

Cost and Results of Some Recent English Strikes.

A writer in *Fraser's Magazine* estimates that the engineers' strike, which began in February last and continued about 33 weeks, caused a loss of \$70,000 to the strikers. The average number of men out of employment during this time was 500. If no strike had taken place, their wages would have amounted to \$144,000. But they received from society funds about \$74,000, reducing their personal loss to \$70,000. Of notable strikes that have taken place within the last two years, that of the London masons, which lasted 33 weeks and threw 1,700 men out of employment, cost the strikers about \$130,000. The carpenters' strike in Manchester involved about the same number of men, and cost nearly as much. The strike and lockout of the boiler makers and iron shipbuilders on the Clyde cost the society upward of \$65,000, the estimated losses being \$1,500,000. The losses of the miners in the Durham strike are estimated at \$1,200,000. In the above strikes, excepting that of the engineers first mentioned, the strikers suffered disastrous defeats. While strikes are exceedingly expensive luxuries to the men, even when successful, the writer above cited maintains that the number of strikes from which the employes reap no advantage are extremely few, as compared with those from which they derive some benefit, proximate or remote. In illustration of what is sometimes gained by the strikers, he cites the builders' strike and lockout in London in 1859. About 24,000 men quit work, but many of these obtained employment elsewhere. The number engaged in the struggle was from 6,000 to 10,000. The whole number interested in the result of the contest was between 40,000 and 50,000. After spending upward of \$250,000, besides the loss in wages, the men were compelled to yield. But they gained the Saturday half holiday, which is now enjoyed by not fewer than 100,000 building operatives. This is computed to be a gain to the men of about \$2,800,000 a year, "if not in money, at least in money's worth." The writer claims that the employes get over their losses much more speedily than the employers. With the former, he says, it is a matter of temporary inconvenience, or, at most, of present suffering only; with the latter it means not merely a derangement of business for the time being, but in many cases future embarrassment, if not failure.

The First American Rolling Mill.

Mr. Thomas C. Lewis, of Portsmouth, Ohio, who was formerly an iron roll maker, in a recent letter to the editor of the *SCIENTIFIC AMERICAN*, states that his father, the late Thomas C. Lewis, was the maker of the first iron rolling machine erected in this country. This mill was put up at Middletown, Pa., 45 miles east of Pittsburg, in the year 1817, for the owners, Mason & Co. Mr. Lewis, Sr., came from Wales in 1815, when our informant was thirteen years of age. Our correspondent thinks that himself and his brother are the only persons now living who witnessed the making of the first bar of American rolled iron. This was the inauguration of what is now one of our most important branches of industry.

NOVEL PEDO-MOTOR.

The annexed engraving represents a new device for accelerating the motion of walking. It seems to occupy an intermediate position between the roller skate and the velocipede.

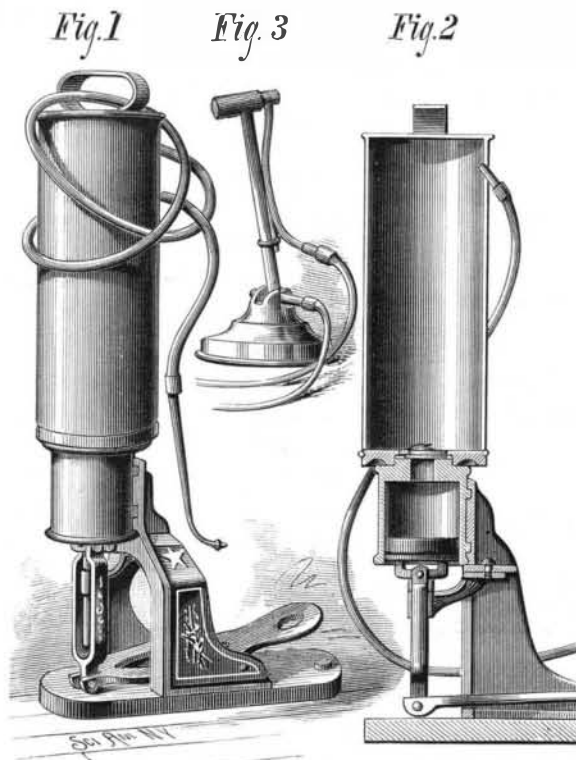
The invention consists of a frame supported on three wheels, two of which are small and employed only in supporting the main frame of the device, while the third and larger one is used both as a supporter of the frame and a driver of the machine. All of the wheels are furnished with rubber tires, and the larger one is fixed to a shaft extending across the frame and carrying a ratchet, also a loose pinion provided with a pawl capable of engaging the ratchet. A foot pedal is pivoted to the upper part of the pedo-motor frame, and carries a segment rack which engages the loose pinion on the drive wheel shaft. When the toe of the foot pedal is depressed the segment rack, by its engagement with the pinion, turns the drive wheel and propels the machine forward. The motion of the foot necessarily to impart a rotary motion to the drive wheel is exactly the same as that of the ordinary act of walking. For checking the motion of the pedo-motor a brake is provided, which is made to press upon one of the smaller wheels by pulling a wire or cord, which extends upward, and is provided with a hook or loop for attachment to some part of the clothing of the user. The pedo-motor is the invention of Mr. Richard Gornall, of Baltimore, Maryland.

New Preservative against Scurvy.

In reporting the reception of Prof. Nordenskjöld and the staff of the *Vega* at Nagasaki, the correspondent of the *North China Herald* notes that there was not a single case of scurvy during the whole voyage. This, he learns, was owing to the free use of a curious little berry that springs out of the eternal ice and snow during the short summer; it bears profusely, and has a taste like the raspberry, but more acid. The fruit is dried, and then mixed with the milk of the reindeer, and it can be carried in a frozen state for thousands of miles. There was also used a curious kind of food made from the whale's hide, which is pickled and eaten freely during the winter.

IMPROVED BLOWPIPE.

The annexed engraving represents a compact, simple, and efficient device for maintaining a continuous supply of air under light or heavy pressure for blowpipe use. The advantages of an invention of this character will be readily admitted by any one having had experience with the ordinary mouth blowpipe, as it not only saves a great amount of hard labor, but it delivers a steadier and stronger blast than it is



BURGESS' PATENT PORTABLE MECHANICAL BLOWPIPE.

possible to maintain with the mouth, and it also enables the operator to get a better view of his work, and permits of greater freedom in the use of the hands.

The general appearance of the blowpipe is shown in Fig. 1, and its internal construction will be readily understood by referring to Fig. 2, which is a central vertical section. The pump cylinder is mounted on an arched standard, and contains a piston having a valve opening upward. This piston is connected with the foot pedal by a forked connecting rod, and is moved by a slight and easy motion of the foot. The upper end of the pump cylinder is closed, with the exception of a valve aperture, which is covered by a valve, opening upward into a cylindrical air reservoir secured to the upper end of the pump. Near the top of the air reservoir there is a nipple, to which is attached a flexible tube communicating with the blowpipe.

The manufacturers furnish either the ordinary blowpipe or the compound blowpipe, represented by Fig. 3. The machine is light and portable, weighing but twelve pounds



GORNALL'S PEDO-MOTOR.

and measuring twenty-four inches in height. The pump cylinder is two and a half inches in diameter with three inch stroke.

This device will be invaluable to a large class of artisans, and especially useful to dentists, jewelers, chemists, assayers, metal workers, miners, and others who desire a strong steady blast for reducing, fusing, soldering, etc. It may be used to advantage in connection with the small melting furnaces now so largely in use. It is also of great utility to machinists and steam, water, and gaspipe fitters in making alterations and repairs, as it admits of the local application of a strong heat, and thus obviates the necessity of removing the parts. The blowpipe may be used effectively in connection with a gas, alcohol, or oil flame.

The pipe outlet is much smaller than in the mouth blowpipe, to permit of maintaining a pressure which may

be increased or diminished by a quick or slow motion of the treadle. The air chamber is easily filled, and when charged affords a constant supply of pure air. It is claimed by the manufacturers of this blowpipe that the pump possesses many advantages over the bellows or bladder, as a pressure of many pounds is readily sustained with but little exertion.

Further particulars may be obtained from J. Elliott Shaw, No. 154 South Fourth street, Philadelphia, Pa.

MECHANICAL INVENTIONS.

Mr. George Stewart, of High Point, N. C., has patented an improved spark arrester. This is an improvement in the class of smoke stacks in which the ascending sparks and cinders are diverted laterally by an inverted cone and strike upon inclined flanges or wings, whereby they are extinguished and pulverized before escaping from the stack.

An improved drilling machine has been patented by Messrs. Nicholas Remmel and Mathias Remmel, of Kewaskum, Wis., for operating drills for drilling holes in metal, and also for holding auger bits and other tools for boring wood. It consists in a drill stock connected with a shaft rotated by a crank or band wheel and gearing and held in a stationary frame, and in a device for feeding the work to the drill by means of a table placed on a shaft held in vertical guides and connected by levers with a treadle.

Mr. Elias A. Wible, of Folsom, Cal., has patented an improved vehicle axle formed of a socketed tube and a wooden stick, in combination with an interposed layer of rubber. There is a hole leading through the axle to the shaft, and provided with a case, a cup, and a screw, for the purpose of lubrication.

Mr. Gustave Wedel, of San Francisco, Cal., has patented an improvement in the class of binders for folios, or a series of detached leaves; it consists of metal strips doubled longitudinally to form lips or clamping edges, between which the leaves are secured.

Mr. John Kenmuir, of St. Joseph, Mo., has invented an improved twelve bells striker for clocks, the object of which is to furnish a clock for use in Masonic lodges, which shall be so constructed that it may be made to strike twelve low bells whenever desired, which will strike at no other time.

Mr. William W. Mackey, of Galion, O., has patented an adjustable gauge for cutting bevels for miter joints with a circular saw, and for cutting them on opposite ends of the moulding without changing the gauge. It consists of two gauges pivoted at one end to the sliding bed on the side next to the saw, and having the opposite ends pivoted to levers or arms having longitudinal slots, which are crossed and secured together and to the bed by a set screw passed through the slots at the junction. These arms are designed to be graduated so as to permit the gauges to be set readily at any desired angle to the saw.

Mr. Richard Cotter, of Virginia City, Nev., has patented a machine for tarring flat and round wire ropes, which is so constructed as to coat the ropes thoroughly with tar, force the tar into the crevices of the ropes, remove the surplus tar, and prevent it from running down the ropes.

Mr. Warren H. Guthrie, of Florence, N. J., has patented an improved screwdriver having a jaw on each side of the blade, the two jaws being connected by a right and left thumbscrew passed through a slot in the blade, whereby the ends of the jaws can be moved to and from the blade, and thus adapted to clasp screw heads of various sizes.

Messrs. William F. Flanagan and Daniel A. Sager, of Pine Wood, Tenn., have patented an improved automatic let-off mechanism for looms, for letting off the yarn from the yarn beam at a uniform speed from the first to the last end of the warp, the speed of the yarn beam being increased in proportion to the decrease of the yarn on the beam.

Mr. Ansel T. Green, of Minneapolis, Minn., has patented an improved belt stretcher. It consists in fixing gear wheels on the heads of the two long side screws of the stretcher, and in arranging two corresponding pinions on a crank rod in such a manner that when the pinions are thrown in gear with the gearwheels both screws will be worked simultaneously; and it further consists of a graduated clamp for the more accurate adjustment of the sides of the belt, of hinged screw sockets for the quicker attachment and removal of the stretcher, and of a thumbscrew nut of novel construction.

Messrs. Jabez C. Terry and Herbert J. Terry, of Springfield, Mass., have patented an improved button lathe designed for turning buttons into finished shape from blanks previously prepared; and instead of operating upon the principle of a cutter formed to suit the pattern of button, it employs a single cutting tool, which, by a variety of adjustments, that may be effected either by hand or automatically, permits the button to be turned and finished according to any desired pattern.

The same inventors have also patented an arrangement of revolving gripes for holding the stock, which are held normally together by spring pressure, but have a treadle connection for separating or retracting them, and a cutter head revolving in a plane at right angles to the plane of revolution of the gripes, or parallel with the axis of the latter, which cutter head is combined also with a treadle connection for causing the cutter head to approach the axis of the gripes at the will of the operator.

The New Copying Process.

We have heretofore given full directions for the working of this process, which is thus described by Mr. R. H. Ridout in *Nature*:

A very elegant process has recently been introduced into this country for copying and multiplying letters and documents. It is known by various names, according to the etymological skill of the makers. One calls it a "hektograph," another less pardonably calls it the "centograph," while yet another, to bridge the gap between ancient Greek and modern English, styles it the "printograph." But whether it is introduced by these names, or the polygraph, the compo-lithograph, or the velocograph, the principle is the same, though the details are slightly varied in each case. A slab of gelatinous material in a shallow tin tray forms the type. The letter is written with a special ink on any kind of paper, and when dry is placed face downwards upon the jelly, and allowed to remain a minute or more. On removal it is found that the greater part of the ink has been left behind on the jelly. It is only necessary to place pieces of paper on the latter, and on their removal they are found to be perfect facsimiles of the original copy. The number of copies obtainable varies with the ink, the most potent being aniline violet, such as Poirrier's. With this a hundred copies may be produced. Others, such as bleu de Lyon, Bismarck brown, or Roseine,* yield forty to fifty. It was with a view to determine the principles which govern this beautiful process, that I made an examination of the subject. The slab consists of gelatine and glycerine, with carbolic or salicylic acid to prevent fungoid growth, and in the "chromograph" a quantity of barium sulphate is added, which gives the slab a white, enamel-like appearance.

If a hot, strong solution of gelatine in water be prepared † and then a certain quantity of glycerine stirred in, the whole mass will become solid in cooling. This might at first sight appear to be a solution of gelatine in water and glycerine; but such is not the case, the gelatine being quite insoluble in glycerine. When the aqueous solution solidifies, the gelatine still retains the water, but the large quantity of glycerine being dispersed through the mass makes the whole into what is practically a very fine gelatine sponge containing glycerine in its pores.

The moisture-loving nature of the glycerine prevents the "sponge" from getting dry, while the insolubility of the gelatine in the glycerine prevents its becoming liquid. When the copy is placed on the jelly, the glycerine comes out to meet the ink, for which it has an intense liking. All the suitable inks are freely soluble in glycerine. Some, too, contain acetic acid either in the free state or in combination with bases, as in rosaniline acetate. The acetic acid exerts a solvent action on the gelatine, so that it will be found that after taking off some impressions with an acetic acid ink, as the "multiplex," the jelly will be etched wherever the ink has come into contact with it. As long as any ink remains on the jelly the glycerine will come out of the pores to keep it moist, but when the whole of the ink has been removed the flow of glycerine ceases, and the parts become quite dry. If the ink is not entirely removed by taking a sufficient number of impressions, and the jelly left, after a lapse of twenty-four hours the remaining ink will be absorbed by the jelly. It is necessary, therefore, that the copies should be taken off as soon as possible, so as to avoid the defect caused by the spreading of the ink.

Most of the makers suggest that directly the slab is done with the type should be washed off. The hektograph and most others require that the water should be warm, but the finely divided barium sulphate in the chromograph renders the surface less tenacious, and the impression may be removed with cold water.

Where practicable, it is better in all cases to leave the slab for twenty-four hours, when the old impression will be quite absorbed, and not interfere with a new one.

This gelatine copying process has been received with so much favor by the public that it shows there is a great want for some rapid means of getting a limited number of copies of letters, etc.; and seeing that any number of colors may be used in the original drawing, Mr. Norman Lockyer has suggested that it would be of much use in laboratories for the multiplication of original sketches of biological specimens, and even for spectra charts, and so save much of the time spent in making duplicate copies. The gelatine slab cannot be said to be perfect, as it is liable to be affected by atmospheric changes; but, bearing in mind the fact that the whole is simply a sponge filled with a compound capable of liquefying certain inks, it is reasonable to hope and expect that chromography is only the pioneer of a process which shall possess all its advantages and none of its defects.

The Fire Laws of Japan.

The severity with which persons in Japan are punished who have the misfortune to be burned out is stated as follows: If the house is unoccupied and is accidentally set on fire, the person through whose carelessness the fire is started

* A very potent and easily prepared ink which will yield a hundred copies may be made by dissolving rosaniline in a cold saturated solution of oxalic acid. It must be allowed to dry spontaneously.

† 4 oz. gelatine dissolved in 6 oz. water, and 20 oz. glycerine, sp. gr. 1.26, previously warmed, stirred in. Any air bubbles in the gelatine are removed before the addition of the glycerine. A cheaper compound, which answers equally well, but is rather darker, consists of Scotch glue, 6 oz.; water, 8 oz.; glycerine, 20 oz. These quantities make a slab 10 × 18 × ¼.

receives ten days' imprisonment with hard labor; if it is inhabited and the fire be produced by the proprietor, then he is punished with twenty days; if the fire spreads to other houses the sentence is forty days, and when anybody is killed thereby, one degree heavier; but if the person killed is a relative of the first degree, the punishment is one hundred days; if the house belongs to the government, one hundred days; if a temple, from sixty days to one year, but ten years are inflicted if it happens to be one of the great temples of Isle, or in the precincts of the Imperial Palace. If a robber sets fire unintentionally to a house, he is punished with, at least, three years' imprisonment with hard labor. Decapitation awaits incendiaries, ten years' penal servitude an attempt at arson; the punishment being mitigated if the would-be incendiary is a servant who has just received a sharp rebuke, or if the attempt be made on an uninhabited dwelling. If a man sets fire to his own house, ninety days, but if the fire spreads to houses in the neighborhood, two years and a half; and penal servitude for life is inflicted if the offender profits by the opportunity of the fire to purloin goods or property.

IMPROVED DRAUGHT TUG SPRINGS.

The accompanying engravings show two forms of draught tug springs patented by Mr. R. W. Smalley, of Salem,

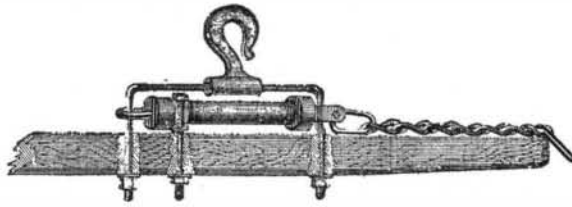


Fig. 2.—SMALLEY'S DRAUGHT TUG SPRINGS.

Mass. These springs are intended to relieve the horse from sudden jerks and strains in drawing a load over a rough road, and also in starting heavy freights, saving a great percentage of power and often preventing the horse from balking.

Fig. 1 shows the device, with a portion of the spring case broken away to show the internal construction. Fig. 2 shows the application of the device to short tugs, such as are commonly used on drays. The invention consists in a barrel or spring casing, having at one end a hook, and containing a strong, double steel spring which surrounds a rod extending through the end or the casing opposite the hook. This spring presses against a nut and washer on the inner end of the rod. When the springs are used in connection with traces, the hooks engage the ends of the whiffletrees, and the opposite ends are secured to the traces. When the springs are used in connection with short traces or chains they are arranged as shown in Fig. 2; the iron staple being

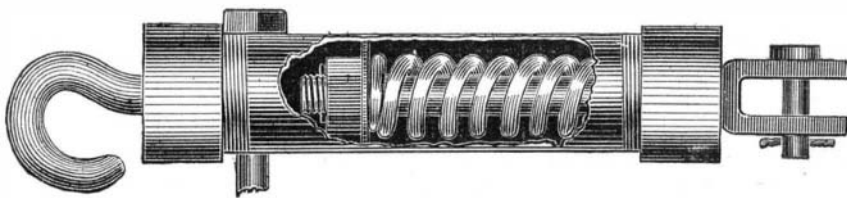


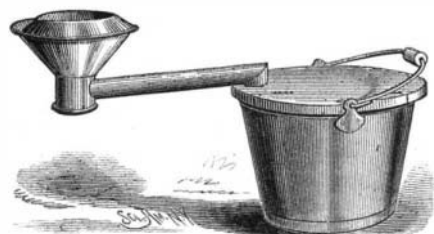
Fig. 1.—SMALLEY'S DRAUGHT TUG SPRINGS.

made high enough to allow the back-chain hook to move freely.

Any one having regard for the welfare of his horses, or the durability of his harness and carriage or wagon gear, would do well to examine this device, as it assists greatly in starting and drawing heavy loads, prevents galling the horse's shoulders, saves tug straps, and relieves the running gear of wagons and carriages of a great deal of strain.

COMBINED MILK STRAINER AND STOOL.

The accompanying engraving represents a combined milk strainer and stool invented by Mr. G. B. Valentine, of Shepardsville, Clinton county, Mich. The design of the invention will be at once understood by reference to the



VALENTINE'S MILK STRAINER AND STOOL.

engraving. The milk pail is provided with a cover which excludes dirt and dust, and at the same time converts the pail into a stool for the milker. A tube extending from the pail cover supports a strainer which receives the milk as it is drawn from the cow and prevents the entrance of dirt or dust to the pail, and the milk is conveyed to the pail in a clean and wholesome condition. The accidental overturning of the pail, so common to the ordinary methods of milking, is not likely to occur when this device is used.

MISCELLANEOUS INVENTIONS

An improvement in horse powers, patented by Messrs. Elijah Wade and William McAulay, of Quitman, Ga., consists in a novel arrangement of a tongue and double tree, in combination with the sweep or lever of a horse power, whereby greater leverage may be obtained within a given circle.

An improved tire fastening for vehicle wheels has been patented by Mr. Chauncey H. Starkey, of Colorado Springs, Col. The object of this invention is to provide a simple and effective means for fastening the tires and felloes of vehicle wheels together, so that the tire will not slip off from the contraction of the wood. This dislocation of the tire is of frequent occurrence, and as it generally results in the breakage of the wheel, it is a very serious difficulty, and is especially embarrassing when it happens to loaded wagons in the western country, where opportunity for repairs exist only at long intervals.

An improvement in advertising frames, patented by Mr. Emory J. Morrell, of Petrolia, Ontario, Canada, consists of a center post or standard, on which are set two broad collars, one below the other, from which radiate arms that support on their forward ends upright boxes, the faces of which are each of them divided by vertical strips into three sections, provided with glass fronts, through which may be seen the business cards, etc., that are placed within. Over each column or section will be placed the name of the business represented by the cards below.

An improved road scraper, patented by Mr. Samuel H. Dudley, of Bantam Falls, Conn., consists in the combination of guard bars having their upper ends bent forward at right angles to fit into the notches in the upper edge of the plank, and having sockets formed in their lower parts to receive the rear ends of the draw rods, with the plank, the draw rods, and the staples of a scraper.

Mr. Alfred R. Garver and Haney Hemenway, of Colorado Springs, have patented an improved wire-stretcher, which consists in combining a spring having a pawl and a T-lever with ratchet on the spool, and in combining with a frame having a slot at one end, and a median spool, a ribbon of metal, and a head, to connect the spool and grippers.

An improvement in grain-separators has been patented by Mr. Alexander Fugel, of Clayton, Cal. The invention consists in a novel means for imparting motion to the upper and lower shoes of a grain-separator.

Mr. William H. Allen, of New York city, has patented an apparatus for weighing grain, flour, and other similar substances as they flow from a spout into a hopper or other receiver. It is so constructed as to deliver the substance in exact and uniform quantities, and at the same time accurately register the quantities delivered.

Mr. George Wood, of Trenton, N. J., has patented a simple, convenient, and effective machine for removing corn from cobs. It is so designed as to take off the pulp and leave the hulls.

Mr. William T. Bradberry, of Allegheny, Pa., has patented an improved combined fire screen and blower, which, when the device is not in use as a blower, may be lowered and used as a fire screen.

Mr. John Decker, of Ogdensburg, N. J., has patented an improvement in burglar alarms, consisting of a sliding match carrier and a weight so arranged and connected with a door or window that when the door or window is opened the weight falls and gives a sufficient alarm, and at the same time causes a match to be lighted on a friction surface and to be moved to and light a lamp. The device may be connected to one or more windows or doors.

Messrs. Partrick J. Clark and Joseph Kintz, of West Meriden, Conn., have patented an improvement in extension chandeliers. This invention relates to chandeliers that are fitted with telescopic joints, so that the lower portion, carrying the burners, may be raised and lowered on a fixed rod attached to the ceiling.

Mr. Edward Edwards, of South Charleston, Ohio, has patented a strong, easy, and convenient seat or range of seats for halls, opera houses, etc., consisting of several upright side frames rigidly held by iron rods that support the seats. The seats have a strong bracing strip running across and secured to the hind legs.

Mr. Azell N. Rouech, of Bay City, Mich., has patented an improved cup, such as are used on billiard tables for holding chalk for application on the tips of billiard cues, the object being to make convenient the chalking of the cue without handling the chalk, and to keep the chalk and the cup from rattling and shaking at the concussion of the balls with the cushion of the table.

Mr. Marshall J. Hughes, of Jersey City, N. J., has patented an improved stereotype casting box. This is an important improvement, and dispenses with the spacing blocks previously employed, and clamps or secures the side bars at any desired distance apart very quickly and easily. It also permits of inserting or removing the mould with much less difficulty and labor and in a shorter time.

Messrs. Henry B. Andrews and Oscar W. Ball, of Fairbault, Minn., have patented a machine for pressing the axle boxes into the hubs of wheels. It consists in the combination of a bed plate or frame, having a large hole or opening through its center, a detachable plate, having a hole through its center to receive the end of a hub, and stationary uprights, supporting a detachable crossbar having a lever, and the lever for pressing the box into the hub.