly official document, we cannot explain. Suffice it that the writer says that he has had an experience of twenty years on a farm, and "not on a side walk," and that his remarks are practical. Transplant, he says, finest or standard fruit trees, some in the fall and some in the spring, until you have from 10 to 50 trees growing. No tree should stand nearer a building than twenty feet, and the trees should be about twenty feet apart throughout the entire grove or orchard. Establish forest trees along the road and the front ward, and fruit or forest trees on other sides of the house. Sugar maple, commonly named hard maple, is preferable of forest trees, and thrifty, hardy apples or pears, or both, of the standard (not dwarf) kinds.

Ornamental trees should be trimmed during the first few years, leaving the main shoot to form the trunk of the tree, in order to have the branching lower limbs of the final tree from six to seven feet from the ground. The land in such an orchard grove can be cultivated for all ordinary crops, including a garden, by plowing shallow and carefully near the trees.

DECISIONS OF THE COMMISSIONER OF PATENTS

PATENT TOBACCO BAG,-JAMES D. CULP.-Appeal.

[Appeal from the decision of the Board of Examiners-in-Chief in the matter of the application of James D. Culp, for patent for Improved To-bacco Packages.-Decided April 15, 1874.] LEGGETT. Commissioner:

Applicant claims-1. The use of elastic knit or loosely woven tobacco sacks, substantially as berein described, for packing tobacco. 2. As a new article of manufacture, elastic tobacco sacks made of knit or loosely woven fabrics, substantially as berein set forth and described. Heretofore sacks for containing small quantities of granulated tobacco to be sold at retail in small packagcs, have been made of woven fabric, pleces being cut out, folded, and sew nat one side and one end to form the sack.

sacs. In packaging the tobacco it is pressed into a metallic tube, over the end of which the bag is slipped to receive the tobacco as it is forced out of the

In packaging the tobacco it is pressed into a metallic tibe, over the end of which the bag is slipped to receive the tobacco as it is forced out of the tube. Applicant proposes to knit long tubes of the diameter of a tobacco pack-age and cut them into suitable lengths to form tobacco sacks, and merely sew them across the bottom. The novelty of this plan of making tobacco sacks is admitted, but the Board hold that, as it is common to knit tubular faorie for stockings and purses snd cut it into proper lengths and sew up one end, there is no favention in making tobacco sack in this manner. The following politics are made by the applicant against the soundness of this opinion. He says his sack can be manufactured with less expense than the old sack, because it requires less sewing. But this advantage is sue solely to the method employed in its manufacture, which, broadly consic-ered, is old. Laying aside the method, which, although it has never bern employed before to make tobacco sacks, has been used to make purses and stockings, and considering the alleged qualities and advantages of the fin-shed article, its asid, first, that on account of its elasticity it will readily fit the metallic tube, even if there is some variation in its size, and thus the waste or in sinting sacks, which occurs in the use of the unyielding woven fabric, is avoided; accound, the danger of giving way at the side seam, which is incident to the sacks adapt themselves to the sizes and shape of the packages, requiring nothing but the draw string to smoothly close their imouths for the reception of the revenue stamp, and the ordinary seam across their bottoms to smoothly close their mouths for the reception of the revenue stamp, and the ordinary seam across their bottoms to smoothly close their mouths in the object of the law to promote the production of new snd im-proved articles for the use of the public. Very little snalogy appears between a stocking or purse and a sack for a tobacco package.

tobacco package. Decision of the Board reserved and a patent allowed to the applicant.

BIGHTS OF EMPLOYERS AND EMPLOYEES TO INVENTIONS

GILBERT, AND CLARK, BONZANO & GRIFFEN.-INTERFERENCE.-ELEVATED RAILWAY PATENT. [Appeal from the decision of the Board of Examiners-in-Chief in the matter of the interference petween the application of Rufus H. Glipert, and Clarke, Bozano & Griffen, for patent for Improvement in Elevated Ratiways.-Decided April 16, 1874.]

[Appeal from the decision of the Board of Examiners-in-Chief in the matter of the interference retween the application of Rufus H. Gilbert, and Clarke, Bonzano & Griffen, for patent for Improvement in Elevated Railways-Decided April 16, 1874.] LEGGETT, Commissioner: The lavention in controversy is an elevated street railway. Such a means of transitin large clicks has long been a project of absorbing interest to the applicant, Dr. Gilbert. With adding account of the humber the Pennsylvania, distin-ting practical furtherance. It is admitted that the widespread reputation of its practical furtherance. It is admitted that the widespread reputation of the subject by his suggestions. Cannot be doubted. How far he had ne-tured the structure of the device in his once widespread reputation the subject by his suggestions. Cannot be doubted. How far he had ne-tured the structure of the device in his owner had uncertain. It is clear-however, that he had not perfected all the details, and probably could not have done it. Butthat he nad conceived this much, that he must have sup porting columns, an arch of some kind properly elevated, and a track the groperly support and far enough beneath to admit of the pas-sage of steam cars under the arch, all of sufficient strength for the gurpose contemplated, is certain. The very conception of the deso of an elevated steam railway over the center of a street, which would not obstruct ravel, must have suggested this much, there is undicine proof the structure which he practical suggestions and instructions of skilled mechanics and engineers. They could and did tell him that a golfic arch would not do. They probably could be doubt should be dowe. They no doubt informed him also with reference to the structure of the structure endodying the intervention of a did tell him that a golfic arch would not do. They probably to did mains and entraction was define of the structure which he practical suggestions and instructions of skilled mechanics and engineers. They could and did tell him t

because of the inducement of ultimate profit to be derived from it as em-ployees in the line of their profession. Therelation of employer and employee was essentially established be-tween the parties. That being the case, althitting all that is claimed to have been suggested by Clarke, Bonzano & Griffen, I cannot see that they have any claim to independent inventorship. Decision in favorof Gilbert.

DECISIONS OF THE COURTS.

United States Circuit Court-District of Massachusetts, PATENT ELASTIC FABRIC.-- WILLIAM SMITH US. THE GLENDALE ELASTIC FABRICS COMPANY.

[Inequity.-Before Shepley, Judge.-Decided February 18, 1874].

The previous production to a limited extent of goods resembling those fabricated by the plaintiff's process, and by means somewhat similar, held to have amounted to no more than abandoned and unsuccessful experi-ments, and not to impeach the validity of his patent. SHEPLEY, J.:

SHEPLEY, J.: This is a bill in equity founded on alleged infringement of letters patent reissued to the complainant, numbered, respectively, 2,843 and 2,814. Ferdinand hoebly and Henry G. Gurney, witnesses in behall of the de-fendants, testify to the use of looms with stationary warps before the date of complainant's invention. Neither of them give any drawing or model of the looms to which they testify, Bord ot the witnesses themselves or any experts in the case testify that the mechanism described by them was substantially like that described by the complainant in his specifica-tion. In the case of Gurney only a trifling quantity of the elastic web was made in the loom described by him. It is not easy to determine from they tather was made on the loom with a stationary warp. I think they are to be regarded in the light of abandoned, and, ludgius from the speciments of the work fields and the ease as unsuccessful, experiments before the date of complainant's invention. There is considerable testimony in the case tending to show that the easting volue and be to the use of a rising and failing rubber warp. Machinery operating in that way is open to be used without initinging the complainant's patent. The fact that rspondents preferio use the mechanism patenced to complainant is evidence that there is sufficient utility in the invention to support a pat-entity of the support a pat-

ent

Thus the best bridge builders in this country make the

In Gazette.

† rans. An... - R.

It is suggested that the first ten trees be planted on the south side of the house, if none be there already.

If a wind break is wanted on the west, northwest, or southwest, plant as near together as possible and have a part of the trees evergreens, to complete the thicket. The forest and fruit trees, arranged about twenty feet apart, as above described, will be estimated by the owner or other persons at the expiration of five years from the time of planting to be worth at least five dollars each, and at the expiration of ten years at ten dollars each, with an increasing value thereafter.

Inventions Patented in England by Americans.

[Compiled from the Commissioners of Patents' Journal.] From April 14 to April 16, 1874, inclusive.

BOILER AND FURNACE .- D. Renshaw, Hingham, Mass. HORSE COLLAR LINING .- D. Curtis et al., Madison, Wis LEATHER DRESSING MACHINE.-J. M. Cailer, Salem, Mass. NEEDLE .- W. Trabue, Louisville, Ky. PUMP.-W. D. Baxter, New York city. TEMPERING APPARATUS.-G. F. Simonds, et al., Boston, Mass. WASHING MACHINE, ETC.-E. Marshall, Tola, Kansas. [7. A. Lencks and L. Scott, for complainant. Benjamin Dean, for defendants.

United States Circuit Court .--- District of Massachusetts.

WADE H. HILL et al. vs. G. H. WHITCOMB et al.

Lin equity.—Before Shepley, Judge.—Decided February 13, 1874.] The Court held as follows: Shepley. Judge: The Alien Manufacturing Company, being the owners of the rights sc-cured by three different letters patent of the United States, for the inven-tions of Edwin Alien in improvements in printing presses, on the inst of February, 1871, entered lato a certain contract with the complainants This bill is brought to enforce the rights of the complainants under that contract. The contract begins with a recital that the Allen Manufacturing Company

This office or the second seco

covenant to protect and defend the complainants in the exclusive use and enjoyment of the said automatic envelope printing presses in the territory

arcreastd. The fourth clause provides for the payment by complainants of the sum of one thousand dollars for each press ordered and received by them, and of a rayalty of one dollar per day on each press on which envelopes can be printed of size No. 6, and corresponding royalites for other sizes " when said parties of the second part shall be protected in the exclusive use and enjoyment of them according to this agreement."

The fifth clause contairs provisions concerning the sale by complainants to other parties not material to the subject matter of this inquiry. It is provided in the sitch clause that complainants shall have the exclusive right in said territory to use any and all improvements upon said presses, which shall hereafter be made, sand which shall be owned by or under the control of said parties of the first part, and shall have the exclusive right under the use of the first part, and shall have the tright to adapt said improvements. The complainants were, therefore, not grantees of an exclusive right under the use of the store the whole or any specified part of the United States. They were licensees with the right of mains and vending to others to be used, within the specified territory, such presses embodying the patented inventions as they might purchase of the Allen Company, which owned the patents, and having coupled with that license a grant of the exclusive right to use real, and yend said presses in the apecified terri-tory upon the prescribed conditions, and a covenant for protection in 'the exclusive use and enjoyment of said automatic printing presses afore-said and of the improvementasforesaid." Suce a contract clearly gives the licensee no right of action for an in-fringement of the patent. To enable the purchaser to sue, the assignment muse undoubtedly convey to him the eattire and unqualified monopoly which the patentee held in the territory specified, ercluding the patentee, and the legal right in the monopoly remams in the patentee, and he alone can mainsin an action against a third party who commits an infringement upon it. Even when a suitatiaw will lief or the intring ement of a patent, proceed

upon it. Even when a suitatlaw will lief or the infringement of a patent, proceed-ingsin equity may usually be maintained, as a fording a more practical and

"Even when a suitatiaw will lie for the infingement of a patent, proceed-ings in - quity may usually ne main tained, as a fording a more practical and Moone can maintain as ut for the infingement of a patent except the patentee, or an assignee who owns the entire right in it for a specified ter-ritory, exclusive of the patentee himself. The owner of the exclusive right to use a patented article, and to sell it within a specified territory, out not the right to manufacture it, is a mere licensee, and cannot maintain on any action for infringing the patent. The parties who own the exclusive right to use and sell a patented inven-tion within a specified territory, with a guarant for its enjoyment from the patentees, cannot maintain a bill for an injunction and for an account against the patentees and parties who, with knowledge of the contract, have purchased the arrangement from them without the territory, and are using it within it.

using it within it. The federal courts have no jurisdiction over a suit brought to enforce such a contract against the patentees, and the purchasers from them, where all the parties are citizens of the same State.

Bill dismissed. [Causen Browne and Jabes S. Holmes, for complainants. George S. Hillard, James E. Magnadier and M. F. Dickinson, for de-

fendants.j

United States Circuit Court---District of California. PATENTAMALGAMATING PAN .- COOLIDGE #8. MCCONE.-INFRINGEMENT.

[Decided March 5, 1874.]

In a patent for an amalgamating pan, a claim for "constructing and placing the shoes and dies upon upper and netter disks obliquely at about the angle as described, together with the beveled bars B B B," stc., is a claim for the shoes and dies in combination with the bars. The claim is not infringed by using the shoes and dies without the bars, a)though it should be shown that the bars are of no use in the combina-tion.

although it should be shown that the bars are of no use in the combina-tion. Sawyer, Circuit Judge, delivered the opinion of the court. We have examined the specifications sinexed to the patent very care-fully, and it is very plain to our minds that the patent is for a combination of several elements or parts. The petitioner commences by describing the drawings, and then states as follows: The nature of my invention consists in the arranging of shoes and dies having grooves or channels cut obliquely from the circumference to the center, terminating in a line of a radius to the center or axis. My inven-tion also relates to beveled bars placed between each die and partially filling the grooves, for the purpose of keeping the ore near the same as they pass each other. Then he describes how the dies are fixed to the disks, and tells us how other dies have been used in a different arrangement; points out how the beveled bars are arranged in connection with the ether parts; describes their operation, and concludes with the claim, which is in the following with down the state of the same disc for the purpose of xedua

not claim broadly the use of shoes and dies for the purpose of reduc

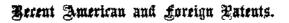
I do not claim broadly the use of shoes and dies for the purpose of reduc-ing amalesmating ores, for these are well known and used. What I do claim, however, and desire to secure by letters patent, is constructing and placing the shoes and dies upon u...er and nether disks obliquely at about the angle as described, together with the beveled bars B B, etc., sub-stantially as described, and for the purposes set forth. There is notating to show that this combination was made or sold by the defendant, or that he has made portions of it and sold them to other par-ties, with the knowledge that they were to be used in connection with the "beveled bars" for the purpose of making up a single complete machine. The court thereupon advised the jury to return a verdict for the defend-ant, which was accordingly done. Lewis *d* Deal and Beaty, for op plain tift. With ama & Bixter, for defendant.]

United States Circuit Court---Southern District of New York.

PAPER BAG MACHINE PATENT .- THE UNION PAPER BAG MACHINE COMPANY et al. vs. GEOEGE L. NEWELL et al.

New York. PAPER BAG MACHINE TATT. THE UNION PAPER BAG MACHINE COMPANT *icl.* vs. GEDROEL NEWELL *et al.* Bitchford, *Judg.* This dist section of the sact of July 8, 1870. (16 U. S. Statutes at Large, *Statutes of the same may be given upon certain specified otices in the and proots of the same may be given upon certain specified notice in the and proots of the same may be given upon certain specified otices may be pleaded and drot inventor of discoverer of any material and substantial part of the bit inventor of discoverer of any material and substantial part of the bit inventor of discoverer of any material and substantial part of the thing patented, and " that it had been in public use or on sale in this coun-try for more than two persos before his application for a patent, or had been abandoned to the public." As to notice in the samwer, the section requires that, in giving such nolices as to proof of previous lawer and by whom it had been used." As to the effect specified, the section provides that " if general to the special matters alleged and the found for the de-fendant, judgment shall be rendered for him with costs." The is a suit in equify for relief against an alleged infringement by the Binney, assignee of E. W. Goodale, as inventor, September 12, 1873. The an-swer was field duly, infa. The relicitation was field August 23, 1873. The answer was field duly, infa. The relicitation was field August 23, 1873. The same and residences a new parts have the section provides the the same and be the uput in or discusser and the state as a super same and be abanding apper bags. The bill was field May 13, 1873. The an-swer was field duly, infa. The replication described and claimed in the section of the other and and first inventor of soft fan hearing. The state apperlimitary is all of documentary proofs for final hearing. The state apperlimitary is all of documentary proofs for final hearing, the state of the defendants as the yed in the state the defendants for the the state*

through the mass, by which its combustion is maintained, the vaporization of the zinc and its exidation in the furnace above the charge, when the zinc in the ore is expelled, and the repetition of the process. In the blast furnace-to which alone, as a prior device, it is necessary to refer-the fuel and ore are not comminuted, nor is the charge spreadin a thin layer, and when its working is begun it must accessarily be continued without interruption until the furnace is blown out. In all these particulars the wetherill process is different. The bed firs consists of fuel in a commi-nated form, so also does the charge of mingled ore and carbon. This charge is spread in a layer of the maximum depth of eight or nine inches, and through it is diffused a blast of air, not only to keep up combustion, but to supply the vaporised sinc with sufficient oxygen in the furnace chamber to convert it into white oxide, and when the metallic zinc is expelled from the ore, the soria or slag is removed and he process re-peated. It is thus an alternating process, insemuch as it is susceptible of temporary suspension and repetition, whereby it is distinguishable from the operation of the blast furnace, which is continuous and incapable of interruption. The process used by the defendants is claimed to differ essentially from wetherill's, first, in the character of the charges employed, and, second, in the continuity of their treatment; and upon the determination of these facts the result of the presents application diepands. The defendants introduce supplemental blast in the results were perfect without it. Now, if the means employed by the defendants to supply the charge with all beneath it operate less efficiently than Wether-in life, although they are identical in function and mode of operation, does it to low that a necessary supplemental blast was turned on. But, in view of the preponderating weight of the proofs tagen before the final hearing, if the product is not perfect without this additional isupply of oxygen, it must be



Improved Gas Regulator,

Joseph Adams, Washington, D. C. -- This invention relates to that class of regulators in which the pressure of the gas acts upon a fiexible diaphragm to which is attached a valve that opens or closes as the gas is turned on or off from the burner, or as the pressure varies from the street mains; and it consists in a new and improved arrangement, in which the valve is made more sensitive to the pressure of the gas by means of a balcon-like arrangement of thin metal in the diaphragm that opens down through the valve, and, being constantly filled with gas, counteracts, by its buoyancy, the weight of the valve, and hence makes the diaphragm, as connected with the valve, more sensitive to the pressure of the gas.

Improved Hydrant.

John Thomas Davis, Washington, D. C.-This invention is designed to provide novel means calculated to facilitate the operation and manipulation of hydrants, while they are also effectually prevented from freezing in the severest temperature of the winter.

Improved Saw Mill. John N. Hall, Central City, Col. Ter.—The features of this invention are: An improved apparatus for adjusting the ends of the log as it rests upon the head blocks; for adjusting the log for slabbing; for automatically mov ingthe log laterally toward the saw after each cut, or from the saw when necessary; and for operating the log carriage.

Improved Velocipede.

Friedrich C. Scharfi, Chillicothe, O.-This is a perambulator to be used by grown-up persons and children for the conveyance of parcels. horizontalframe is supported on the crank axle, to which the driving wheels are keyed. The middle part of the frame has a seat. Upward and downward extending standards are cast to form the bearings for crank shafts, by which the motive power is transmitted from hand cranks of the upper shaft to the driving wheel. These shafts, as well as the axle of the driving wheels, are provided with double cranks, one crank on each shaft being under right angles to the other. The crank rods connect the upper driving shaft with the lowercrankshaft, and suitable rods connect the lower shaft with the crank axle of the wheels, transmitting thus the driving power to them. The lower shaft is also provided with radial arms and weights, which serve the purpose of a fly wheel, and assist transmission of power. There is also a guide wheel, readily governed.

Improved Portable Feather Renovator.

Abner B. Hutchins, Brooklyn, N. Y.—There is a perforated plate for dis tributing the steam throughout the mass of feathers contained in a cylin der. A jacket surrounds the cylinder, to confine the steam for drying of the feathers, and there is a flexible tube for discharging the feathers from the cylinder into the sack. The jacket is arranged to form the bottom, sides, and top of the truck body; also a protecting case for the steaming cylinder The steam pipes arc provided with cocks, controlling the steam so as to let it into the cylinder, first for steaming the feathers, and afterward into the jacket for drying them off.

Improved Breech Loading Fire Arm.

Joseph C. Dane, La Crosse, Wis.-This invention relates to means where by the barrel or barrels of a breechloader may be conveniently locked to and unlocked from the stock, and consists in a slide that forms both a part of the trigger guard and a part of the mechanism for operating the key.

Improved Paper Box Machine.

William Gates, Frankfort, N.Y.-A roll of paper or straw board is placed on a spindle supported by arms, and its end is carried under a slitting cylinder where slits are cut by spring cutters. The paper i carried from the slitting cylinder upward, and under the pasting roller whence it is carried to the platen, the face of which is provided with small points, which hold the paper in place over the mold ready for the plunger. Each plunger is preceded by a knife, which cuts off the paper for the box. The plunger forces the paper into a recess, and doors are then forced against its sides, forming the box. The parts are then firmly pressed together by suitable mechanism.

Improved Painter's Pail.

Francis C. Landon, Josiah Smith, and James H. Flood, Southold, N. Y. This is an improved painter's pail, so constructed as to enable the

Improved Sewing Machine Table and Cabinet.

Harriet R. Tracy, New York city.-This invention consists in combining with a sewing machine table a set of drawers, which are pivoted at the front corner in such a manner as to enable the same to be turned beneath the body of the table top when not in use, and to be turned in an outward direction therefrom to bring the drawers in prolongation of the end of table, in order to form an extension of the latter for supporting work. The invention further consists in applying, to the ;bottom of the drawer frame, hinged legs which can be turned down to rest on the floor for relieving the hinges of the drawers from all strain, the bar being also hinged so as to enable the same to be turned up against the drawer frame, in order to enable the latter to clear the base of the table or cabinet and the treadie. At the upper edge of the drawer frame is a hinged bar carrying a hinged leaf, which is adapted to be turned against the edge of the table top for forming a flush surface, and to be turned in an outward direction from the drawers to form an extension leaf. There are two pivot plates for sustaining the leaf of the drawer frame in an extended position, said

Improved Device for Burning Hydrocarbons.

plates being adjustable vertically.

George W. Rumrill, Lima, Peru.-This invention consists of an air blower (in combination with a boiler having the oil delivered into the furnace in spray by a steam jet) to be used for producing a jet before steam is raised. The blower is connected with the boiler, or to the steam pipe leading to the injector. This is an apparatus for regulating the delivery of the oil into the furnace, and for shutting it off altogether and letting it. on, so arranged that by turning the screw the steam pipe will be shifted forward and back to open or close the annular space between its nozzle and that of the oil pipe. This device for burning hydrocarbons has been in successful operation for some time, and further information may be had concerning it by addressing J. G. Holbrook, Guardian Mutual Life Insurance Company, 251 Broadway, New York city.

Improved Rotary Engino.

Josiah C. Hamilton, Ashtabula, O.-The steam enters alternately from he cut-off valve to sliding abutment valves, and from them to the piston by a top slot on one side and a bottom slot at the other side. and vice versa when reversed. This, with the action of a sliding tube which controls the exhaust, causes the effective rotation of the shaft at any point of the piston, and without dead points.

Improved Frame for Cultivators, Scrapers, etc. John W. Rabb, La Grange, Tex.—This invention consists in so constructng the running gear of a two wheeled vehicle, that it may be conveniently applied to the several purposes. The axle is bent four times at right angles, giving it a crank form, and may be turned down to bring its side parts into a horizontal position, or turned up to bring its side part into a vertical position without changing the position of the cross beam. It may be locked in place, when turned up, by a button, which may be turned over the side part. The plows can be raised and lowered by simply loosen ing the nuts and bolts. The lower parts of the standards are curved to give any desired pitch to the plows. By attaching a marking plow to each end of the cross beam. two rows, six feet apart, may be marked at a time, By attaching a third plow to the center of the cross beam, three rowsthree feetjapart, may be marked at a time. A scraper plate is bolted to the forward side of the cross heam, and is intended for use in covering cotton, corn, and other seeds, for filling up inequalities in the surface of the ground, to move the soil loosened by the plows in roadmaking, and for other similar uses. By suitable construction, should an obstruction be encountered, a very slight rise of the rear end of the machine will change the line of draft so that the draft upon the machine will raise the axle into a vertical position, raising the plows, harrow, scraper, or whatever may be attached to the cross beam, and enabling them to pass over the obstruction. The machine can be used as a cart without detaching the plows, scraper, or harrow that may be attached to it, by simply raising the axle into a vertical position.

Improved Car Coupling.

Alexander Crocker, La Crosse, Wis.-This invention consists in a nove mode of constructing a two part coupling link so that the two sections cannot come apart (as long as the conjoined cars remain on the track), nor turn on each other : but if one runs off an embankment or bridge and turns over, a wooden pin may be at once broken, one section turned on the other and the two separated.

Improved Antomatic Car Coupling.

Ezra N. Gifford, Cleveland, Ohio.-This invention relates to car couplings hat are bifurcated and operated by the pressure of the link, and consists in making enlargements on the coupling pin to prevent it from rising or falling when upheld; in reducing the pin at a certain part to enable it to be reversed; in providing the drawhead with side projections and the buf-fer head with an incline, to hold up the coupler; and finally, in making a short upward incline on the coupling pin, to receive the advancing link and facilitate the tripping operation.

Improved Jump Seat for Carriages. John A. Hanna, Bel Air, Md.—This invention consists in the improvement of the ordinary jump seats of carriages, by causing the rear seat that turns forward and backward to be supported in both positions by the same side handle, and to allow said support to set well forward and the bolt to go up through the seat without running into the end panels.

Improved Hand and Foot Power.

John J. Kimball, Naperville, Ill.-This is an ingenious combination of levers, so arranged that the operator, by throwing his weight alternately upon his heels and toes, and, at the same time, alternately pushing and pullingupon the levers, can give a steady and uniform motion to the shaft and through it to the machine to be driven.

Improved Car Coupling.

Jacob F. Burner, Elko, Nevada.-This automatic carcouplingconsists of stationary lower jaw with hinged upper spring jaw, which is provided with a pivoted hook and voke for coupling the slotted arrow or other shaped link, and lifting the same for uncoupling, so as to detach it from the hook endsof the laws. The pivoted jaw and hook are connected, by a chain, with suitable mechanism to raise them and uncouple the link.

Improved Belt Tightener.

Charles L. Work, Cincinnati, Ohio.-This is a simple and convenient device for tighteningbelts easily and quickly, and without removing them from the pulleys. A block, which is securely clamped to one extremity of the belt, carries a rack parallel in direction to the latter. On this rack travels (by means of a cog and handle) a second block, which is secured to the other end of the belt. By running the sliding block forward, the two ends are brought together and the belt tightened, when it can, through its

van. No around is shown in any other respect for dissolving the injunc-tion. In order to avoid any implication that the defences sought to be set up in the affdavits as defences under the fist section would, on the papers put in on both sides on the application, be regarded as made out to such an extent, at least, as to warrant the dissolving of the injunction or to have required the withholding of the injunction when originally granted, it is proper to say that an examination of such papers has ied me to the conclu-sion that no such result would follow from a consideration of the fact established by such papers. The motion to dissolve the injunction is denied. [George Harding and Horace Banney, 3d, for complainants. Marcus P. Norion, for detendants.]

United States Circuit Court---District of New Jersey

WETHEBILL et al. vs. THE NEW JEBSEY ZINC COMPANY.

WETHERILL et al. vs. THE NEW JERSEY ZINC COMPANY. McKennan. Circuit Judge: At a final hearing of this cause it was adjudged that the defendants had infringed letters patent granted to Samuel Wetherill, on the 18th of No-vember, 1855, and extended for seven years, for a process for making white oxide of zine, and they were perpetually enjoined "from the further con-structing, using, or selling in any way or manner. directly, indirectly, the said patented improvements or any part or parts thereof." They are now alleged to have violated this injunction, in the use of a process sub-stantially the same as Wetherill's, or at least embracing its essential fea-tures, and a motion has been made for an attachment against them for contempt.

tores, and a motion new occur made for an astronum against signing to contempt. The characteristic features of Wetherill's process were stated to consist in the employment of a thin bed fire of chestnut coal and of a superincum-bent layer of pulverized ore and pea coal of the approximate thickness of three inches, the enforced passage of atmospheric air in numerous jets in

painter to take up the ladder with him paints of different colors, and a

large and a small brush for each color, with the same facility that he now takes paint of a single color. It consists of a tray having a cover provided with holes not unlike a table castor, into which two or more paint buckets may be set. Receptacles are provided for brushes, etc., and the whole is suitably suspended.

Improved Car Starter.

William Guilfoyle, New York city .- This invention consists of double drums with central or side ratchet wheels, which are keyed to the axles of the car wheels, and encircled by metallic springs or bands lined with leather, one end of said bands being connected to a heavy elliptic or other shaped spring, the other to a chain which passes over a windlass roller and pulley to the brake shaft. Loose bands or shoes of the drums take off the friction and wear from the connecting bands, and preserve the same thereby.

Improved Device for Cleaning Bottles, Barrels, etc. C. G. Hüpfel, New York city.-This invention consists of a tubular John standard having a perforated cylindrical extension tube, which is inserted into the bottle or barrel till the projecting stem of a conical valve at the base of the extension tube is carried down by the pressure thereon, open ing the valve and forcing the water instantly through the perforations to the inside of the barrel. The pressure of the water closes the valve as soon as the object to be cleansed is raised from the valve stem, and thereby the supply cut off. This is a very ingenious contrivance for ac-complishing the object designed for it.

portion hetw n the blocks, be cut and released.

Antomatic Machine for Retouching Photographic Negatives. Alfred S. Johnson, Waupun, Wis.-This invention consists of automatic

mechanism to be worked by spring power or other means, a pencil holder, a cam or other equivalent device, and one or more springs, so combined and arranged that a reciprocating motion may be imparted to the penell to cause it to strike blows on the negative with its point in quick succession for the employment of mechanical means in substitution of the hand pro cess always heretofore employed for this purpose.

Improved Fire Shovel.

John B. Firth, Brooklyn, N. Y. - This is a durable coal shovel, which may bestamped of two parts, in such a manner that not only a stronger connection of handle and shovel is produced, but also the double use of a shovel and stove lid lifter be obtained. The invention consists in so cutting the back of the shovel, and lapping the edges over each other, that a strong connection of two thicknesses, with two rivets only, is obtained.

Improved Lumber Carrier.

Esau Tarrant, Muskegor, Mich .- This invention proposes the construc tion, in lumberyards, of long tracks, between which are numbers of trans verse rollers. The planks are laid upon the latter, and held against them by passing under other rollers, disposed at intervals, held in spring bear ings. Each plank passing between the rollers will be pushed against the one ahead of it, and that one against the one ahead of it, and so on to any extent, so that they can be carried by this plan to any distance that may be required.