

THE FAIR OF THE AMERICAN INSTITUTE.

The closing days of the Fair have been marked by still greater throngs of visitors. Indeed, we doubt whether any previous exhibition during late years has met with so large a share of popular appreciation, and certainly none has more richly deserved the same. As a consequence, we hear from exhibitors on all sides self-gratulatory remarks as to the benefits gained. One manufacturer informs us that he has received orders for forty-five of his engines; another traces a large increase in his sales to his representation at the Fair; a company in need of working capital have negotiations well advanced for the same, simply through presenting their products under working conditions; and so on through a number of instances, all tending to show the value of such exhibitions, when rendered really attractive to the public, as a means of bringing together the seller and the buyer.

To the careful student of the gradual growth and establishment of new national industries, there are many evidences of progress which cannot but be gratifying. Two instances occur to us: the fine porcelain and elaborate paper hangings, manufactured respectively by the Union Porcelain Works, of Greenpoint, and Messrs. Beck & Company, of this city. The porcelain will, in delicacy of make and tasteful ornamentation, compare favorably with the best produced abroad. The wall paper presents a series of embossed, gilded, and colored designs, equal in every respect to those of the finest imported. We notice also fine collections of bronzes and chandeliers, also a variety of philosophical, dental, and medical instruments, the workmanship of which it seems hardly possible to excel.

There is a slight difference between swill or sugarhouse refuse and clear, bright honey, and yet the bees contrive to find the latter in the former waste as readily as in the sweetest of buckwheat fields. A neat hive at the Fair contains the comb, insects and all, and the visitor can see for himself that the neglected sweets of New York produce a by no means inferior article.

The Blake stone crusher, a machine which literally chews stone into fragments with a rapidity exceeding that to be found in the geological investigations of a whole regiment of convicts, is in full operation. It has just gained another medal—this time at Cincinnati. Snow's water wheel governor is also exhibited in motion. This device (which we illustrated on page 182 of our current volume), when the water is drawn down to a given point, automatically closes the gate so as to allow the water to regain the lost head, and, when at the available point, of itself resumes its natural action. Hall's universal emery grinder is a tool which will recommend itself to mechanics, on the score of handiness, if of nothing else. It is an emery wheel, arranged at the extremity of a long arm and actuated by elastic belts. By means of counterpoises and suitable attachments of the arm, the wheel can be carried to any point within the radius of the latter, turned upside down, carried to the floor or high in the air, and, when let go, remains in convenient position to be readily grasped.

Messrs. Merrill & Sons' drop hammer has been in operation, forging small articles, the metal being heated in a small portable forge near by. Phillips' corn husker deserves mention as an excellent machine of its class. The stalks, with the ears adhering, are fed in at one end, meeting toothed rollers and other devices which tear off the ear, husk it, and deliver it clean, on an endless band, while the stalk, thoroughly crushed, is thrown out beneath.

Stiles' patent hydrostatic mercury pressure gage is a novelty on which we have heard much favorable comment. Its principle is simply the counterpoising, weighing, and indicating the steam pressure by means of a low mercury column. The construction is quite simple, and there are no springs, levers, or other complicated mechanism.

The Value of Fresh Air.

Dr. Le Bow, of Paris, in a recent work on hygiene, speaking of the hygiene respiration, observes that typhoid fever, anæmia, typhus, and dysentery are the diseases to which those who breathe an atmosphere insufficiently renewed are predisposed. If these individuals are wounded, they are rapidly decimated by purulent infection. Of all the facts that can be cited to show the danger to human life that results from inspiring air vitiated by the products of our own respiration, especially when debilitated by disease, none is more convincing than the mortality which occurs in our American hospitals, and which can only be termed frightful when compared with that of foreign hospitals, where the system, always adopted by us, of immense wards containing many patients, has been completely abandoned. In comparing the mortality of patients operated on during the wars of the Crimea and of the Secession, we see, from the statistics of Chénu and of Woodward, that, while the French army lost 73 per cent of all operations, the English army only lost 40 per cent, and the Federal only 34 per cent. In this case it might be objected that the English and American wounded were, as has elsewhere in this work been stated, well fed, while the French were very badly fed. Insufficient food will always increase the bad effects of imperfect aeration, and it is difficult, perhaps, to assign to each the exact part that it plays. But in the example which follows, this reason cannot be invoked, for the patients were well cared for in time of peace, and in the most renowned hospitals.

In some statistics in which M. Lefort compared those who had suffered from the same lesion, amputation of the thigh, he arrived at the following results, which he communicated in 1868 to the Society of Surgery:

In a hospital containing 100 patients, 25 per cent died; in one containing 200, 31 per cent died; in one containing

300, 37 per cent died; in one containing 400, 40 per cent died; in the hospitals of Paris, there die 74 per cent.

It thus appears that the most dangerous fields of battle are less murderous than for a wounded man to take refuge in one of the hospitals of Paris, and it may well be open to question whether any advantage they afford can counterbalance a sojourn in these dangerous establishments.—*Medical and Surgical Reporter.*

Co-operation.

We have recently had to call attention to several new phases of the cooperative movement, which has done so much in many countries to induce the industrial classes to economize their means and invest their savings in mills, mines, factories, and stores. One of the largest of such associations (which illustrates the principle admirably, though it can scarcely be considered as a workmen's movement) is the Civil Service Supply Association, of London, England. It was begun by a few government clerks, who united to purchase their own tea by the chest and calicoes by the piece.

In six months just ended, goods to the amount of nearly \$2,000,000 were purchased by the Association; these goods were retailed at a gross profit of about 10 per cent, showing a nett result of 2½ per cent on the whole, after payment of expenses. But the remarkable feature about this associated trading is that these large operations sprung from and were transacted on an original capital of \$10,890. The profit of 2½ per cent on \$2,000,000 is \$50,000, equivalent to more than 500 per cent on the original stock of the Association. It would be difficult to find a better illustration of the value of small profits, quick returns, and prompt payments than this.

Substitutes for Rubber Insulators.

Th. du Moncel examines the manner of rendering wood non-conductive—a question of some practical importance, since the only insulator free from brittleness hitherto known, suitable for the construction of electric insulators, is ebonite, a substance both costly and liable, in course of time, to an efflorescence of sulphur.

Ivory and guaiacum wood, which are both relatively good conductors, become nearly non-conductive if stove-dried and saturated with certain oily and resinous liquids, which close up the pores of the bodies in question, and prevent moisture from penetrating within. Other kinds of wood can be modified in the same manner.

Sawdust of hard wood, agglutinated with blood and submitted to a considerable pressure, so as to mold it into a solid tenacious body, like the hardened woods of M. Latry, is a good insulator for voltaic currents. After remaining six days in a damp cellar, it showed no galvanometric deviation.

Samples of wood baked and soaked in paraffin, and then exposed to moisture, were sensibly conductive.

Wood, stove-dried and soaked in different varnishes, proved also still capable of re-absorbing moisture, and, consequently, of becoming conductive. Compression diminishes the conductivity of wood for the time being.—*Chemical News.*

Albumen.

Albumen is an organic compound found both in animal and vegetable substances. Its properties are best studied in the white of an egg, which is a very pure form of albumen. It also abounds in the blood and chyle, and more or less in all the serous fluids in the animal body; it also exists in the sap of vegetables and in their seeds, and other edible parts. Albumen forms the starting point of animal tissues. The chief component elements of albumen are carbon, hydrogen, nitrogen, and oxygen, with small proportions of sulphur and phosphorus. It is believed to be a definite chemical compound, though the exact proportions and the rational formula have not been definitely ascertained. Carbon forms fifty-four per cent of it, nitrogen sixteen, and sulphur two. The disagreeable smell arising from the decomposition of eggs is from the generation of sulphuretted hydrogen.

Albumen is capable of existing in two states: in one of which it is soluble, in the other insoluble, in water. As soluble in water, it is found in the egg, the juice of flesh, the serum of blood, and the juice of vegetables. Soluble albumen may be converted into the insoluble form in the following ways:

1. *By the application of heat.*—A moderately strong solution of albumen becomes opalescent and coagulates on being heated to about 150° Fah., but a temperature of 212° is required if the liquid is very dilute.

2. *By addition of strong acids.*—Nitric acid coagulates albumen perfectly, without the aid of heat. Acetic acid, however, acts differently, appearing to enter into combination with the albumen.

3. *By the action of metallic salts.*—Many of the salts of the metals coagulate albumen completely. Bichloride of mercury, acetate of lead, sulphate of copper, and nitrate of silver form insoluble compounds, and the egg is therefore used as an antidote to these poisons. The white precipitate formed on mixing albumen with nitrate of silver is a chemical compound of the animal matter with protoxide of silver, and has been termed albuminate of silver. Albumen also combines with lime and baryta. When chloride of barium is used with albumen, a white precipitate usually forms. By long keeping, albumen loses its alkaline reaction and becomes sour and more limpid than at first. Mucous threads like cobwebs form in it, which appear to be caused by oxidation.

Ammonia added to albumen is said to preserve it for a longer time, and a lump of camphor floated in the liquid has a good effect. Alcohol, ether, creosote, and tannic acid likewise cause the coagulation of albumen.—*Western Photographic News.*

Recent American and Foreign Patents.

Improved Heating Furnace.

Adolphus F. Bishop and John H. Aiken, Norwalk, Conn.—The boiler contains two air chambers near the ends of the cylinder, the faces of which are concentric rims. Said chambers are connected by air tubes extending all the way round, except in front, where the fire doors are. In a central space is placed a furnace, above which is a smoke chamber. The furnace, air and fire tubes, air and smoke chambers, are watertight, and the air and fire tubes are sufficiently apart to permit an easy circulation of the water between, around, and among them.

Improved Car Coupling.

Frank W. Rowe, Hardwick, Vt.—A frame is placed a little below and in the rear of the draw bar, and a bar is connected with it, so as to have a small longitudinal movement. The forward end of said bar receives a hinged block. The forward end of the block projects a little in advance of the drawbar, and has a flange, the upper edge of which has two notches formed in it to receive the link, so that the link may be raised into a horizontal position by raising the forward end of the block. To a lever is attached an arm which projects forward into such a position that, when the free end is moved forward, the said arm may pass in beneath the hinged block, and raise its forward end to raise the link into a horizontal position. With the lever and frame is connected a spring, which, when the lever is released, forces the said lever back, withdrawing the arm and allowing the flanged block to drop away from the link and the drawbar.

Improved Animal Clipping Machine.

Warren S. Burgess, Norristown, Pa., assignor to himself and Charles P. Bickings, same place.—The cutter is attached to the end of a vibrating lever, and vibrates on the cutter plate. An air engine gives the vibrating motion to the lever. The machine is connected with the pump or compressed air reservoir by a flexible tube, so that it may be conveniently moved over the animal. By means of a fly wheel, the cutter is given a steady and regular motion, and the machine is guided with great ease and accuracy.

Improved Crosscut Sawing Machine.

Jefferson Thompson, Mexico, Ind.—The saw is supported on guides or ways as it is moved back and forth by a pitman, clasps serving as slides on the ways. A cord attached to the forward end of the ways extends upward, and passes between pulleys in a stand, consisting of the two inclined posts. From this stand the cord extends through a plate, which is adjustably attached to a back post, and thence to an adjustable arm. The arm is adjusted on a circular plate, so as to arrest the downward movement of the saw at any desired point by means of a pin through the plate. The saw is also lifted up and supported by the cord when it is not in operation.

Improved Manufacture of Glass.

Hugh Percival, Bishop Wearmouth, Eng.—This invention consists in the adaptation of covered pots or coverings to be used in connection with ordinary tanks, and also in the adaptation of ordinary tanks to be worked in connection with covered pots or coverings. Said pots or coverings are constructed with an opening at or near the bottom for the inflow of refined glass, as well as an opening at the upper part, where the glass is gathered and worked into merchantable articles. Two or more tanks are also connected together, and with the tank containing the pots, by conduits below the surface of the glass.

Improved Cotton Planter.

Oliver H. Trout, Honey Grove, Texas.—The opening plow is attached to the lower end of a standard inserted and pivoted in a slot in the rear end of the tongue. The draft strain upon the standard is sustained by a brace bar which is curved and passes through a slot in the tongue, and has a number of holes formed through its upper part to receive a pin which rests upon the tongue. The lower end of a forked lever receives the upper part of the brace bar, and can be operated by the driver from his seat to raise the opening plow from the ground in passing.

Improved Cotton Tie.

Alexander A. Szabo, Houston, Texas.—This invention consists in a block for holding the ends of bale wire, it having an open cross slot on each side leading to an inner aperture, as well as a cramping groove running longitudinally from the latter to the end of block. This enables the baling to be effected very rapidly, while the tie is reliable under all contingencies.

Improved Grain Separator.

Herman Kurth, Milwaukee, Wis.—This invention relates to certain improvements in machines for cleaning grain of cockle, garlic, and other impurities. It consists in the combination of a perforated revolving cylinder with an internal oppositely rotating reel, and the relative adjustment of the two, through friction wheels. Also in the combination, with the reel, of an internal and external spiral conveyor, and furthermore in the combination, with the perforated revolving cylinder, of an endless apron passing over adjustable rollers.

Improved Reel or Carriers' Aprons of Threshing Machines.

George C. Dodge, Millburn, Ill.—This invention consists of a reel with a hand crank arranged at the rear of a threshing machine, so that the carrier can be readily rolled upon the shaft, so as to save the labor and time lost in taking it off and packing it when the machine is to be moved from place to place, or when it is necessary to put it under shelter from rain and snow.

Improved Washing Machine.

George D. Berdan, Saddle River, N. J.—This invention consists in the application of circular guards to the lower head of a vertical revolving rubber having fluted rollers, which act on the clothes placed between them and the corrugated sides of the tub. The guards are of galvanized wire, and keep the clothes away from the pivot of the head, forcing them out against the sides of the tub.

Improved Ironing Table.

Francis Harvey, Renovo, Pa.—A bracket is attached to the wall for supporting a knuckle which has a pivot passing through a plate, and secured by a pin which allows it to revolve a quarter of a turn, and arrests its further movement by stops. The table is connected to the knuckle by a vertical pivot projecting from its under side. The leg is pivoted at the outer end of the table, so as to be folded up and secured by a button. The plate turns on its pivot to swing the table to, or from the wall when folding up or down, and the knuckle turns in said plate, for shifting the table to a horizontal or vertical plane.

Improved Grubbing Machine.

George E. Reyner, Clay, Iowa.—Power is applied to this device by attaching a horse to the outer end of a beam, which end is supported by a wheel. The mechanism at the other extremity is adjusted and operates as follows: The machine is raised from the ground, and a loop is dropped over the stump. A ring is then placed upon the stump, and a wedge is driven into the top of the said stump, which spreads it sufficiently to fasten the ring. The ring prevents the loop from slipping off the stump, and at the same time serves as a band to prevent the wedge from spreading the lower part of the stump, so as to tighten said loop. The knife is then forced into the ground five or six inches, more or less, and the horse is driven around the stump, the knife cutting off the side roots that may be in its path. At each round the knife is forced deeper into the ground until all the side roots have been cut off. A hook between the knife and staple or loop is then dropped to the ground, and is held down with the foot until it catches upon a root, when a few rounds will twist off the top root, and allow the stump to be raised from the ground.

Improved Ice Creeper.

George F. Lemon, New York city.—The upper and lower plates are cut of soft rubber, corresponding to the shape of the shank or hollow of the shoe, the upper plate being made tapering toward the front part for fitting the curve of the shank, and producing a nearly horizontal position of the studded plate, which projects slightly with the points of its studs below the level of the base of the heel. Both plates are riveted to a lateral strap which is interposed between them, and applied by a buckle at the ends to the foot.

Improved Key Fastener.

Alfred W. Sperry, Wallingford, Conn.—This invention consists of a pointed shaft or arbor with a hooked-shaped part keyed thereto. A slot and pointed cam slides thereon for being opened and attached to the key by a pivoted lever acting on a projecting pin or stud of the cam. The slotted cam slides in the circumferential groove of the shaft, and resists, by its steady position thereon, any attempts at pushing the shaft inward from the outside.

Improved Grain Binder.

William Lenz and Robert Wittke, Glenwood, Iowa.—This grain binder is operated by following the reaper, taking up the grain left at suitable intervals by the same. The attendant is seated on the front frame of the binder, operating with his foot the lever mechanism for throwing the spider frames in and out of gear. He places the serrated clasp with one hand into the grooved jaws of the lock, places with the other hand the end of the binding cord from the outside below the lock and up the inside over the clasp, winds it around one jaw and secures then the end to the band spring at the rear of the lock. The turning motion of the tines unwinds a sufficient length of the cord from the spool to extend from the guide rod along the circumference of the tines over the supporting springs of the same, till the turning of the tines is nearly completed. The cord has then loosely encircled the gathered grain on the tines. The toothed segments of the spider frames gear at this point with the spool shaft, and produce the re-winding of the cord on the spool, and the stretching of the same, to such a degree that the supporting tines springs give way and allow the formation of the loop around the grain. The cord is then tightened until the strain throws the spool shaft out of gear by means of the tension springs. The lever of the lock mechanism is engaged almost simultaneously with the rear extending spring of the front frame, so as to clamp the clasp into the cord ends and cut the cord by the shears. The sheaf is then dropped and taken up by the gatherer.

Improved Folding Seat and Table.

William Tetley, Pana, Ill.—This invention consists of folding seats and tables, contrived to fold into recesses into the floor of a building flush with the surface. The object is to provide public and other halls, market and other buildings, with seats and tables that can be more readily disposed of when it is desired to clear the floor of them.

Improved Earth Auger.

Don Juan Arnold, Brownville, Neb.—The improvements consist in the construction of devices for guiding the bit into proper position when lowered on the shaft, and in the provision of a socket arm on the sweep which connects with the windlass gearing and causes the bit to be raised when a certain predetermined depth has been reached, and in improved means for coupling the shaft sections. There is a square lower end on the lower section of the shaft, and on a square lower end on the bit sleeve, for connecting the bit to the shaft in such a way that the said bit may be operated by turning the said shaft.

Improved Opera Chair.

Bernhard H. Koechling, New York city.—By suitable construction, when the seats are turned up, the seats and backs become vertical and parallel with each other, so as to take up the least possible space, and the seats are thrown back by angle irons, so as to considerably widen the passage in front of the chairs, giving more room for a person to stand while another is passing.

Improved Steam and Water Heater.

Edward B. Light, Westfield, Mass.—The sections of the boiler, each of which consists of a hollow hub and hollow ring, are connected with each other by radial tubes. Any desired number of the sections may be used. Upon the outer sides of the hollow rings of the sections are formed a number of hollow radial arms, which are flattened toward their outer ends to furnish a large amount of radiating surface. These are provided with a horizontal diaphragm or partition, extending from their inner ends nearly to their outer ends, so that, as the steam rises and enters said arms above the diaphragm, it may force the air out beneath them.

Improved Post Driver.

Ira M. Hardy, Oshkosh, Wis.—The upright guides are attached to the hind bolster, and the bolster is provided with an adjusting brace and connected at the top to uprights, so that they can shift laterally to the wagon. The uprights have a cranked pinion gearing with a toothed portion of the brace, by which to shift them along it for righting them when the truck stands on uneven ground. The uprights are shifted forward and backward by an extensible brace, made of two parts, which slide along each other. One is toothed, to be worked by a pinion on the other, turned by a hand crank. The rope for hoisting the hammer passes under a guide pulley at the hind axle and along to the front of the wagon, where a horse will be hitched to it for hoisting the hammer.

Improved Car Coupling.

Jacob Shaaaber, Reading, Pa.—As the cars are run together, and as a lower loop or clevis slides up on a hook, it will raise the upper loop into an erect position, so that it will be caught by an outwardly projecting hook pivoted to the front of the car, so as to be entirely out of the way.

Improved Machine for Transmitting Power.

Albert Reed, Oroville, Cal.—This invention consists of suitable weighted, swinging, and regulating levers, which produce, when set to work, a uniform degree of motive power. By setting the operating handle in motion, the various parts are consecutively brought into active operation, until the final reciprocation of a single lever is obtained.

Improved Combined Scrubber and Mop.

George Pirrung, Ravenswood, Ill.—This invention consists of a mopping contrivance attached to a handle. There is a water-receiving box and a piece of thick flexible rubber, so contrived that, by placing the edge of the rubber on the floor and pulling quickly along, it will spring back from the water box, forming an opening into the same, through which it will force the water which it gathers from the floor at its front, and then, being quickly lifted from the floor, it will instantly spring up to the box and close it, and confine the water to be removed and poured out.

Improved Wagon Body.

Frank Clemens, La Fayette, Ind.—Strap hooks, attached to the side boards, hook into the eyes of an eyebolt attached to the ends of cross bars. The ends of the two middle cross bars connect with short bars, which serve as a platform to the wagon bed, and to which braces are bolted near one end. The braces rest against the side boards, and are secured in place by hand screws. Other arrangements are provided, so that, by removing a rod from either end of either end board, the end board can be swung out upon the rod as a hinge, and, by removing several rods and hand screws, the whole bed can be taken apart.

Improved Car Coupling.

Alexander Neel, Richwood, Ohio.—The drawhead of one car is provided with a pin, which is connected by an extension rod with the top of the car. A band spring of the car is bent forward and locks into a notch of the pin when the same is raised, the pin being readily released from the spring catch on the sliding back of the drawhead. The drawhead of the adjoining car has the common coupling pin, but is provided with a lever rod, which swings on a perforated bracket bar, and supports, by a bottom guide loop, the coupling link in horizontal position for coupling. The top end of the lever rod is retained in position for holding the link by a catch piece. When the link is thus held horizontally, and the coupling pin of the other drawhead raised, the approach of the cars produces the entering of the link, and, by the contact of the lever rod with the drawhead, the dropping of the same and its swinging back over the other drawhead toward the car. The link enters then the drawhead until the concussion of the drawheads releases the raised pin and causes the dropping of the same.

Improved Fare Register.

Emanuel P. Loveman and Herman H. Loveman, Atlanta, Ga.—This invention relates to fare-register boxes, which not only register, on an inside dial plate, the number of fares taken by a car conductor, but simultaneously strike an alarm that notifies each passenger that a record of his particular fare has been made. The invention consists in novel means whereby the conductor can make his register and strike the alarm in a more rapid and convenient manner than heretofore.

Improved Centering Device.

William D. Slack, Lewisburg, Pa.—This invention relates to certain improvements in centering tools. It consists in a flanged annular ring, to the under side of which is pivoted the ends of several gripping arms. Inside said ring is a centrally perforated disk, which is attached to the gripping arms by links. This said disk is extended above the outer ring in the form of a boss or hub, in which is contained a pointed punch, usually held up by a spiral spring and provided with a knob. Attached also to the hub is a radially moving lever. When said lever is moved, the gripping arms beneath clutch the shaft to be centered, and a blow upon the knob of the punch taps the same in the center by causing the punch to descend through the hub and the hole in the disk.

Improved Fire Shovel and Tongs.

Harvey Maranville, Akron, Ohio.—One arm of the tongs has a shovel end, and the other terminates in a plate. The rear extremities are pivoted to a short bar. Arrangements are provided by which the shovel arm may be thrown in advance of the other, while the latter is closely held thereto, making the implement into a shovel; or both arms may be brought down evenly, so converting it into a tongs.

Improved Circular Saw Guide.

Calvin H. Husted and Charles H. McPherson, Southwater, Col. Ter.—The guide consists of two arms and a guide plate, which latter is made to slide transversely on an adjusting plate. A supporting roller, for the purpose of supporting the overhanging portion of the log, having its upper surface on a level with the lower surface of the log, is connected with the adjusting plate, and, by means of a slotted flange in which it revolves, is made adjustable as to height, and may be entirely detached from the adjusting plate and saw guide. This saw guide may be adjusted to the saw with safety when the saw is running as well as when it is at rest.

Improved Fermenting Vat.

John C. Hüpfel, New York city.—The object of this invention is to provide for brewers' ice houses an improved fermenting vat, in which the beer may be exposed in large quantities to fermentation, and kept at the requisite temperature, without the use of ice floats. The device consists of an open vat with vertical cooling tubes, attached securely to the bottom for the free circulation of the air, or the application of ice by means of a detachable bottom at the lower opening of the cooling tubes.

Improved Hat Ironing Machine.

Antoine Giroux, Louis Drovon, and Claude Sturel, Newark, N. J.—The block for ironing the brim is arranged in a large hole in the center of the table with its lower end resting on a vertically adjustable stand, so that it can be taken out after the brim has been ironed on the upper side and reversed, to iron the under side, the crown being placed in the hole in the table. The stand for the block is adjustable, high or low, to adapt it to crowns of different heights.

Improved Process of Concentrating Copper Pyrites.

François A. H. La Rue, Quebec, Canada.—This is a process for eliminating impurities from and preparing copper pyrites for convenient transportation, by partially reducing the previously roasted and carbonized ore with heat until it becomes magnetic, and then passing the product through an electro-magnetic machine, whereby the copper and iron ore are separated from the earthy or other matter.

Improved Wagon Tongue Support.

Joseph Oehler, La Fayette, Ind.—The pole is provided with rear extending side pieces, by which a fork-shaped end is produced. A center piece is interposed between the front part of the hounds, and projects, by a tongue extension, into the forked pole end and is pivoted therein. The center piece is further strengthened by a longitudinal bar, extending back to the under side of the front axle and fastened thereto.

Improved Check Row Attachment for Planters.

Lyander L. Haworth, London, Ohio.—A cross board is secured to the frame of the planter, and to the end parts are pivoted two pulleys, around which passes a cord which is stretched across the field. The ends are secured to the ground, and it is provided with knots at the required distance apart of the hills. To the ends of a shaft are attached arms which receive the cord, so that the same can slide through freely, but not the knots. As each knot strikes the slotted arm, it turns the said arm to the rearward until it can slip through the outer part of said slot. The arm is then again carried forward by a weighted arm also attached to the end of the shaft. To the shaft are besides attached guard arms, which prevent the cord from getting out of the slot as the knots slip through. Suitable connection is provided from this shaft to the dropping slide and valve.

Improved Electric Railway Signal.

Paul Tesse, Henry Lartigue, and Pierre D. Prud'homme, Paris, France.—This invention is a semaphore mast, to the top of which are pivoted two large arms fulcrumed so as to hang vertically, said arms being attached to the cranks of two similar electrical apparatus below by a traction rod. Just below these two large arms are two small ones, fulcrumed to said mast so as to hang horizontally, and connected, each by traction rods, with separate electrical apparatus similar to the first mentioned. The whole line consists of a series of these masts provided with arms and electrical apparatus, said arms being disposed vertically along the mast when not in use, and the electrical apparatus of the large arms of one station being connected by wires with the electrical apparatus of the small arms of the second station, etc. The large arms are locked or presented horizontally to the gaze of the engineer, mechanically by moving a crank of the electrical apparatus. Said motion, also, by means of a commutator, brings into play a battery, which, by communicating with the electric apparatus of the small arms of second station, allows them to fall horizontally. The mechanical effect of said fall, through a commutator and battery of second station, sends a current back to first station, which acknowledges, upon a bell and an annunciator at first station, the receipt of the original signal sent from said first station. By means of this arrangement the large arms of a mast at the first station serve as a signal to an approaching train, and the elevation of them notifies the agent at second station, through the electrical apparatus, battery, wires, and small arms of mast at second station, of the passage of the train past the first station. After the train has reached the second station, the agent there allows the small arms of his station to fall, which mechanical action, through a commutator and battery of the second station, allows the large arm of the first station to fall. Said fall, through the commutator and battery of first station, sends another current to second station, which acknowledges, by a bell and annunciator, the receipt of original signal, and announces the fact that the large arm of first station has fallen. This combined electrical and mechanical apparatus is situated in between the two tracks, one large arm and one small one on same side of the mast being used for the trains passing up, and the other large arm and small arm on the opposite side for the trains passing down.

Improved Washing Machine.

Daniel Kunkel, Oregon, Mo.—This is an improvement on the washing machine for which letters patent were granted to same inventor October 30, 1866. By suitable construction, as a disk is turned in one direction, a pin will rest against said disk and hold another pin projecting downward vertically, to take hold of the clothes and sweep them through the suds. As the direction of the disk is changed, rollers partially revolve, the projecting pins resting against the disk, and the others projecting to take hold of the clothes in another place and sweep them in another direction through the suds. Mechanism is provided which keeps the clothes away from the center of the tub, so as to be in proper position to be moved through the suds by the pins.

Improved Seed Separator.

William E. Lee, Swan River, Minn.—This is a machine for separating cockle from wheat, comprising a sheet metal cylinder perforated with holes just large enough to receive the cockle, but too small for the wheat, with a skin belt as wide as the length of the cylinder surrounding it. This causes the perforations to retain the cockle, carry it up, and throw it on a descending shaking trough, hanging in the cylinder above the wheat, to chute the cockle out at one end. Above the cylinder, where it is not covered by the belt, a revolving brush is arranged to brush back on the chute any grain that may stick on the perforations. The chute has a brush at one edge to brush down the wheat and leave the cockle in the hole.

Improved Shingle Block Sapper and Bolter.

John F. Bassett and James Nichols, Limestone, N. Y.—This invention consists of a sector-shaped table, pivoted to and moving by friction rollers on a truck of the usual construction. The table is provided with raised concentric rings for turning readily the block to be cut thereon, and also with a slot and segmentally cut-off side part corresponding with a saw recess of the truck. A stop pin at the bottom of the pivoted table and a spring latch define, in connection with a check block and stop pin on the floor, the position of the table toward the saw. A pivoted arm with center pin swings in a standard of the table, and is applied to the block or a center dog fastened to the same. A pivoted hand lever with adjustable dog swings on the center pin of the arm, and serves to adjust the block for sapping and bolting.

Improved Electric Car Detaching Device.

William W. Carson, High Bridge, N. Y.—This invention consists of a pivoted lever frame, which is applied above the rail between the wheels of each car truck, and placed in electrical circuit by means of spring contacts with a powder charge and detaching mechanism of the drawhead. The closing of the circuit, whether by the action of the lever frame on the spring contacts when the car is thrown off the track, or by direct action from the car, ignites the powder charge, separates thereby the drawhead and detaches the car.

Improved Power Hammer.

Alfred L. S. Chenot, Paris, France.—This invention consists in a percussion cylinder bearing upon its lower end a hammer block and hammer, and moving smoothly in an incasing cylinder, which acts as a guide, and prevents any lateral motion of the percussion cylinder resulting from the strokes of the same. Inside the said percussion cylinder is a piston rod bearing upon each end a piston which moves freely in the cylinder and between the two pistons and permanently attached to the cylinder, a diaphragm, which, with the two pistons, divides the cylinder into three air compartments. When the piston rod is elevated by the connecting mechanism, a vacuum is formed in the upper and lower compartments, a compressed plenum in the middle compartment, and the cylinder raised by the elasticity of the air. When the connecting mechanism drives the piston rod down, the force of the steam, gravity, and the elasticity of the air combine to give a heavy, quick, and elastic blow.

Improved Spring Saddle Seat.

John L. Sommerville, Maysville, Ky.—Between the sides of the tree and beneath the pommel, are spiral springs inclined in short tubes. A joint in the leather covering of the tree separates the seat from the pommel, and is laced up with elastic cord. Strong leather supports attached to the rear portion of the saddle tree extend forward to near the joint, the forward ends of which are attached together and to the leather covering of the seat. Wire rods are connected with the spiral springs at one end and with the leather covering of the seat at the other end, so that, when the seat is depressed by the weight of the person, the pressure will act upon the springs and render the seat elastic.

Improved Car Coupling.

Michael J. Roach, Middle Granville, N. Y., assignor to himself and R. L. Williams, same place.—The drawhead has an additional detachable face plate fastened to flanges, and cushioned off by packing. The approaching drawhead strikes against the face plate and carries a slide back until its pinhole is vertically below the pinhole of the drawhead, releasing thereby a pin from the slide and dropping it to couple with the link of the ordinary shape. An inclined movable plate is arranged in side grooves of the drawhead below the slide plate, to protect the spring of the sliding plate from injury.

Improved Valve Coupling for Hose Branches.

James R. Higgs, Utica, N. Y.—This is an improved valve coupling for hose branches, by which two or more streams of water may be thrown on the fire from the same main hose, and thereby the extinguishing of the same facilitated. The hose branches are opened and closed by a sectional spring valve sliding on a guide tongue of the valve stem turning in suitable bearings.

Improved Reservoir.

Bennet Cohen, Jersey City, N. J.—This is a reservoir which may be attached to the water pipes in the upper stories of buildings, so that, should the water be cut off from below, there may be a sufficient supply retained above for temporary purposes. The upper part is made semicircular, and its lower portion tapers down to its junction with the water pipe. The back is perfectly flat, so that it may be secured to the wall. In the pipe near each reservoir is a check valve, so that the upward pressure of the water in the pipes will cause the water to run continuously up through the pipes and reservoirs. Each reservoir is provided with a ventilator, which will close automatically by means of a float valve when the reservoir is filled. A faucet taps the water pipe between the check valve and lowest part of the reservoir, so that it may be able to carry off all the water contained in the latter.

Improved Watchman's Time Detector.

Anton Meyer, Stuttgart, Germany, assignor to Theodore Hahn, of same place.—In this device the printed dials hitherto in use may be dispensed with and plain paper disks substituted, on which the marks of the stations and the time are quickly printed by suitable spring devices without the direct action of the keys on the marking parts and a bridge piece. There is a rotating steel dial, which has the hour and minute subdivisions engraved in raised figures thereon, and is set in motion by a suitable clock train. The numbers of the stations are arranged sidewise thereof, and marked on a plain paper disk, rotating with the steel dial, by means of strong band springs with steel marking plates. The last are actuated by the keys at the stations, so that one spring strikes on the steel disk at each station for indicating the time, while the springs for marking the stations strike their corresponding numbers consecutively in the customary manner.

Improved Wood Planing Machine.

John H. Russell, Milwaukee, Wis.—This is an improved system of springs for attachment to planer and stickers, to enable rake heads with tapering or arched backs and other different shaped pieces of wood to be planed upon three or four sides at a time, and which will hold the wood to be planed firmly in place while being operated upon.

Improved Rotary Steam Engine.

William Haab, New York city.—The shafts attached to a piston plate enclosed between the two parts of a cylinder, to which the piston is secured. The abutment is given a horizontal reciprocating motion by the exhaust steam, and is fixed to one leg of a gate. On the other leg is a piston, which works in a small straight cylinder, which cylinder is connected with the main cylinder. The abutment plays back and forth in a chamber. A supplementary exhaust tube is connected with the cylinder and is for the purpose of exhausting any steam that may remain between the piston and the abutment after the piston has passed the exhaust cylinder. A spiral spring on this tube throws the abutment and the small piston back, the former into the cylinder and the latter to the cylinder, at each revolution of the main piston. The steam is admitted through the tube, in which is a rotating steam valve, which is alternately closed and opened by tappets on the shaft striking an arm attached to the valve stem.

Improved Liquid Compound for Burnishing Leather Goods.

James Clausen, New York city.—This compound is prepared of ground nutgalls and extract of logwood boiled in water, Castile soap, and glycerine. A few drops of the liquid are mixed with the common ink used for burnishing and finishing leather goods, the ink becoming thereby of superior blacking quality.

Improved Molding Machine.

Otto Meyer, Kansas City, Mo.—This invention consists of a barre saw mounted on rollers, which are in adjustable supports adapted for shifting readily to suit saws of different sizes for sawing different curves. There is an adjustable work-holding table for presenting the work to the saw, by which it is designed to saw moldings to shape with less waste of time than attends the present mode of sticking moldings. The idea is to saw out whole strips in making grooves, and in cutting out corners and the like that may be used for window stops, beads, and the like, which are now cut into shavings.