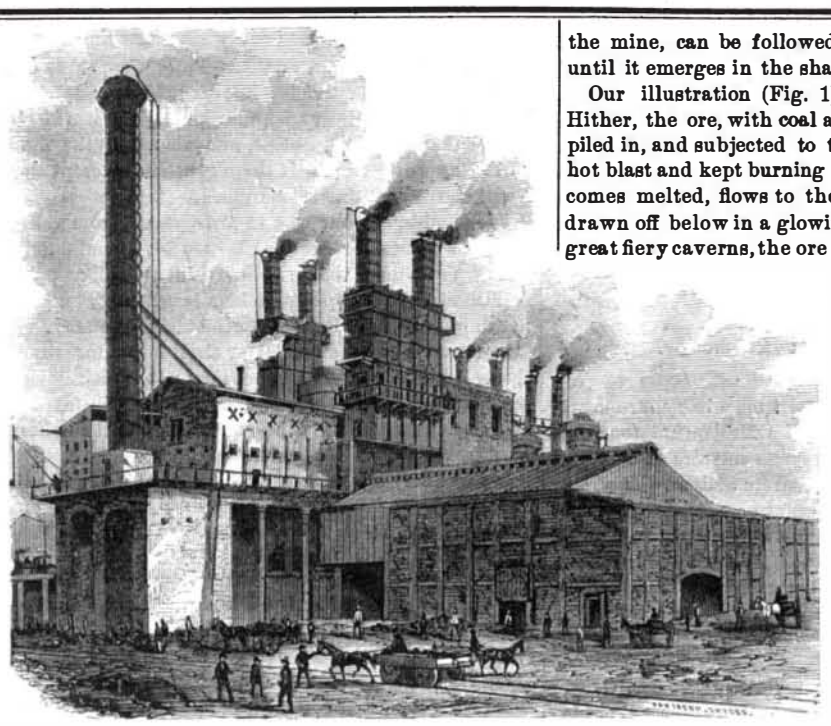

FIG. 1.—THE PHŒNIXVILLE BLAST FURNACES.

IRON BRIDGE CONSTRUCTION.

The various processes by which iron is prepared to be used in bridge building are many of them as new as is the employment of this material for the purpose. The subject is

FIG. 6.—BOILING FURNACE.

one of considerable public interest, and hence we extract from an album of designs, recently published by Messrs. Clarke, Reeves & Co., the well known iron bridge builders, the accompanying engravings and description, deferring, to a subsequent article, illustration and notice of some of the most remarkable structures constructed at the extensive establishment of the above firm.

The Phœnix Iron and Bridge Works are located in Phœnixville, in the Schuylkill Valley, Pa., and were founded in 1790. At the present time over fifteen hundred hands are constantly employed, and the establishment is probably the only one in the world where the crude iron ore, fresh from the mine, can be followed through all its transformations until it emerges in the shape of a finished bridge.

Our illustration (Fig. 1) represents the blast furnaces. Hither, the ore, with coal and a flux of limestone, is carried, piled in, and subjected to the heat of the fires, driven by a hot blast and kept burning night and day. The iron, as it becomes melted, flows to the bottom of the furnaces, and is drawn off below in a glowing stream. Into the tops of these great fiery caverns, the ore and coal is dumped, being raised by elevators (Fig. 2) operated by a blast of air, and then thrown in by the men, as shown in Fig. 3. The blast for the furnace is driven by two three-hundred horse power engines, and is heated by the consumption of the gases evolved by the material itself.

The engine room, with its giant machines, forms the subject of our fourth engraving. Twice every day the furnace is tapped, and the stream of liquid iron flows out into molds formed in the sand, making the iron into pigs (Fig. 5). Next follows the boiling process, the furnace being an oven heated to an intense heat by a fire urged with a blast (Fig. 6). The cast iron sides of the furnace are double, and a constant circulation of water is kept passing through the

FIG. 5.—RUNNING METAL INTO PIGS.

chamber thus made, in order to preserve the structure from fusion by the heat. The inside is lined with fire brick, covered with metallic ore and slag over the bottom and sides, and then, the oven being charged with the pigs of iron, the heat is let on. The pigs melt, and the oven is filled with molten iron. The puddler constantly stirs this mass with a bar let through a hole in the door, until the iron boils up or "ferments," as it is called. This fermentation is caused by the combustion of a portion of the carbon in the iron; and as soon as the excess of this is consumed, the cinders and slag sink to the bottom of the oven, leaving the semi-fluid mass on the top. Stirring this about, the puddler forms it into balls of such a size as he can conveniently handle, which are taken out and carried on little cars, Fig. 7, made to receive them, to the squeezers. In the latter (Fig. 8) the ball is placed and forced with a rotary motion through a spiral passage, the diameter of which is constantly diminishing. The effect of this operation is to squeeze all the slag and cinder out of the ball, and force the iron to assume the shape of a short thick cylinder, called a bloom. This process was formerly performed by striking the ball of iron repeatedly with a tilt hammer.

The bloom is now reheated and subjected to the process of rolling. The rolls (Fig. 9) are heavy cylinders of cast iron placed almost in contact, and revolved rapidly by steam power. The bloom is caught between these rollers and passed backward and forward until it is pressed into a flat bar, averaging from four to six inches in width, and about an inch and a half thick. These bars are then cut into short lengths, piled, heated again in a furnace, and re-rolled. After going through this process they form the bar iron of commerce. From the iron reduced into this form the various parts used in the construction of iron bridges are made, by being rolled into shape, the rolls through which the various parts pass having grooves of the form it is desired to give to the pieces. These rolls, when they are driven by steam, obtain this generally from a boiler placed over the heating or puddling furnace, and heated by the waste gases from the furnace. This arrangement was first made by John Griffie, the superintendent of the Phœnix iron works, under whose direction the first rolled iron beams over nine

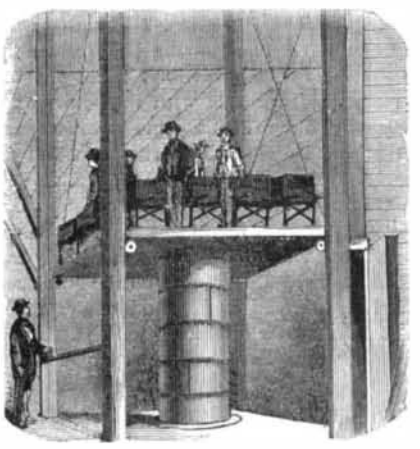

FIG. 2.—ELEVATOR.

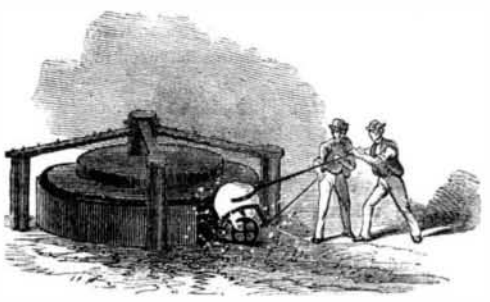

FIG. 8.—ROTARY SQUEEZER

inches deep that were ever made were produced, at these works. The process of rolling toughens the iron, seeming to draw out its fibers; and iron which has been twice rolled is considered fit for ordinary uses. For the various parts of a bridge, however, where great toughness and tensile strength

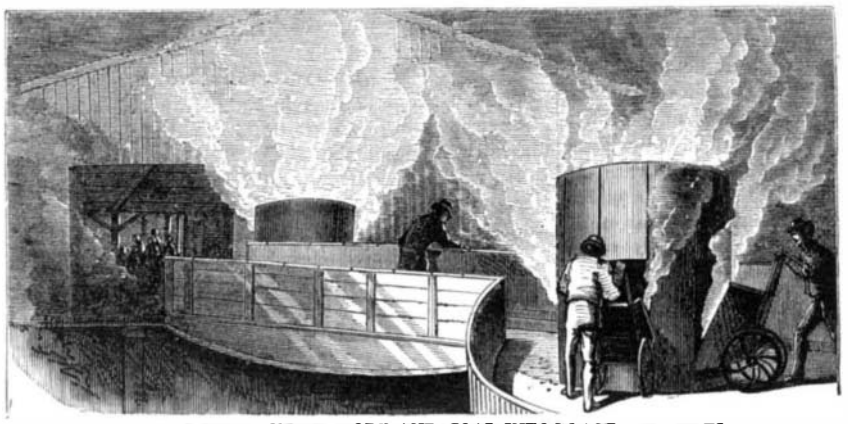

FIG. 3.—DUMPING ORE AND COAL INTO BLAST FURNACES.

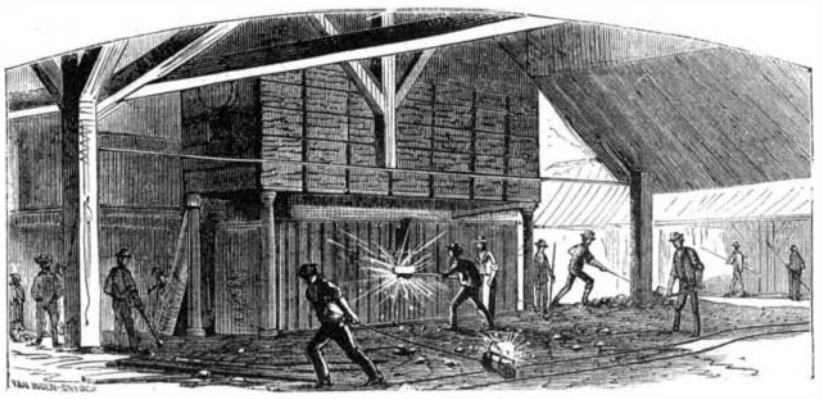

FIG. 7.—CARRYING THE IRON BALLS.

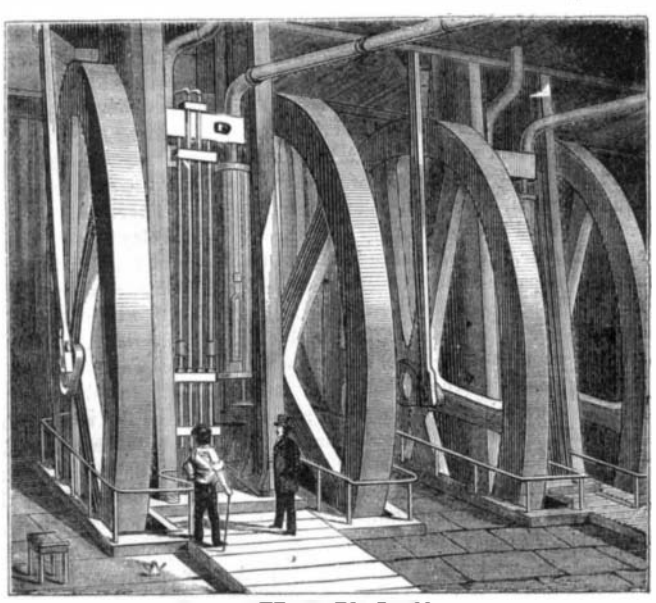

FIG 4.—THE ENGINE ROOM.

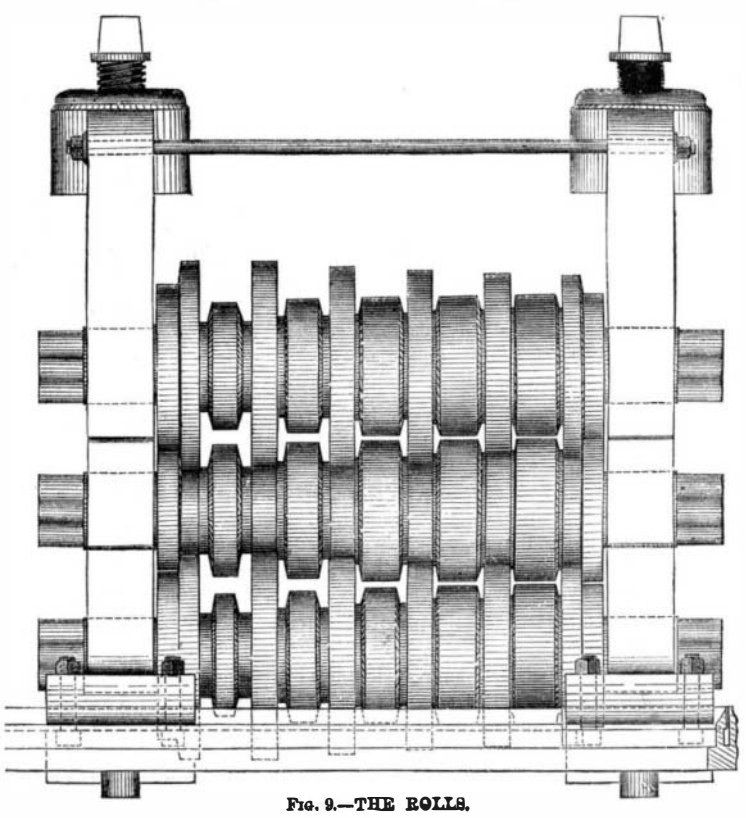

FIG. 9.—THE ROLLS.

as well as uniformity of texture, are necessary, the iron is rolled a third time. The bars are therefore cut again into pieces, piled, re-heated, and rolled again. A bar of iron which has been rolled twice is formed from a pile of fourteen separate pieces of iron that have been rolled only once, or "muck bar," as it is called; while the thrice rolled bar is made from a pile of eight separate pieces of double rolled iron. If, therefore, one of the original pieces of iron has any flaw or defect, it will form only a hundred and twelfth part of the thrice rolled bar. The uniformity of texture and the toughness of the bars which have been thrice rolled

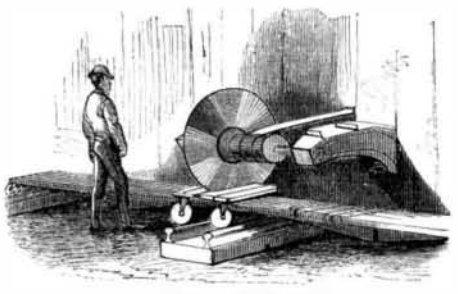

FIG. 10.—COLD SAW.

are so great that they may be twisted, cold, into a knot without showing any signs of fracture. The bars of iron, whether hot or cold, are sawn to the various required lengths by the hot or cold saws, shown in the illustrations, Figs. 9 and 10, which revolve with great rapidity.

For the columns intended to sustain the compressive thrust of heavy weights, a form of the firm's own design is used in this establishment, to which the name of the Phœnix column has been given. They are tubes made from four or from eight sections, rolled in the usual way and riveted together at their flanges (Fig. 12). When necessary such columns are joined together by cast iron joint blocks, with circular tenons which fit into the hollows of each tube.

To join two bars to resist a strain of tension, links or eye bars are used, from three to six inches wide, and as long as may be needed. At each end is an enlargement with a hole to receive a pin. In this way any number of bars can be joined together, and the result of numerous experiments made at this establishment has shown that, under sufficient strain, they will part as often in the body of the bar as at the joint. The heads upon these bars are made by a process known as die forging. The bar is heated to a white heat; and under a die worked by a hydraulic pressure (Fig. 13), the head is shaped and the hole struck at one operation. This method of joining by pins is much more reliable than welding. The pins are made of cold rolled shafting, and fit to a nicety.

The general view of the machine shop (Fig. 14), which covers more than an acre of ground, shows the various machines and tools by which iron is planed, turned, drilled, and handled as though it were one of the softest of materials. By means of this application of machines, great accuracy of work is obtained, and each part of an iron bridge can be exactly duplicated if necessary. This method of construction is entirely American, the English still building their iron bridges mostly with hand labor. In consequence also of this method of working, American iron bridges, despite the higher price of our iron, can successfully compete in Canada with bridges of English or Belgian construction, The American iron bridges are lighter than those of other nations, but their absolute strength is as great, since the weight which is saved is all dead weight, and not necessary to the solidity of the structure.

Before any practical work upon the construction of a bridge is begun, the data and specifications are given, and a plan of the structure is drawn, whether it is for a railroad or for ordinary travel, whether for a double or a single track, whether the train is to pass on top or below, and so on. The calculations and plans are then made for the use of such dimensions of iron that the strain upon any part of the structure shall not exceed a certain maximum, usually fixed at ten thousand pounds to the square inch. As the weight of the iron is known, and its tensile strength is estimated at sixty thousand pounds per square inch, this estimate, which is technically called a factor of safety of six, is a very safe one. In other words, the bridge is so planned and constructed that, in supporting its own weight, together with any load of locomotives or cars which can be placed upon it, it shall not be subjected to a strain of over one sixth of its estimated strength.

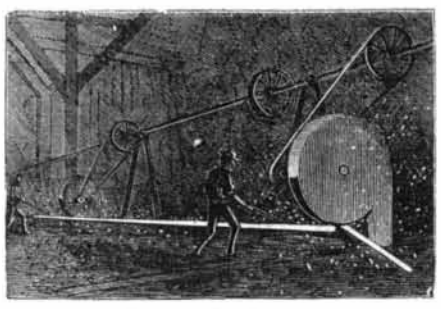

FIG. 11.—HOT SAW

After the plan is made, working drawings are prepared and the process of manufacture commences. The eye bars, when made, are tested in a testing machine at double the strain to which, by any possibility, they can be put in the bridge itself. The elasticity of the iron is such that, after being submitted to a tension of about thirty thousand pounds to the square inch, it will return to its original dimensions; while it is so tough that the bars, as large as two inches in diameter, can be bent double, when cold, without showing any signs of fracture. Having stood these tests, the parts of the bridge are considered fit to be used.

When completed, the parts are put together or assembled, as the technical phrase is, to see that they are right in length, etc. (Fig. 15).

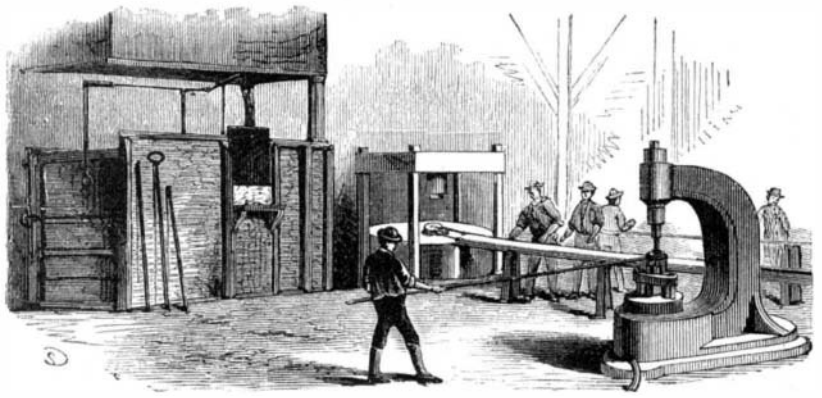

FIG. 13. FURNACE AND HYDRAULIC DIE.

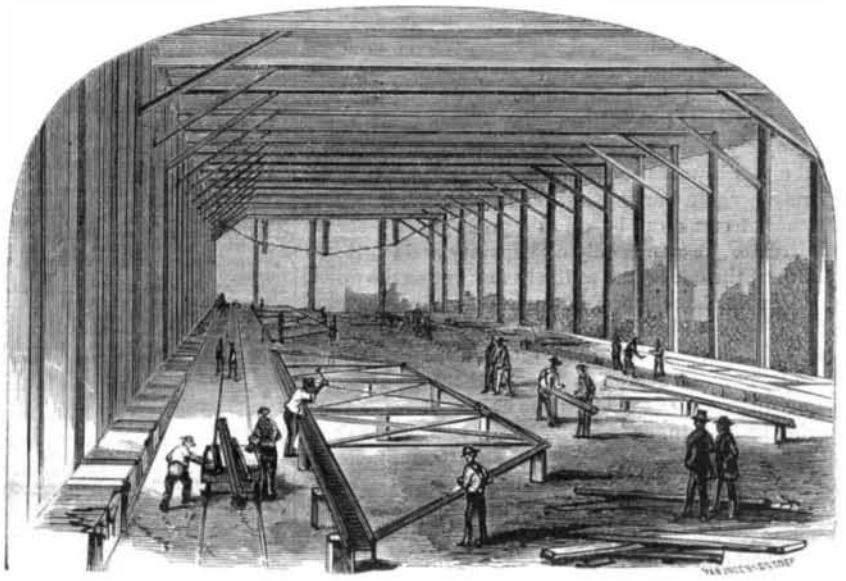

FIG. 15.—ASSEMBLING BRIDGE UNDER SHED

Then they are marked with letters or numbers, according to the working plan, and shipped to the spot where the bridge is to be permanently erected.

As an example of the architectural beauty as well as the engineering skill displayed in the manufacture of these fabrics, we give on our front page an engraving of the Girard avenue bridge, in Philadelphia, Pa. Its width is one hundred feet, equal to six railroad tracks. It has three spans of one hundred and ninety-seven feet and two of one hundred and thirty-seven feet, with seven trusses.

Corns in Horses.

There is a wide-spread fallacy that corns usually depend upon some peculiar form of foot, and that with such feet they are, like coughs and colds, almost unavoidable even with the best management. The truth is, that corns are always caused by an ill-fitting shoe. So long as a level shoe rests evenly upon the proper bearing surface of the foot, no corn can occur, but when the surface of either foot or shoe is irregular, then the most prominent point of contact is pressed upon unevenly and bruised. A corn is a bruise and nothing more, save that usage has confined the term to bruises of one part of the foot—the angle of sole between the wall and bar. This part of the foot is most liable to injury by uneven pressure, because it is in relation to the termination of the shoe. If the end of the shoe does not reach the extremity of the heel, it forms a point upon which the yielding horn is pressed at every step. Short shoes then are most objectionable, and, we find, a frequent cause of corns. They are often purposely employed on hunters, and on horses with capped elbows, seldom really necessary, but if so, should be very carefully fitted. By way of avoiding corns, it is the common practice of many farriers to "ease the heel of the shoe," that is, to so fit it that the last inch of the shoe takes no bearing on the foot. A space is thus left between the shoe and foot in which one might place a penny piece. This is one of the greatest evils of shoeing, for not only is an inch of the best bearing surface of the foot unused, but increased pressure is thrown upon the spot where shoe and foot are in contact. Instead of preventing corns, it is a common cause, and why it should be so will be understood when we say that the seat of the corn is about an inch in front of the extremity of the foot, in fact, just at the spot upon which this "eased heel" throws most weight. Corns may be due to an uneven surface of foot, not of shoe, as when the wall at the heels is lower than the bar, in which case a level shoe is almost certain to act as an exciting cause.

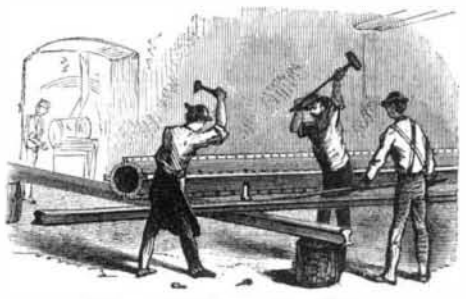

FIG. 12.—RIVETING A COLUMN

Lameness from corn usually shows itself about a week after the horse is shod, depending of course upon the degree of pressure existing. In some cases, however, a corn is the cause of lameness after a shoe has been on for a month or more. This may be due to the shoe having shifted on the foot, or to the growth of horn carrying the shoe forwards and within the wall.

The inside heels of the fore feet are most commonly affected, because the shoes for them are always fitted closer on the inside than the out, and hind feet are hardly ever affected, because the shoes for them are always fitted long and wide.

Let us repeat, a corn is simply a bruise, similar in every way to a bruise of our nails. There is injury to the sensitive parts, followed by discoloration of horn. When a horse is lame, if on removing the shoe and gently trying the foot all round with the pincers, tenderness is shown at the heel, we suspect a bruise or corn. The farrier would at once cut away the horn at the part until he saw it discolored, and then would say he "had found a corn." Imagining this discolored horn to be the offending substance, he would proceed to remove it, layer after layer, until he reached the sensitive and now bleeding tissues. We need hardly point out the absurdity of this practice. The stained horn is simply a sign of injury to the sensitive foot, and the removal of this horn, while it does no good

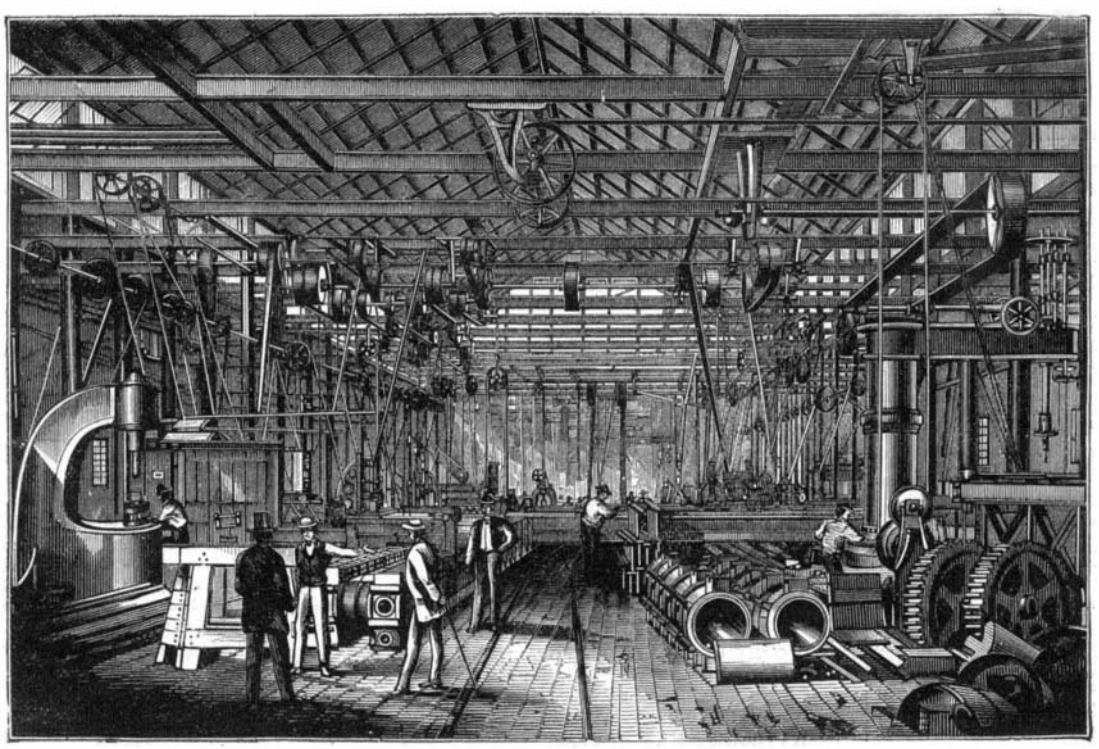

FIG. 14.—VIEW OF MACHINE SHOP

to the bruise, leaves the foot miserably weak for weeks or perhaps months. What would be thought of a surgeon, who, because his patient had a discolored nail, the result of a bruise, proposed to remove the stained horn and lay bare the sensitive tissues? No medical man would do such a thing, and no patient would permit it. Yet veterinary surgeons and farriers follow this practice on the horse's foot, and horse owners assent to it. The result is, that corns assume a fictitious importance, and the heel, robbed of its horn, is liable to fresh injury for a long time.

We may be told that the horn is removed so as to release any matter formed as the result of inflammation. It is certainly a plausible excuse, but not a true one. A professional man should be able to diagnose the presence of matter without injurious explorations, and matter is never present unless a horse is worked for two or three days after the appearance. In about 80 per cent of the cases in which a farrier professes to have let out matter, he has simply let out a straw-colored effusion which would have been naturally reabsorbed in a day or two after the cause of injury—the shoe—had been removed. The remaining percentage of corn cases show matter because from negligence or ignorance the shoe has been allowed to remain on the foot, continuing the injury, and thus set up active inflammation.

The rational treatment of corn is to remove the shoe, and foment the foot with warm water—in other words, to remove the cause of injury, and help nature to reabsorb any effusion. If matter forms, it must be thrown off. Nature does this through an opening at the top of the wall, between hair and hoof; man endeavors to do it by an opening through the sole. Now, we believe in nature's plan, and experience show us that it is the best, if not the quickest, course for the horse's foot. Warm fomentations facilitate this course, and therefore the treatment we have suggested is applicable to all stages. This treatment does not injure the hoof, and a cessation of pain, and consequent lameness, can be followed by the immediate application of a properly fitted shoe. On the other hand, when the bars are destroyed and the sole cut away, the wall is left without any support. It is too weak to properly sustain weight; if it rests upon the shoe it is pressed either inwards or outwards, and the recently injured parts are again hurt. Thus, and thus only, it is that the existence of corns can be said to predispose a horse to their recurrence. A corn is only a temporary accident, like a bruised finger; the one is just as likely to recur as the other. If a horse remains lame over a fortnight, there is something more than a corn—either a badly fitted shoe, or the injury inflicted by the farrier's knife—to account for it. Verily, the ordinary cure for corns is worse than the disease. Horses are, we know, frequently lame or tender for months after having had a corn. Let such animals be properly shod, no cutting out of the heel allowed, and we guarantee a speedy cure. Remember that a corn is only a bruise of a horn-covered part. Treat it as you would your own finger under similar circumstances, and very little trouble will be entailed.—*Land and Water.*

PATENT OFFICE DECISIONS.

THE DISINTEGRATING FLOUR MILL PATENT.—CARR *vs.* DAVIDS.

[Appeal from the Board of Examiners-in-Chief in the matter of the interference between the application of Thomas Carr, of Bristol, Eng., and the patent of G. B. Davids, of Baltimore, Md., granted December 14, 1869, for a disintegrating mill.]

LEGGETT, *Commissioner:*

It is proved and admitted on the part of Carr that Davids made his invention in September, 1868. Carr obtained a patent for his invention in England, which was enrolled April 6, 1869. He introduces testimony to show that he made the invention in England long before that date, which testimony has been ruled out by the Examiner of interferences and the Board, in conformity with the established practice of the courts and the Office. (See Howe *vs.* Morton, 1 Fish., 595; Brooks *vs.* Norcross, 2 Fish., 661; Bain *vs.* Morse, 1 B. app., p. 222; *ex parte* Jno. Cochrane, Com'rs D. 1869, p. 60; Tucker *vs.* Davis, O. G., vol. 2, p. 221.)

I do not find sufficient ground in the argument presented in behalf of Carr for a departure from this practice. The statute is explicit in declaring that any inventor may obtain a patent for his invention, provided it has not been patented or described in a printed publication in a foreign country before the date of his invention. Davids made the invention before it was so patented or described, and his right to a patent is clear.

No evidence of the date of an invention in a foreign country, other than that of a patent or a description in a printed publication, ever has been or can be received under the law. Inventions abroad are ignored by the statute until made to appear through one or the other of the channels named. Therefore Carr did not make the invention in contemplation of law till he patented it, April 6, 1869, and Davids preceded him. Without the light of controlling precedents, I should be unable to place any other interpretation upon the statute than that which constitutes the established practice of the Office in like cases.

The decision of the Board is affirmed.

DECISIONS OF THE COURTS.

United States Circuit Court.—District of California, Ninth Judicial Circuit.

IMPORTANT DECISION CONCERNING THE RIGHTS OF ASSIGNEES OF PATENTS.—PATENT EGG CASE.—DAVID MCKAY *vs.* JOHN B. WOOSTER *et al.*

[In Equity.—Before Sawyer, Judge.—Decided April 7, 1873.]

SAWYER, *Judge:*

On February 28, 1867, a patent was duly issued to J. L. and G. W. Stevens, of San Francisco, for an "improvement in cases for transporting eggs."

In August, 1872, said patentees, by deed, granted and assigned to H. F. Billings, of Chicago, in the State of Illinois, "for, to, and in all the States and Territories of the United States east of the Rocky Mountains, all the right, title, and interest which they, the said John L. and George W. Stevens, had in and to the said letters patent, and the invention as secured to them by said letters patent, and all their rights, liberties, privileges, and franchises which they had or might acquire by or under the said letters patent," which said deed was duly recorded. Since said assignment, said Billings has erected a manufactory for said patent cases for the transportation of eggs at Chicago, in the State of Illinois, and has manufactured, in accordance with the specifications of said patent, and he still continues to manufacture said cases; and he has sold and continues to sell the same "to the public, or to whomsoever desires or desired to purchase them, without any restriction or reservation whatsoever."

On the 17th of October, 1872, said J. L. and George W. Stevens made a similar transfer of all their right, title, and interest in said patent and invention, in and to all the States and Territories lying west of the Rocky Mountains, to the complainant, David McKay, who thereupon entered upon the manufacture of said patent cases at San Francisco, and he has ever since continued to manufacture and sell the same for use in that portion of the United States lying west of the Rocky Mountains.

The defendants are commission merchants doing business at San Francisco, receiving goods consigned by merchants east of the Rocky Mountains and selling the same on commission. M. Evans & Co. are merchants doing business at Ames, in the State of Iowa, and a part of their business is dealing in eggs. Said Evans & Co., between the 17th of October, 1872, and the filing of the bill in this case, purchased in the usual course of business at Chicago, of said Billings, "without any restriction or reservation" on his part, a number of said patent cases manufactured by him as aforesaid, filled them with eggs in the State of Iowa for the purpose of transportation, and shipped them so filled with eggs to defendants at San Francisco, who received them and sold the eggs on commission in the regular course of their business as commission merchants.

The use of the aforesaid cases in the transportation of eggs from the Rocky Mountains to San Francisco is the infringement complained of; and the threatened continuance of the practice, and further use and sale of the cases so received, the injuries sought to be restrained. Numerous other parties are engaged in similar transactions.

Under the view I take, the only question necessary to determine seems to be precisely the same decided by Shepley, Circuit Judge, in Adams *vs.* Burke, 4 Fisher's Patent Cases, 393, namely: "Does the purchase of a patented article, *lawfully* manufactured, and *sold without restriction or condition*, within his territory by the territorial assignee of a patent right, convey to the purchaser the right to use or sell the article in another territory for which another person has taken an assignment of the same patent?"

The learned judge answers the question in the affirmative. This is the only case I have found in which the precise question has ever been considered. One would suppose that a question of so much importance, and so likely to arise, would long since have been presented to the Supreme Court and authoritatively determined, but it does not appear to have been done. It is insisted that the case cited is not correctly decided, and argued with a great deal of force, that since Lockhart and Seeley, in that case, and Billings in this, only purchased the right of the patentees in a limited territory, they did not themselves have the right to supply, either directly or indirectly, other territory than that purchased; that their right only extended to making, using, and vending *to be used* in the specific territory purchased; that, as they had themselves no right to use in other territory, their vendees could acquire no greater right than they themselves owned; that their purchase of the right to a specific territory necessarily limited their power to sell the machine to be used in that territory alone; that this limitation and restriction is necessarily implied in the sale, even without any express stipulation to that effect; that the patent under the fifth section of the act of Congress of 1836 in terms gives the patentee "the full exclusive right and liberty of making, using, and *vending to others to be used*" the said invention throughout the jurisdiction of the United States; that the eleventh section authorizes him to assign the whole or part of his interest for "any specific part or portion of the United States;" that when he assigns his entire interest for a specified part, he assigns the right acquired under the fifth section of "making, using, and vending to others *to be used*" in that specific part, and "to be used as well as to make and use in that part *alone*;" that, therefore, when an assignee of a specific territory sells a machine in that territory, the machine so sold is taken out of the monopoly as to that territory only, there being no power in the vendor to withdraw it from the monopoly as to other territory in which he has no monopoly or control, and that he can only dispose of his own share of the monopoly, or liberate therefrom to the extent of his own interest therein. This it is argued, is the reasonable construction of the law, and the contract of assignment of the right of the patentee to a specific part of the territory authorized by the act. The consequences of a different view are also urged in support of the position taken, some of which, it is said, find a striking illustration in this case. Thus, it is argued that, labor and materials being cheaper, and the other facilities for cheap manufacture being greater at Chicago than at San Francisco, the patent cases for transporting eggs can be made at a cost so much lower at Chicago than at San Francisco, that the purchaser of the Chicago manufacture could undersell the complainant in his own territory. Eggs also being so much cheaper east than west of the Rocky Mountains, large quantities are there purchased and sent to these western markets. The transportation of the patent cases costs nothing, because it is necessary in shipping to use boxes or cases of some kind, and these require no more room than others.

The freight is paid on the eggs as merchandise, and the greater security against breakage and the improved condition of the eggs brought in these cases more than compensate for their cost at Chicago. Those dealing in eggs, therefore, can purchase these patent cases at Chicago, ship them with eggs from any part of the United States east to parts westward of the Rocky Mountains, and after disposing of their contents sell them at half cost, or even give them away, and still make a remunerative profit on their transactions. There is no use for the cases for return freight. Thus the entire market west of the Rocky Mountains, including nearly one third of the territory of the United States, can be wholly supplied, indirectly, through middlemen, at prices less than it is possible to make the article for here, by parties who have only purchased the territory east, to the utter loss or ruin of those who have purchased and paid for the territory west of the Rocky Mountains. So, again, it is said it may well be in the case of many inventions that some particular locality affords such facilities for cheap manufacture that the whole United States may be supplied from that point at prices that would defy competition in any other locality, so that it would only be necessary to purchase the right for the territory on which the factory is located in order, through middlemen, to practically enjoy a monopoly of the whole country.

It is easy to see that the result of supplying the whole country indirectly through the merchant, who is usually the seller to the consumer, is precisely the same as though the maker himself directly sells to the consumer.

It must be confessed that these arguments are entitled to grave consideration. Enough has been said in this, and in the case cited, to render it manifest that great practical inconvenience may result from either view.

In the absence of an authoritative adjudication, I should hesitate long before venturing to dissent from a well considered decision of so learned, experienced, and eminent a jurist as Judge Shepley. But in this instance I can perceive no good ground for doubting the soundness of the proposition laid down in the guarded form in which it is stated in the case cited.

An important question not discussed by the learned judge may, however, arise as to when, or under what state of facts, a patented machine may be regarded as "*lawfully * * * sold without restriction or condition within his territory, by the territorial assignee of a patent right.*"

In the case now under consideration it will be seen by reference to the stipulated facts that the assignment to Billings was made in August, 1872, while that to complainant was not made till October following. If there is any conflict, therefore, in the rights claimed by the parties, the complainant's assignment, so far as the conflict is concerned, being subsequent in time, was taken in subordination to the prior grant to Billings—that is to say, he could only take by his assignment what was left after Billings' interest had been carved out. At the date of the assignment to Billings the patentees were still the holders of the entire interest under the patent. Had they at that time, at Chicago, sold one of the patented articles in question without restriction or condition, that undoubtedly would have been a lawful sale without restriction or condition, and the article so sold would have been taken out of the monopoly, and the purchaser, or any one deriving title through him, would have been entitled to use it till worn out in any part of the United States. The patentee himself could not by a subsequent assignment of his patent have limited the right of the purchaser already vested. The vendor being at that time entitled to the whole monopoly for the entire jurisdiction of the United States, it was competent for him to wholly emancipate the article sold by taking the entire royalty for the use in any part of the territory. And a sale without restriction or limitation would work such emancipation. In such case any party subsequently purchasing the right to any specific portion of territory would take that right subject to the use of the machine so sold at any point within the territory purchased. What the patentees could do with respect to one machine, they could do as to any number of machines in existence or to be brought into existence. What they could do themselves they could by contract authorize or convey the right to any other party to do. As the patentees themselves could *lawfully sell* these patented articles at Chicago *without restriction or condition*, so as to authorize the purchasers, or those claiming under them, to use the machines anywhere in the United States, they could convey the right to Billings to lawfully do the same. This authority to emancipate from the monopoly by an unrestricted sale was a part of their "right, title, and interest in the invention secured by the patent," that could be exercised and enjoyed at Chicago or other places east of the Rocky Mountains as well as elsewhere. The assignment to Billings is in the broadest terms. It is of "all the right, title, and interest which the said John L. and George W. Stevens had in and to the said letters patent, and all their rights, liberties, privileges, and franchises which they had or might acquire by or under said letters patent," "for, to, and in all the States and Territories of the United States east of the Rocky Mountains." There is no limitation of the power to vend within the territory. The patentees could lawfully make without restriction or condition, could use without restriction or condition, or could *vend without restriction or condition* anywhere within the specified territory, and all their rights they conveyed to Billings without *restriction or condition*, who thereupon stepped into the shoes of the patentees as to the territory sold. Had they intended to limit the right of vending "to vending to be used" by the purchasers within the territory sold only, they should at least have so specified the intention, and by some apt words restricted the right of use in the deed of assignment. This unrestricted assignment of the right to vend put it in the power of Billings to *lawfully* vend the patented article within his territory without restriction or condition, and thereby wholly emancipate from the monopoly the articles so sold. The complainant subsequently purchased his territory, and, whatever the terms of his grant, he could of course only obtain what was left of the franchise or monopoly. As the patentees, after their sale to Billings, could not object to sales by him without restrictions or conditions, their subsequent assignee cannot object. The latter's right is subject to the right of Billings and those who have lawfully purchased without restriction or condition from him. This is as far as it is necessary to go in this case. It is unnecessary now to consider the effect of an express limitation in the deed of assignment of the right to vend for the purpose of use only within the purchased territory, or how far the complainant, being a subsequent purchaser of territory, can lawfully vend without restriction or condition, so as to wholly emancipate the article sold from the monopoly, and enable the purchaser of the patented article of his manufacture to use it in the territory of Billings.

If there is any practical hardship in the construction adopted of the law and contract under it, and it should turn out to be the correct construction, then the patentee, when he desires to assign, must consider whether he can afford to do so without restriction, and the subsequent purchaser, when he wishes to buy, must determine whether he can afford to do so with the burden entailed upon his territory by a prior grant unlimited in the particulars indicated. There must be a decree for defendants. Let the bill be dismissed with costs.

Holland & Spencer, for complainants.
Churchill & Haight, for defendants.

NEW BOOKS AND PUBLICATIONS.

TEXT BOOK IN INTELLECTUAL PHILOSOPHY FOR SCHOOLS AND COLLEGES, containing an Outline of the Science and an Abstract of its History. By J. T. Champlin, D. D., President of Colby University. Price $1.50. Also, by the same author: CHAPTERS ON INTELLECTUAL PHILOSOPHY, designed to accompany the above. New York and Chicago: Woolworth, Ainsworth, & Co.

These two treatises are lucid and well written exponents of a branch of study which deserves more attention than it usually receives. The object for which they are written is carefully kept in view by the author, who has, throughout, abstained from wandering into the higher metaphysics. To the "Text Book" is added an appendix, containing questions on each section of the work, which will be valuable both to teachers and pupils.

PHILOSOPHY OF RHETORIC. By John Bascom, Professor of Rhetoric in Williams College: Author of "Aesthetics, or the Science of Beauty," Price $1.50. New York and Chicago: Woolworth, Ainsworth, & Co.

This is a valuable essay, written in an agreeable style which makes it acceptable to the general reader as well as to the student. There is much thought in small space in Professor Bascom's writings; and the work now before us is written in a very terse and expressive manner.

Recent American and Foreign Patents.

Improved Extensible Ladder.

John C. Hearne and Duston Adams, Pleasant Hill, Mo.—This invention consists of two "lazy tongs" contrivances connected together at the middle joints of the bars by cross bars long enough for the ordinary purposes of the cross bars of a common ladder, the cross bars being connected, near each end, by cords, which limit the extension of the lazy tongs frame, and support the weight of the climber. The top cross bar is provided with hooks or other devices for suspending the ladder, and a rope is attached to and passed from the lower cross bar up over the top one, or through an eye suspended from it, so that the ladder can be folded up out of the way by pulling the cord down; the ladder can be quickly let down when required for use by releasing the rope. The whole constitutes a convenient and efficient ladder for scuttles and the like, not frequently wanted for use, and where it will be out of the way when so folded up.

Improved Turbine Water Wheel.

John C. Green, Flanders, N. J.—This invention is an improvement in turbine water wheels, in which the objectionable feature—the termination of the wheel case at the bottom flange, which renders it difficult to make the joint tight within the outer edge to prevent water leaking through the flange at the holes for the bearings—is done away with, and the case is extended below the bottom flange, and a special flange is provided to rest on the floor, support the wheel, and make a joint around the discharge hole; and this flange also serves to support the wheel so high as to prevent heavy bodies from being carried into the wheel. By this arrangement, it is claimed, the water leaking through the flange at the holes for the journals will remain in the flume.

Improved Addressing Machine.

Francis A. Darling, Fayetteville, N. Y.—This invention relates to an improved addressing machine, intended particularly for use of newspaper publishers and such other persons whose business requires them to send at frequent intervals documents or mail matter to the same subscribers or persons, whose interest it is, therefore, to retain the address of such persons in position for use in printing. The invention consists in the employment of an endless chain passing around a prismatic presser block, and having the address or printing plates removably secured to it by springing their ends into slots formed in the links of the same. The invention also consists in hanging the chain around a drum or wheel that is supported by a sliding frame, and in forming a toothed segment engaging with opposite ratchet wheels on the arbor of the lower chain holder or presser, for the purpose of turning the same one quarter revolution at each downward motion of the frame, and for retaining the same in position immovably during the upward motion of the same.

Improved Door Bolt.

Adolph Hofstatter, New York city.—This invention has for its object to furnish an improved attachment for bolts, by the use of which it will be impossible for the bolt to be worked back and the door unfastened from the outside of said door. By suitable construction, when the bolt is pushed outward so as to bring its knob into the space between the forward end of an open central keeper and the rear end of a forward keeper, and a semi-cylindrical plate has been moved laterally upon the bolt so as to cover the opening or slot in the central keeper, it will be impossible for the bolt to be drawn back without first moving the plate to one side to uncover the said slot and allow the knob to pass through it. Upon the rear end of the plate is formed a small projection, which, when the said plate is adjusted to cover the opening in the keeper, may be slipped into a notch in the forward end of the rear keeper, and which, when the said plate is moved to uncover the said opening, may be slipped into a notch in the rear end of the open keeper, to prevent the said plate from getting out of place accidentally when in either position.

Improvement in Recovering Tin from Waste Scrap.

Henry Panton, New York city.—The inventor proposes to utilize the tin on scrap tinned plate cuttings, etc., by recovering it by mercury amalgamation. For this purpose he cuts the chips into small pieces and places them in a revolving cylinder, into which a shower of mercury is constantly falling. Besides the method of recovering the tin, the patent covers a process of converting the remainder scrap iron into steel, as well as the cylindrical apparatus already described.

Improved Folding Chair.

Asahel C. Boyd, Worcester, Mass.—The invention consists in forming each front leg and superposed arm in a single side piece that is reversely curved at its opposite ends. It also consists in providing the side pieces with a round that serves the double purpose of a connecting pivot for the links and a rest for the upper ends of the legs.

Improved Car Dumper.

Owen M. Avery, Pensacola, Fla.—The invention consists in dumping a car on the side by means of rocking beams pivoted to the middle of a beveled bolster. It also consists in a peculiarly constructed and operated shifter, by which the rock beam is made to perform its intended function. It also consists in a locking device applied at each end of the shifter. It also consists in a double notched lock bar applied to the middle of the shifter. It also consists of means for throwing the line of gravity from the median line of the truck and to that side of the car on which the load is to be dumped. It also consists in a peculiarly simple and convenient mode of coupling car dumpers together.

Improved Fertilizing Material.

James Whitehill, Frederick, Md.—The invention consists in grinding or reducing limestone to a granular state so that it will pass the drill evenly and may be applied in small quantities with as great effect as in large quantities. Thus it is sold in packages, air tight or approximately so.

Improved Vacuum Pan.

Dr. Aurelius P. Brown, Upperville, Va.—The invention consists in a method of producing and maintaining a vacuum in the condensing coil of a vaporizing apparatus whereby the continued action of an air pump (although one may be used to start it, if desired) is rendered entirely unnecessary, and a great saving is thereby produced in the ordinary process of distillation.

Improved Horse Collar.

William Guilfoyle, New York city.—The object of this invention is to construct a horse collar which not only is stronger, cheaper, and more durable than those at present in use, but protects, also, the neck of the horse against scalds and bruises caused by the undue pressure of the collar. This invention is intended to obviate these defects by strengthening the leather part with a metallic shoulder piece having a projecting rim, by which the usual hames are dispensed with and the strain on the collar distributed over the whole surface, protecting not only the neck of the horse, but also furnishing a stronger and more durable collar. Suitable trace hooks are applied to the metallic covering and connected by a strong wire piece, with rings attached to hold the harness together.

Improved Convertible Freight Car.

William Worsley, Little Falls, N. J.—The invention consists in V shaped detachable sections applied to the floor of a grain car, to give the necessary pitch to the bottom, and a nozzle combined with a swiveled elbow spout, so that the grain may be discharged on either side of the car from the same nozzle.

Improved Hose and Pipe Coupling.

Theodore E. Button, Waterford, N. Y., assignor to himself and L. Button, of same place.—The invention consists in the improvement of pipe or hose couplings. The joint where the two pipes are connected may be either ground or packed. A nut, made in two parts, has each part hinged to a swivel working on one pipe. The other pipe screws into this sectional nut, which draws the pipes together. The two parts of the nut are held together by a ring which is made to fit the conical surface of the outside of the nut. The taper of this surface must be sufficient to allow the ring to be easily pulled off. The ring is provided with lugs to which are attached chains which are made fast to some fixture. Now, by a slight movement of either the coupling or the fixture, the ring is pulled off and the coupling disconnected. Each pipe is provided with a pressure valve. When the pipes are connected these valves are open; but when the pipes are separated, they close automatically or by the pressure.