

Illumination of Lighthouses.

M. E. Allard, engineer-in-chief of the Administration of Lighthouses, has lately brought before the Paris Academy of Sciences some papers on the illuminating power of the flames employed for illumination, their transparency, and the translucency of the atmosphere. The first paper treated on the transparency of flames. The burners used in lighthouses have diameters of from 1 to 5 inches, and carry from 1 to 6 concentric wicks. In measuring the luminous intensity of the flames which they produce, it is found that these intensities increase a little less rapidly than the consumption of oil, and also that the intensity for each $\frac{1}{4}$ of a square inch of apparent surface increases, while, on the contrary, the intensity for each $\frac{1}{16}$ of a cubic inch of volume diminishes in direct proportion to the diameter. These results can only be explained by admitting that the transparency of the flame is not absolute.

This is the object of the first investigation made by M. Allard; he has determined the co-efficient of this transparency by three series of experiments: by measuring the intensity of different flames with a flat wick looked at sidewise or edgewise; by means of a curved mirror, which reflects towards the focus the rays which it receives, and thus causes them to pass through the flame; and by measuring the intensity of an electric light across a flame of large diameter. These investigations have led to the adoption of the number 0.8, as a mean value of this co-efficient reduced to a thickness of 0.39 inch in the flame passed through. One important conclusion is arrived at, namely, that the total quantity of light produced, or the absolute intensity, increases much more rapidly than the weight of oil consumed; but as the quantity of light absorbed, by the passage of the rays across the flame itself, increases in a still greater proportion, the difference between these two quantities, or the effective intensity, follows a law of augmentation a little less rapid than the consumption of oil.

M. Allard was next engaged on the translucency of the atmosphere. The observations made by lighthouse keepers on the visibility of neighboring lights consisted in noticing, three times each night, whether each of the lights could or could not be perceived, so that it might be ascertained, at the end of a certain number of years, how many times out of a hundred each of these lights was visible. A diagram showed, for each of the lights noticed, what is the limit of translucency in which it ceases to be perceived from the place of observation.

In another paper M. Allard has studied the impressions produced on the organ of sight by flashing lights. It appears that, by causing a series of flashes to be succeeded by equal intervals of darkness, each flash at moderate speed produces the same effects as if in an isolated state; in proportion as the speed increases, the impression on the retina is prolonged, and after a certain speed the effect is that of a constant light

Volatilized Gold.

General Howston lately donated to the Microscopical Society of San Francisco a slide mounted with volatilized gold, which, under a $\frac{3}{8}$ objective, opaque, was not only a beautiful but instructive object. The microscopic globules were perfect in shape, and were obtained at some distance from the melting pot, from which they had been thrown off by the draft and heat in a volatile form, so to speak, and condensed in the air in the form of minute shot, forming a veritable shower of golden rain. With all the care and appliances for the prevention of wastage in smelting or refining gold, a portion is lost in this way; and no doubt the roofs of the houses adjacent to mints and refineries would yield enough of the precious metal to show the color, at least, under the microscope.

Hiring Horses.

It has been decided, says the *Turf, Field, and Farm*, that when a horse or carriage is let out for hire, for the purpose of performing a particular journey, the party letting warrants the horse and carriage fit and competent for such journey. If the hirer treats the horse or carriage as any prudent man would do, he is not answerable for any damage either may receive. But he must use the horse for the purpose for which he hired him. For instance, a horse hired for saddle must not be used in harness. If the hirer violates this express condition of the contract, he is liable for any damage that may occur. If the horse is stolen through the hirer's negligence, such as leaving the stable door open all night, he must answer for it. But if he is robbed of it by highwaymen, when traveling the usual road at usual hours, he cannot be held for damages. As these questions are frequently in dispute, it is not out of place to shed a little light upon them.

Comparative Photographs of Blood.

The *American Naturalist* states that Dr. J. G. Richardson, for the sake of illustrating in criminal cases the distinguishable appearances of different kinds of blood, has flowed drops of blood from different animals so nearly in contact on the glass slide that portions of the two drops appear in the same field, and can be photographed together. Dr. C. Leo Mees has modified this method, and obtained exquisite results in specimens presented to the microscopical section of the Tyndall Association. He spreads the blood by Dr. Christopher Johnston's method, which is to touch a drop of blood to the accurately ground edge of a slide, and then draw it gently across the face of another slide, leaving a beautifully spread film. In this way one kind of blood is spread upon the slide and another on the cover. When dry, one half of each is carefully scraped off with a smoothly sharpened knife, and the cover inverted upon the slide in such posi-

tion as to bring the remaining portions of the film into apposition. Under the microscope and in the photograph the two kinds of blood appear in remarkably fine contrast, even those bloods that are too nearly alike for safe discrimination in criminal cases being easily distinguished when thus prepared from fresh material.

Musical Sand.

Mr. Frink states in the "Proceedings of the California Academy of Sciences," that, in order to ascertain, if possible, "the cause of the sound that is produced by the sand from Kauai, presented to the Academy at a former meeting, I investigated its structure under the microscope, and I think the facts I have ascertained fully explain the manner in which the sound is produced. As the grains of sand, although small, are quite opaque, it was necessary to prepare them so that they should be sufficiently transparent to render their structure visible. This was effected by fastening them to a glass slide and grinding them down until one flat surface was obtained. This surface was then attached to another slide; and the original slide being removed, the sand was again ground down until sufficiently transparent. The grains were found to be chiefly composed of small portions of coral and apparently calcareous sponges, and presented under the microscope a most interesting object. They were all more or less perforated with small holes, in some instances forming tubes, but mostly terminating in blind cavities, which were frequently enlarged in the interior of the grains, communicating with the surface by a small opening.

A few *foraminifera* were also met with, and two or three specimens of what appeared to be a minute bivalve shell. Besides these elements, evidently derived from living beings, the sand contained small black particles, which the microscope showed to be formed principally of crystals of augite, nepheline, and magnetic oxide of iron, imbedded in a glassy matrix. These were undoubtedly volcanic sands. The structure of these grains, I think, explains the reason why sound is emitted when they are set in motion. The friction against each other causes vibrations in their substance, and consequently in the sides of the cavities they contain; and these vibrations being communicated to the air in the cavities, under the most favorable conditions for producing sound, the result is the loud noise which is caused when any large mass of sand is set in motion. We have, in fact, millions upon millions of resonant cavities, each giving out sound which may well swell up to resemble a peal of thunder, with which it has been compared; and the comparison—I know from others who have heard it—is not exaggerated. The effect of rain in preventing the sound is owing to the cavities in the sand becoming filled with water, and thus rendered incapable of originating vibrations."

Another Opportunity for Inventors.

An interesting competition is about to be opened by the German society *Verein von Gas and Wasser Fachmännern Deutschlands*, which offers a prize of \$400 to the author of the process for the economical purification, from carbonic acid, of illuminating gas obtained from coal. The systems now commonly employed involve either hydrate of lime, certain salts, muriate of manganese for example, and iron oxides. Whether these methods leave more or less to be desired according to the nature of the coal distilled, or whether the forms of purifiers are imperfect, it is nevertheless certain that carbonic acid still remains present in illuminating gas, and its presence is decidedly unhealthy. Either a new system for its complete removal, or an effective improvement on the older processes, is required. The invention must be economical, easy of manipulation, and must not lower the illuminating power of the gas. The memoir describing it must be complete, and explain both the theory and the practice. Manuscripts must be signed with some distinctive device, which is to correspond with a similar mark on a sealed packet in which is written the name and address of the author. Communications are to be addressed to the president of the commission, Dr. Schilling, at Munich, prior to December 31, 1876.

Microscopic Ruled Test Plates.

"The finest lines I have succeeded in ruling are about $\frac{1}{100000}$ of an inch in width. These values are substantially the same as those given by Dr. Royston-Pigott, as representing the ultimate limit of visibility under the microscope. The smallest angle at which an object can be distinctly seen is stated by him to be 6', while other writers place it as high as 60', or even 120'. Even the smallest value named is much too large. I will at any time undertake to rule a single line, $\frac{1}{300000}$ of an inch in breadth, which can be seen at the distance of seven inches from the eye. This corresponds to an angle of about 1'. In this case the line is filled with plumbago; but if reflected from a silvered surface, it can be easily seen at the distance of eleven inches from the eye. Comparing minute particles of matter which can be seen under a Tolles' $\frac{1}{10}$ objective with those which can be measured, in the way indicated above, there is every reason to suppose that the limit of visibility falls beyond $\frac{1}{400000}$ of an inch. It is quite possible that the conclusion reached by Sorby, that the microscope has already reached the limit of its power in separating lines whose distance apart is equal to one half of a wave length, may be found to be justified by future observations. It is certain that no lines beyond Nobe's 19th band have ever been resolved. The great difficulty in distinguishing true from spurious lines has caused more than one skillful microscopist to doubt whether the resolution has been certainly carried as far as that point. But that light is 'of too coarse a nature' to

enable us to see particles of matter, as small as $\frac{1}{200000}$ of an inch, is a conclusion which can be refuted without the slightest difficulty."—*William A. Rogers.*

VENTILATION OF RAILWAY TUNNELS.—Mr. G. J. Morison says that, when tunnels without shafts are to be ventilated, fans should be employed to keep up an artificial ventilation; that for a given amount of traffic the power required to ventilate long tunnels varies as the fourth power of the length; that when a long tunnel is to be ventilated it is more advantageous to have a double line tunnel with trains in each direction than two single line tunnels with trains in one direction only; that for every tunnel there is a limit to the amount of traffic, where locomotives are used, beyond which ventilation becomes impossible: this limit cannot be very definitely fixed, but for a tunnel of twenty-two miles it does not exceed a total of twenty trains a day.

Inventions Patented in England by Americans.

(Compiled from the Commissioners of Patents' Journal.)

From July 4 to July 28, 1876, inclusive.

ACOUSTIC TELEGRAPH.—T. A. Edison, Menlo Park, N. J.
 AXLE BOX AND OILER.—J. N. Smith, Jersey City, N. J.
 BATTERY.—J. Byrde, Brooklyn, N. Y.
 BOILER.—V. D. Anderson, Washington, D. C.
 BOTTLE STOPPER, ETC.—S. S. Newton, Binghamton, N. Y.
 CARTRIDGE PRIMER, ETC.—E. Remington & Sons, Ithaca, N. Y.
 CLEANING BOLT CLOTHS.—L. V. Rathbun, East Pembroke, N. Y.
 CLEANING COTTON, ETC.—R. Kitson, Lowell, Mass.
 COPYING PRESS.—W. B. Sargent, New York city, et al.
 DRIVING CHAIN.—W. D. Ewart, Chicago, Ill.
 ENVELOPE MACHINE.—M. S. Chapman, Hartford, Conn.
 FLUID METER.—W. Smith, San Francisco, Cal.
 FOLDING PAPER.—S. D. Tucker, New York city.
 LANTERN, ETC.—J. E. Folk, Brooklyn, N. Y.
 LUBRICATOR.—T. F. Stevenson, New York city.
 OIL STOVE.—E. B. Cox, New York city.
 OIL STOVE.—O. Edwards, Northampton, Mass.
 PAPER-CUTTING MACHINE.—E. Schlenker, Buffalo, N. Y.
 PAPER MATERIAL.—W. F. Nast (of New York city), London, England.
 PENCIL SHARPENER.—J. Herts, New York city.
 PIN PACKAGES, ETC.—G. C. Hoadley, New Haven, Conn.
 PREPARING CHINA GRASS, ETC.—J. B. Vogel et al., New York city.
 PROJECTILE.—B. B. Hotchkiss, Paris, France.
 SCOURING LEATHER, ETC.—F. A. Lockwood, Fall River, Mass.
 SHARPENING SAWS.—W. L. Covel, Providence, R. I.
 SPINNING MACHINERY.—T. Mayor, Providence, R. I.
 STEAM GENERATOR.—D. Renshaw, Cohasset, Mass.
 TRANSMITTING POWER.—J. Good, Brooklyn, N. Y.
 WASHING BARRELS, ETC.—G. Schock, New York city.
 WATCH ESCAPEMENT.—F. H. Voigt, Buffalo, N. Y.
 WATCH KEY.—J. S. Birch, New York city.
 WRINGER ROLLER.—G. P. Clark, Windsor Locks, Conn.

Recent American and Foreign Patents.**NEW CHEMICAL AND MISCELLANEOUS INVENTIONS.****IMPROVED RELEASING DEVICE FOR STABLES.**

Arthur Chapman, Doylestown, Pa.—This invention consists of a longitudinal rod that extends along the manger of the stalls, and is hinged thereto, having slightly curved fingers or hooks, that retain rings, to which the cattle are fastened. A crank attached to the rod at the outside of the building operates the rod, and releases all the rings when turning the same.

IMPROVED SNAP HOOK.

Newton E. Cissna, Sioux Falls, Dakota Ter.—This is an improved snap hook for connecting the various straps, rings, and other parts of a harness, by which the straps may be readily taken out and inserted, and securely and reliably retained therein. When the tongue is swung in outward direction to be at right angles with the hook, the strap, ring, or other article is introduced, and by carrying the tongue back on the hook, firmly retained therein. The draft on the tongue causes the closing of the same, and secures the locking of the snap hook.

IMPROVED STREET LAMP.

John S. Woods, Brookline, Mass.—This consists of a duplex reflecting lamp, in which an oil holder is located between two burners, both of which are supplied from it, and it serves for the support of reflectors for the burners, to throw the light in opposite directions along a street.

IMPROVED GALVANIZING MACHINE.

George R. Acheson, Philadelphia, Pa.—This invention consists of a machine with rollers for tightening the wire cloth while passing through the galvanizing or painting liquid. Suitable skimmers and beaters are arranged in connection with the cloth at both sides of the same, to secure the regular tinning or painting. A sectional and diagonally jointed winding-up roller serves for being readily taken out of the cloth.

IMPROVED PHOTOGRAPHIC PICTURE CASE.

Thomas F. Adams, New York city.—This is a case with hinged door, to which the frame-carrying board is hinged, to be opened and closed with the door, and locked into open position by suitable spring bolts. The supporting board carries a number of photographic frames, so hinged to intermediate pieces that any one may be readily swung to either side for the inspection of the photographs.

IMPROVED LIME KILN.

Daniel G. Farrell and Andrew T. Lien, Mason City, Iowa, assignors to Farrell, White, & Lien, same place.—The object here is to afford a better application of the fire to the limestone than in kilns constructed in the usual way; to make the kiln airtight, even should it crack; to avoid the use of heavy timber and rods for tying the kiln; to cause the lime to drop evenly to the center of the draw; to avoid the necessity of drawing the lime while at a white or red heat, and to enable the lime to be dropped readily and surely. The invention consists in providing the kiln with a case and filling the space between them with clay, to render the kiln airtight, even in case it should crack in consequence of the effect of excessive heat. The invention further relates to a device for dislodging the lime and causing it to drop into the hopper.

IMPROVED LATTICE PIERS FOR TIMBER TRUSS BRIDGES.

Lewis Scott, Brighton, Mich.—In this invention two sets of posts are so arranged in a truss bridge that they will incline in opposite directions, and be located on opposite sides of the girts. They are all sustained upon a common base, that is thus connected with a superposed beam, so as to form a re-inforcement brace or support to each other. This has the effect of dividing and evenly distributing the weight or strain along the whole length of the foundation or base.

IMPROVED BRIDLE BIT ATTACHMENT.

Thomas M. Allen, Augusta, Ky.—This is an improved attachment bridle bit for driving hard-mouthed horses with great facility; and it consists of the driving lines being passed through a small pulley at the end of the bridle bit, and back through a loop in the saddle, and then downward to the shaft.

IMPROVED COMBINED PUTTY KNIFE AND SCREW DRIVER.

Charles Collins Bartlett, Medford, Mass.—This consists in combining a putty knife and screw driver in one implement, securing the sliding and spring-acted screw driver to the handle when not in use.

IMPROVED DENTAL FLASK.

William E. Buckman, Easton, Pa.—This is an improved dental flask, which shall be so constructed that it may be readily emptied of the plaster without danger of breaking the teeth. By suitable construction, after the molding or hardening of the celluloid or other material has been completed, the few taps required to separate the parts of the flask crack the plaster in such a way that it falls away from the teeth without danger of breaking them, so that the plaster and teeth are readily removed from the flask and separated from each other.

IMPROVED THIMBLE.

Gilbert H. Finger, New York city.—This invention consists in a thimble made with a concave top, and with concave surfaces, one or more, upon its sides. The tops are made thicker than the sides. The object is to prevent the eye of the needle, while being used, from slipping from the thimble and injuring the fingers of the operator.

IMPROVED SOAP RE-MELTER.

Daniel Whitaker, Boston, Mass.—The object of this invention is to provide a vessel for re-melting the scraps or fillings of soap produced by the cutting up of the soap into bars while in the soap frames, whereby the said scraps are utilized by being re-embodied into a solid homogeneous mass, without burning or decomposing. It consists mainly in constructing a pot or cauldron with an open bottom adapted to be closed by a door or cut-off, and providing the interior with steam coils and a diaphragm of woven wire. The said vessels are heated by steam admitted through the steam coils, and also by a steam jacket; and as the scraps of soap are thrown into the vessel, their lodgment upon the coils and the woven wire diaphragm maintains them in suspension in a uniform steam heat until they are melted; and as soon as melted, they drop through the coils and woven wire out through the open bottom before the soap has time to decompose.

IMPROVED FEATHER RENOVATOR.

William M. Shelton, Williamsburgh, Mo.—This invention is an improvement upon the feather renovator constituting the subject of letters patent No. 108,161, and relates chiefly to a roll mounted upon a hollow perforated shaft, which is open at one end to adapt it to receive a perforated tube. Steam is admitted to the renovating chamber through the shaft and tube; but when the latter is adjusted in a certain position, the steam is prevented passing into said chamber and caused to pass into the hollow casing of the same, for heating it and thus drying the feathers.

APPARATUS FOR THE MANUFACTURE OF SULPHUROUS ACID.

William Maynard, New York city.—This invention relates to certain improvements in apparatus for hydrating gases, and it consists in the particular construction and arrangement of the condenser or chamber in which is effected the absorption of the gas by the water; the said chamber being provided with an inlet for the water above and an inlet for the gas below, and fitted interiorly with alternating inclined imperforate shelves, which are provided with ledges or cleats at their lower ends that dam up the water upon the shelves for the absorption of the gas, which water gradually weeps or trickles over the edge of the cleats from one to the other of the shelves. These ledges or cleats are also notched and sawn down to form slits or scores, which permit the draining of the shelves when the apparatus is not in operation.

NEW HOUSEHOLD INVENTIONS.

IMPROVED WASHING MACHINE.

James J. Daly, Bloomington, Ill.—This invention consists in placing in a wash box, between two inclined parallel arms, two wash boards with their ridged surfaces facing each other. The projecting ends of the arms are provided with slots in which projections on the upper wash board travel, thus giving the latter a reciprocating motion. The lower wash board is pivoted between short arms, which themselves pivot at their lower end in the inclined parallel arms, their upper arms being connected by a transverse rail. Immediately below the wash boards is a grooved roller, which has its bearings in the two inclined arms, and is provided with ratcheted ends, which are moved by pawls pivoted to the upper wash board. Motion is imparted to the machine by a crank handle or otherwise.

IMPROVED DRY YEAST COMPOUND.

Charles W. Gschwind, Egg Harbor City, N. J.—This consists of boiled hops, scalded wheat flour, malt, sugar, ginger, rice flour, and middlings. It is well adapted for bread making.

IMPROVED STOVE COVERING.

Andrew J. Vandeventer, Martinsburg, Mo., assignor to himself and Archibald M. Vandeventer, same place.—The object of this invention is to improve the construction of the cook room refrigerator for which letters patent were granted to P. D. Vandeventer, November 8, 1870, to enable the cooking to be done with less fuel and with a more uniform heat. It consists in doors made in two parts, and with their adjacent edges overlapping each other, and at such a distance apart as to leave spaces between them for the entrance of cold air.

IMPROVED CLOTHES DRYER.

David J. Clark, East Elma, N. Y.—This consists of a series of horizontal bars, which are connected at their ends by cords, and provided with wires, for the suspension of the clothes beneath the bars. The latter are capable of being folded together or extended, and may be supported upon frames resting on the ground.

IMPROVED STOVE.

Charles R. Sipes, Arkansas City, Kan.—This relates to improvements on a class of stoves known as the "Tod" stove, by which the objectionable escape of the smoke in the same, when the doors are opened, may be avoided. There is an additional flue and damper at the highest part to prevent the escape of smoke on opening the door, and a swinging foot rail hinged to the lower part of the stove.

NEW AGRICULTURAL INVENTIONS.

IMPROVED WHEEL CULTIVATOR.

William N. Riddle, Caddo Grove, Texas.—This improved wheel cultivator is so constructed that it may be readily adjusted for use in marking the ground, covering the seed, and cultivating the plants. It is simple in construction and reliable in operation in either capacity.

IMPROVED COTTON CHOPPER.

Theodore C. Burnham, Burnet, Tex.—The essential feature of this improved cotton chopper is a contrivance of choppers on vertical rock shafts, with a cam wheel attached to one of the truck wheels, for closing them, and a spring for opening them, upon the row of plants, for chopping them out.

IMPROVED CHURN.

Sylvanus B. Robison, Allenville, Mo.—This churn may be readily put into place and detached, and the gear wheels may be readily adjusted to take up the wear.

IMPROVED BUTTER TUB.

James E. Higgins, Holland City, Mich.—This is a device for fastening covers to pails, and other similar packages, by means of a jointed hasp attached to the cover, which shuts over a staple in the pail, and a wedge placed between the hasp and cover.

COTTON FEEDER AND CLEANER FOR COTTON GINS.

George F. Colquitt, Bremond, Tex.—This invention has reference to devices for feeding seed cotton to cotton gins, and also for cleaning the same preparatory to ginning; it consists of a hopper having wires extending from side to side over a revolving toothed cylinder and a concave thrasher. It is made to reciprocate on a track by pinions on the ends of the thrasher cylinder, working in double rack bars, one in each side of the hopper, so contrived that the pinions run them over one way and under the other, making a simple and cheap mode of obtaining the motion.

IMPROVED GRAIN SEPARATOR.

William Holladay, Blairstown, Iowa.—This invention consists of contrivances for separating the light coarse matters, and also the dust, before the grain goes on to the sieves, and conducting them away in a tube out of the room containing the mill. By separating the straw, etc., before coming to the sieves, the capacity of the mill is greatly increased, in consequence of the sieves not being choked by such matters. The blast can be wholly turned on either device, or partly on both; there is a contrivance whereby a blast may be applied, by suction, to the grain as it passes off from the screen for separating light grain and like matters, not separated by the mill proper.

IMPROVED GRAIN ELEVATOR FOR HARVESTERS.

Ebenezer McFadden, Sparta, Ill.—This is a contrivance of the teeth, the apron, and the rollers which work the apron, for allowing the teeth to swing back automatically to pass the trough into which the grain falls, and in like manner take the required position for taking up the grain.

IMPROVED SULKY PLOW.

John W. Grimes, Appleton City, Mo.—This invention is an improvement in the class of sulky plows in which the plow proper is suspended from the wheeled frame in such a manner as adapts it to be raised and lowered at will, for the purpose of changing the depth of furrow, or for holding the plow entirely off the ground while being transported from one place to another. The improvement relates particularly to the construction and arrangement of parts, whereby the plow beam is held steadily while in use, adapted to be raised and lowered bodily, by means of a single lever, while in operation, and without changing the horizontal position or angle of the plow beam, and whereby the draft is applied in a direct line with the plow beam, whatever be its adjustment.

IMPROVED REAPER.

Solomon Rawson, Scott Thacher, and Isaac Rawson, Hornellsville, N. Y.—This invention relates to certain improvements in reapers for harvesting grain, and it consists mainly in making the platform and sickle-driving mechanism together, adjustable on the main frame, in raising and lowering the sickle, by pivoting the tongue to the main frame, just below the bearing or the main drive wheel, whereby the sickle and its driving mechanism are geared directly together without the intervention of a joint, and whereby also the draft is more in a line with the sickle. It also consists in the construction and arrangement of the devices for connecting and disengaging the sickle from its driving mechanism, and in the means employed for regulating the motion of the rake arms.

FERTILIZER DISTRIBUTER ATTACHMENT TO SEED DRILLS.

Lyman W. Shepard, Arcola, Va.—The invention relates to an improvement in the class of fertilizer distributors in which the material is fed through openings in the bottom of the hopper, by means of auger-shaped or spiral twist shafts. The improvement consists in the application of radial or curved arms to the feed shafts for the purpose of stirring or agitating the fertilizer and drawing it toward the feeders.

IMPROVED HORSE HAY RAKE.

Amos W. Coats, Alliance, Ohio.—This invention relates to certain improvements in horse hay rakes, and it consists in a cheap, simple, practical, and durable means of attaching a clearer for cleaning the rake teeth when elevated, the said clearer being held rigidly in an elevated position above the rake teeth upon supporting bars, projecting rearwardly from the driver's seat, and forming a part of the support for the same.

NEW MECHANICAL AND ENGINEERING INVENTIONS.

IMPROVED GLOVE TREE.

John B. Stevens, Littleton, N. H., assignor to Nelson Parker, of same place.—This invention is a glove tree, made double or in duplicate, the wrist portions of the two different sized parts being joined together, so that the fingers project in opposite directions. The tree is made in sections, and a spring is placed between them to make the tree expandible and compressible. The invention also includes a sliding clamp for holding gloves while being drawn on the tree. For holding the glove on the table on bench, for inserting the tree, a vertically sliding hook plate is hooked into the mouth of the glove to clamp it on the bench, together with a foot treadle for pressing it down, and a spring for raising it.

IMPROVED MOTIVE POWER.

Adam Graner, New Orleans, La.—This invention consists in combining a drive shaft, counter shaft, and saw shaft, the latter provided with a roll arranged thereunder. The crank for turning the driving shaft, by hand, has a handle to which is attached a connecting rod, which, at the lower end, connects with a foot treadle, so that the operator may work with both. It is also proposed to apply these drivers to both ends of the driving shaft in practice.

IMPROVED WATER CUT-OFF.

Charles O. Wilson, Cincinnati, O.—This consists of a cap in combination with a crank, so applied to the cut-off pipe as to bring the mouth of the pipe squarely over the outlet, and make the communication and non-communication with the outlet perfect.

IMPROVED BARBED FENCE WIRE.

George W. Allen, Creston, Ill.—This is an improved barb for wire fences, so constructed and applied to the fence wire that it will keep its place firmly and securely, and will not slip or turn. It consists in a fence barb formed of two short pieces of wire placed parallel with each other upon the opposite sides of, and at right angles with, the fence wire, and having their end parts twisted together, leaving their points projecting.

IMPROVED RAILROAD TRACK LIFTING MACHINE.

Robert Aldred, Glencoe, Ontario, Canada.—This machine consists of a truck adapted to run on the rails, and having clamping jaws or hooks, with which the rails may be seized and raised by levers suitably arranged for the purpose. The entire apparatus is simple, and apparently effective for the purpose.

IMPROVED DISCHARGING CAR.

James W. McDonald, Campbellton, New Brunswick.—This invention relates to a novel construction of cars, designed for distributing gravel and broken stone upon railroads for the purpose of ballasting the same while under process of construction. It consists in a car provided with a supplemental frame, carrying polygonal rollers at the ends, around which passes a continuous, endless belt of sheet or plate iron, which forms the upper surface of the car. This belt is provided with a detachable connection with the running gear of the car, by means of which it is set in motion at the proper time, and the supported load is evenly distributed at the end, a second endless belt being arranged at the end transversely to the car, and inclined to the earth so as to receive the gravel and stone and carry it from its own gravity to one side of the track whenever it is desired to fill in the road bed upon the side.

IMPROVED APPARATUS FOR CONDENSING STEAM.

William Walker, Manchester, England.—This invention is embodied in a cylinder or vessel having a valve for regulating the admission of water, a flexible (rubber) button, or diaphragm, a water supply pipe at the top, a stationary perforated spray plate, a water ejection orifice near the bottom, and a steam induction orifice directly beneath the spray plate. The amount of water admitted to condense the steam, by spraying through the perforated plate, is controlled by the valve whose rod is attached to the flexible diaphragm, and hence rises or falls as the latter is caused to bulge in or out. The object of the latter is to prevent the vessel being completely filled with water when the pump is running at either high or low speed, as the case may be, so as to ensure a vacuum in the vessel, which may be supplied by the exhaust steam.

IMPROVED MACHINE FOR TWISTING HAY FOR FUEL.

James S. Foster, Yankton, Dakota Ter.—This invention is an improvement upon that for which letters patent, No. 180,218, have been granted. It relates chiefly to the combination of a rotating hook, a sliding extensible frame, carrying the fixed or non-rotating head, and devices for locking said extensible frame and the rotating head when required in the operation of the machine. The machine forms a double twist of the hay or straw, which is compact and hard, so that it constitutes a good article of fuel, and is particularly serviceable as such in districts where wood and coal are scarce and dear.

RAISING AND LOWERING PROPELLERS.

Benjamin Mitchell, Hancock, Md.—This invention relates to means for raising and lowering the propellers of canal boats, so as to cause them to work equally well whether the boat is loaded or not. The invention consists in a propeller shaft supported in side plates and raised by adjustable hangers; in an auxiliary plate at the outer bearing, that moves with the bearing plate so as always to cover the slot in the latter and prevent the ingress of water. It also consists in a plate that simultaneously slides and revolves to close the slot in the fixed plate, in which the inner bearing moves, the pinion being adapted to be operated by the same drive wheel, in whatever position it may be placed.

IMPROVED MACHINE FOR BOTTLING AERATED WATERS.

George Wenker, St. Joseph, Mo.—This is an improved machine or pump for manufacture of soda and mineral waters, by which the exact quantity of sirup to be used in bottling may be measured for each bottle. It consists of a barrel with adjustable piston and valve, in connection, with a three-way cock for the sirup and aerated water pipes, and a swinging handle lever that opens and shuts the bottle.

MACHINE FOR TWISTING HAY AND STRAW FOR FUEL.

James S. Foster, Yankton, Dakota Ter.—In using the machine, a handful of hay or straw is placed in a box and its ends are secured to the heads by clamps. The crank is then turned; and as the hay and straw is twisted, its contraction draws one head and frame inward. The movable half of the box is folded over upon the stationary half, doubling the twisted hay, which is afterward allowed to twist itself into a wisp.

IMPROVED ELEVATOR.

Thomas K. Austin, New York city.—This consists in the arrangement of elevators working on guides in wells or shafts, provided at the front and rear of the building. The said elevators are connected above and below by ropes or chains, in such a manner that they may counterbalance each other, and are each provided with gearing, which can be operated by one or more persons on the elevator, to raise or lower it, as may be desired.

IMPROVED GATE LATCH.

Cirby J. Wallis, Troy Station, Tenn.—The latch has a curved rear arm, which is extended to a suitable length beyond the pivot to give the required weight for producing automatic locking. When the latch is applied to doors that are to be opened from both sides, knobs are arranged in connection with a lever that serves to raise the latch by turning either knob.

IMPROVED WEIGHING SCALE.

Hosea Willard, Vergennes, Vt.—The object of this invention is to contrive a lever and beam scale in a simple way that will allow of being suspended for use, and at the same time will be efficient in operation. The weight hook pivot is connected adjustably to the beam lever, and provided with a shifting screw to set the scale for net or gross weight. And there are other ingenious devices well suited to the ends in view.

MACHINE FOR SHAPING GRAIN CRADLE FINGERS.

Andrew Denney, Beverly, O.—This consists of a disk having a groove in the face, corresponding in form to one half the cross section of the finger, with a number of radial notches, in each of which is a cutter having a notch of corresponding form. The cutters are bolted to lugs of the disk projecting from its sides. The disk is made to revolve against the blank, which is first dressed on one side and then on the other.

IMPROVED TIME LOCK.

John B. Overmyer and James A. Huston, New Lexington, O.—This consists of a time piece having a screw connected with one of the posts of the time mechanism, to be turned thereby. On the screw is a nut, which is made to operate the releaser, which lifts the stop from behind the bolt of the lock, the screw being geared to the time piece by friction devices, and having a thumb disk to facilitate the setting of the nut. A graduated scale is arranged in connection with the nut, by which to set it to release the bolt in any predetermined length of time.

IMPROVED CAR COUPLING.

Hiram Pitcher, Fond du Lac, Wis.—This consists of a double coupling hook, that is hinged to the drawbar and united at the front part, to lock over the side extensions of the drawbar to be coupled. The double hooks are raised or lowered by rods extending to the top or side of the car.