

THE WATCH—ITS INVENTION AND HISTORY.

Having given in previous numbers a history of the invention and introduction of watches, we propose to add a little information on the subject of their manufacture, which we think will interest our readers.

In the earlier stages of their history watches were commenced and finished by the same man, who took upon himself the making of each piece of the watch, from the case to the smallest screw or pin, by which system each watch is said to have taken about a year to complete, and cost something like \$1,500; but in the course of time the manufacture became more systematized, and regular factories for established. The watch business is said to have been started in Switzerland by the Protestants who were driven out of France into that country, and notably by Charles Cusin, of Autun, in Burgundy, from which beginning it has spread until it is said that as many as 40,000 men and women out of the 250,000 souls that form the population of the cantons Neuchâtel and Geneva, and of the French-speaking part of the canton of Berne, are engaged in the industry, and turn out about 40 watches each on the average per year, making in all about 16,000,000 watches annually, of which, previously and up to 1873, an average of over 300,000 were exported to this country. Since that time, however, the importation has gradually decreased, until it is estimated that only 75,000 were imported last year. A part of this decrease is no doubt owing to the depression of business, but more is due to the increased demand for the home made article, the manufacture of which is constantly increasing.

Although the Swiss make the largest number of watches, it is said that the English were the first successful manufacturers, and watches of their make have a first-class reputation, but the numbers made by them are comparatively small. Many watches bearing English names are made in Switzerland, and others have most of their parts made there on account of the cheapness of labor. So disastrous has been the competition of the Swiss to the English workmen that it is stated in their trade journal that three fourths of their tools are now in pawn.

The French are also large manufacturers of watches, making some 500,000 per year, the most of which are for home consumption, although some of them are exported. Most of the French watches are made at Besançon, where the manufacture was started by a colony of Swiss from Neuchâtel. Many watches supposed to be French are really Swiss.

The successful manufacture of watches in this country is comparatively of recent date, although sporadic attempts were made as far back as 1812, but all failed; and it was not until the Boston Watch Company, with a capital of \$100,000, was started by Messrs. Dennison & Howard in 1850, that anything like success was attained. These gentlemen erected a factory in Roxbury, which site being found unsuitable on account of the dust, their operations were transferred to Waltham in 1854, but after overcoming many difficulties the company failed in 1856. The factory, machines, etc., were bought by Mr. Robbins, who in 1857 started the American Watch Company with a capital of \$200,000, which was increased to \$300,000 shortly after. As their trade increased their capital and facilities were increased, until they now wield a capital of \$1,500,000, have 800 employees—half of either sex—and produce about 400 movements and 200 cases per day of ten hours.

Previous to the organization of the American Watch Company all watches were made by hand with the ordinary watchmaker's lathes, wheel cutters, etc.; but this company introduced the system of making every part by machinery especially constructed for the purpose, which imparts to every piece an accuracy far beyond that attainable by the most skillful hand labor, nothing being left to the eye or hand of the artisan. After the manufacture each piece is separately and repeatedly gauged by instruments, some of which can measure the seventeenth thousandth part of an inch. Each piece is thus capable of replacing the corresponding part of any other similar watch without fitting, or it may be replaced by another similar piece direct from the workman's hand with the surety that it will fit and work correctly; and a perfect watch may be formed by simply taking up the proper pieces at hap-hazard from the stock and "assembling" them together. To make a complete watch on this principle, it is said that over a thousand processes are required, and that the escape wheel alone requires 84 operations to form its teeth. As an instance of the extreme accuracy of the machinery employed, we may state that the cutters used in making the wheels are all shaped by separate machines, which must make the cutters of the proper shape required for the wheel they are intended to operate on.

To simplify the watch as much as possible the American Watch Company resolved to abolish the use of the chain and fusee, thus decreasing the number of pieces in a watch about 640, so that their watches have only about 160 pieces instead of 800, as have most of the English watches. As the chain and fusee, since the introduction of the hair spring and improved escapement, have been of little or no real use, being retained simply by the conservative habits of watchmakers, this change was not only no detriment to the watch as a timekeeper, but it lessened its cost considerably and correspondingly reduced the liability of derangement. By this innovation in the construction of the watch and their system of manufacturing, they not only produce a comparatively cheap watch, but also make an accurate one. Mr. Favre Perret, a Swiss member of the jury on watches at the

Centennial Exhibition, took at random from the company's safe one their watches of the fifth grade, and exhibited it to one of the first "adjusters" in Switzerland, who after thoroughly examining it, declared "one would not find one such in fifty thousand of our (the Swiss) manufacture." Such is the perfection of their manufacture that their watches are now being exported in large numbers to Europe, some 20,000 per year being sent to England alone.

The American Watch Company, however, are not alone in the manufacture of watches in this country, as our readers are probably aware, there being an offshoot from this company at Elgin, Ill., which started in 1864, and after many enlargements of their establishment to keep pace with the demands of the trade, find themselves with a corps of employees numbering over 700, all of which are employed on movements alone, and yet are unable to supply the demand for their goods, notwithstanding the hard times and that they are working twelve hours per day. They are said to be so far behind their orders at the present time that their English and Russian agencies are idle for want of materials to supply their customers. This success has been attained, let it be remembered, in a section of the country that most people would consider as good ground for raising corn or pork, but without the right class of population for making fine machinery, to say nothing of such delicate articles as watches; so that the company had not only to build their machinery for their factory but to educate their employees to their business also.

In addition to the above companies, there are several others who manufacture watches in different parts of the country, at Boston, Philadelphia, Springfield, Mass., and Springfield, Ill.—in all about twelve, we believe. There is another one stated to be starting somewhere in New England, which will make a new style of watch, containing fewer works than the ordinary one; and these are set around the center and driven by a mainspring beneath them. By means of a toothed rim around the inside of the case, all the works are made to perform a complete rotation around the center of the watch—aside from their own proper motions—completing the performance once in every two hours. Any irregularity due from the difference of weight of any of its parts is said to be thus wholly compensated, no matter what may be the position in which the watch is carried, since in any and all positions the center of gravity of the movement for any two hours as a whole will be uniform. There is also a large factory at Marion, N. J., but we believe it is not now in operation, the company owning it having failed some time since.

A patent has recently been granted for a watch with its works so arranged in the case that, no matter whether it is hung up so as to have the pendant in a vertical position or set inclined in the vest pocket, the movement will always occupy the same vertical position, by which it is hoped that there will be less liability to variation in its going; but we have heard nothing of its being manufactured to any extent.

Pyroxyline for Photographic and Medicinal Purposes.

For the preparation of soluble gun cotton, or pyroxyline, for making collodion, very many recipes have already been published. According to Godeffroy the following has been recommended as the best of these: Nitrate of potash (salt-peter) 560 parts, sulphuric acid 420 parts, fuming sulphuric acid 420 parts, and cotton free from grease 70 parts.

I have, says Godeffroy, used these proportions repeatedly, and obtained as the result a collodion cotton which was for the greater part soluble in ether, although with a turbidity, which was caused by small particles of unnitrate cotton suspended in the solution, and the collodion was totally unfit for photographic purposes, and could only be employed in surgery after standing a long time to settle. I sought for the cause of this unsatisfactory result in the moisture contained in the saltpeter, hence I dried this in a large mortar, and when cold made the mixture again with no better results. One day when I was in a great hurry I neglected to remove the dish and its contents from the sandbath, and after pouring in the mixed acids, at once threw in the clean cotton. This time I obtained a cotton which dissolved perfectly clear in ether.

My supposition, that warming the dish and the mixture to a certain temperature was essential to obtain satisfactory results, proved to be correct, and from that time on I have always got a perfectly soluble cotton, even when I omitted the fuming sulphuric acid and replaced it by ordinary English sulphuric acid.

I found by experiment that the best temperature for the dish is 56° C. (133° Fah.) and that the acid should act upon the cotton for just seven minutes.

The proportions which I use are 700 parts and 350 parts of nitrate of potash to 35 parts of cotton.

The cotton was freed from grease, as usual, by warming it with a solution of soda (the carbonate) and boiling a short time in water to which had been added a little caustic potash, then thoroughly washed, finally with distilled water. The cotton thus purified and dried again, then well pulled in pieces, is put into the dish and kneaded with a pestle so that it may come into perfect contact with the acid, left there seven minutes, then quickly transferred to a large vessel of hot water, then washed in a stream of cold water until the last trace of the acid reaction had disappeared, and finally washed in distilled water. The cotton is heavily pressed, picked apart, and either dissolved at once or transported wet. If the acid acts longer than the time stated,

the quality of the cotton is not injured, but its coherence is destroyed, which causes loss in washing.

PROFESSOR WOOD'S specimens of lower jaws removed for phosphorous disease, and which were recently sent to the Surgical Congress at Berlin, have attracted a good deal of attention, and have reflected credit upon American surgery.

Recent American and Foreign Patents.**Notice to Patentees.**

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NEW MECHANICAL AND ENGINEERING INVENTIONS.**IMPROVED BAND SAWMILL.**

Jacob R. Hoffman, Fort Wayne, Ind.—The object of this invention is to improve the construction of band sawmills, that the strain of the saw is accomplished, in place of applying a greater weight, by employing the upper saw pulley for the purpose of driving the feed or any other mechanism, giving thereby the saw a higher tension or strain, and rendering the same less liable to "dodge" in going through the log. The friction on the bearings of the upper pulley shaft is thereby reduced, and either the front or back edge of the saw strained at will for forward or backward motion. The feed motion is also improved especially with a view to facilitate the "gigging" back of the log carriage. The straining of the saw by employing the upper saw pulley for that purpose and employing means to strain at will the front or back edge of the saw is an important improvement.

IMPROVED OIL BOX FOR LOCOMOTIVE ENGINE CYLINDERS.

William F. Foster, Fitchburg, Mass.—The object of this invention is to furnish an improved device for oiling the cylinders of locomotive engines, which shall be so constructed as to apply the same amount of oil at each oiling, and which may be operated from the cab of the engine. The invention consists in the combination of a tubular shaft, provided with a crank, tubular arms, and buckets, with the oil box divided into three compartments by two partitions. Oiling the cylinder from the cab of the engine and applying equal amount of oil at each time is an important feature.

IMPROVED ENGRAVING MACHINE.

Augustus E. Ellinwood, Garrettsville, assignor to himself and Robert Irwin, of same place, and W. W. Harris, Cleveland, O.—This invention relates to that class of engraving machines used by jewelers for engraving silverware, rings, coffin plates, etc., in which the combination of levers known as the pantograph is used to direct the graver, the tracing point being guided by patterns, forms, or templets. A further device for cutting inscriptions on a curved line, while the tracer works on a straight line, is one of the combinations of this machine.

IMPROVED SAW TOOTH ADJUSTER.

John F. Damon, Rockland, Mass.—This invention has relation to devices for truing the ends of circular saw teeth which are swaged; and the nature of this invention consists in a hand tool constructed with a gage for determining the trueness of the cutting edges of the teeth. The frame of the tool is constructed with a straight edge, with rests on either side thereof, and an adjusting screw combined. By the employment of a tool of this character, and keeping the cutting edges of the teeth true and even, more work will be accomplished with less power.

IMPROVED HYDRAULIC ENGINE.

John Coates, Erie, Pa.—This invention relates to that class of piston engines that employ water under pressure as a motive power; and it consists of a valve of peculiar construction, and in the arrangement of passages in the cylinder for the ingress and egress of water. The advantages claimed are that the water is discharged by its own gravity, and therefore requires no force to eject the water after it is utilized. The construction of the valve is such that its friction and wear are reduced to a minimum, and the full power of the water realized.

IMPROVED GRAIN-REDUCING APPARATUS.

James L. Wilson, Woodstock, Ontario, Canada, assignor to John Forrest.—This is an improved machine for converting the hulled kernels of oats or other grain into a coarse meal. This is accomplished by means of a rapidly revolving cylinder divided into several sections, the faces of which have numerous parallel grooves from the hollow interior space to the circumference, which cause the grain to pass along the grooves, and to be presented endwise to reciprocating knives, the grain being retained for their action by guards in the holes or openings. The grain is fed to the interior of the cylinder in suitable manner, and from the same to the exit grooves and openings, the exit passages having laterally moving agitators to prevent the clogging of the grain in the grooves. The objection to the ordinary methods of crushing by means of or grinding by means of millstones is that a large percentage of the grain is reduced to a fine flour, which is of much less value than the coarse meal.

IMPROVED PUMP ROD ADJUSTER.

N. C. Martin Gifford and Pratt Abell, Barnhart's Mills, Pa.—This invention relates to an improved device for clamping the "polish rods" of oil-pumping apparatus; and it consists in the combination, with a crossbar that is connected with the walking beam of a pumping apparatus by rods, and through which the polish rod passes, of a gib that extends through the crossbar, a bolt that extends from the end of the bar to the gib, and an eccentric for forcing the gib into contact with the polish rod. By turning the eccentric by means of its rod, the polish rod may be instantaneously released or clamped at the pleasure of the operator.

IMPROVED HYDRAULIC JACK.

Daniel L. Weaver and George Noble, Hunnewell, Ky.—The object of this invention is to provide a jack for testing bridge bolts, and for adjusting them to the proper degree of tension, so that the strain upon the several bolts in a bridge may be evenly distributed. An important feature of the apparatus is an index attached to a pressure gauge, which stands at a number representing the bolt under strain.

IMPROVED MACHINE FOR TREATING FLAX, HEMP, AND OTHER SIMILAR PLANTS.

Norbert D. Landtsheer, Paris, France, assignor to Charles Couture, of same place.—This invention mainly consists in cleaning, softening and separating the fibers by the processes of breaking, scutching, and hackling, the several operations being performed by a machine working automatically. This improved machine is calculated to give increased impetus to the culture of flax which will lead to cheapness of the raw material, with increased profit, not only to the grower but the manufacturer, as the cost of breaking and scutching on this improved system will be about one third less than ordinary.

IMPROVED LAGGING FOR COVERING STEAM PIPES.

George B. Wiestling, Mount Alto, Pa.—This invention relates to lagging or covering to be applied to pipes and boilers to prevent the radiation of heat; and it consists of an envelope of one or two thicknesses of ordinary straw board separated from the surface of the boiler or pipe. Cheapness of material, which may be straw board or even straw rope, and the ease of obtaining, are some of the recommendations of this invention.

IMPROVED METALLIC COUNTER FOR BOOTS AND SHOES.

Ira O. Mann and George R. Rankin, Lake City, Col.—This invention is an improved metallic outside boot counter that prevents the crushing down or running over of the heel, protects the back of the boot against wear, protects the eye seam, keeps the boot in proper shape, and the inner counter dry, gives support to the ankle of the wearer, and adds to the symmetry of the boot instead of detracting from the same. This invention is intended to furnish a boot to miners, lumbermen, farmers, etc., that will sustain severe wear and tear, and at the same time preserve its shape and perform its office until the boots should be otherwise worn out.

IMPROVED PNEUMATIC TUBE FOR DREDGING.

William P. Lewis, Oroville, Cal.—This invention is designed for the purpose of hoisting dirt, debris, etc., from river beds, by creating a vacuum in the tube used for the purpose; and it consists of a tube having an inclined valve and side door, both being fitted in air-tight manner, and closed by steam admitted before sinking the tube, which, by condensation, creates a vacuum and draws in the sand, etc., that is finally discharged through the hinged side door on raising the tube. Simplicity of apparatus is the recommendation of this invention.

IMPROVED VALVE GEAR.

Albert M. Scott and Joseph J. Roth, Edwardsville, Ill.—Valve casings are attached to the head of the cylinder, and provided with ports in which a plug or cylinder valves are placed. These valves are cut away to afford a passage for steam through the casings. The space in the valve is of sufficient width to include two of the ports. Levers are attached to the lower end of the valves, and are connected by a rod, from the center of which an arm projects horizontally at right angles. A cam lever is placed under the piston rod whose shaft is at the center of the stroke of the cross head. The arms of the lever are curved upward, so as to engage with the cross head at each end of its stroke. The valves at the ends of the cylinder are oppositely arranged, so that when they are moved by the lever one of them admits steam to the cylinder, while the other permits it to escape through the exhaust port. The advantages claimed for this improvement are that the engine may be readily reversed, is simple and therefore easily constructed, and is not liable to get out of repair.

IMPROVED FRICTION CLUTCH.

William H. Clark, Chicago, Ill.—This clutch consists in a combination of cups and a friction ball mounted on spindles which have their bearings in a jointed frame. This clutch is applicable to sewing machines and all light machinery, wherein it is desired to have a variable motion and to stop the motion of the shaft at pleasure.

IMPROVED RICE CLEANING MACHINE.

Jesse Carter, Lake City, Fla.—The main object of this rice cleaner is to combine in one machine means for both hulling and pounding or mortaring the rice, while it also hulls the small rice that fails to get hulled in the ordinary huller. This is accomplished by a screw that projects down to the stone, working the rice from one end of the cylinder to the other, over one stone and against another. The screw forces the grain by a gentle and gradually increasing pressure against the stones and effectually rubs off the skin as well as the hull. The screw cylinder is adjustably attached to its shaft so as to allow the screw to be brought closer to or further from the stone, according to the quality of the grain. The object of the invention is to furnish an improved machine for hulling rice and other grains that shall be simple in construction, effective in operation, doing its work quicker and with less expenditure of power than the machines heretofore used for the purpose.

IMPROVED DRAIN.

George C. Mesler, Dunellen, N. J.—This invention relates to an improved draining device for freeing cellars and other low places from water; and it consists of a tube having a pyramidal point and a series of perforations at its lower end, and containing a smaller tube also perforated at its lower end and screwed into the pyramidal point, and extending a short distance above the upper end of the larger tube. The manner of using this tube is as follows: The lower part of the surface to be drained is selected, and the tube is driven down through its first stratum of earth and through the first water course, through the second stratum of earth and into the second water course. The upper end of the tube should be just even with the surface to be drained. The water flows down through the tube, into the lower underground current, and whatever air may exist in the water course escapes through the tube, permitting the water to flow freely down the outer tube.

IMPROVED PEGGING-AWL HANDLE.

Alexander U. McDonald, New York city.—This handle is so constructed as to withdraw the awl from the leather automatically by means of a spiral spring before the handle is raised, so that the operation of withdrawing the awl will not pull up the leather from its place. The awl is driven into the leather by a blow with a hammer, and is returned to its place in the cavity of the handle by the action of a spiral spring.

IMPROVED GRIPING AND PROPELLING ATTACHMENT FOR CAR TRUCKS AND LOCOMOTIVES.

James J. Thomas, Cahto, and William J. Anderfuren, San Francisco, Cal.—This invention provides for locomotives and car trucks an improved griping, safety, and brake attachment. It is intended to be used with advantage for ascending and descending steep gradients in railroads, being operated by hydraulic, pneumatic, or mechanical pressure, so as to facilitate the ascent and accomplish the descent with perfect safety, also to prevent derailment at any point. Grooved wheels bind on a center coil and serve, on applying steam or other power to the same, to assist the pulling of the train up hill, while down hill the wheels are pressed firmly without power to the rail, acting thus as a brake.

IMPROVED MACHINE FOR SHEARING BOILER PLATES.

John W. Johnston and Robert Johnston, Ferrysburg, Mich.—The object of this invention is to furnish an improved boiler plate shears, operated by hand or other power, and which may be so changed as to expeditiously give any desired bevel upon different thicknesses of plate. The lower blade is held against outward pressure by a wedge driven between its outer edge and a flange formed upon the outer edge of the bed plate. The movable blade is bolted to the holder, which works in a guide socket bolted to the standard. The guide socket turns upon a pivot at its lower end, and may be adjusted to the lower blade by means of a bolt, or to give any desired bevel to the plate to be cut. The object of this invention is to furnish improved boiler plate shears, which shall be solid, less liable to get out of order, and may be expeditiously changed to give any desired bevel upon different thicknesses of plate.

IMPROVED MILLSTONE BALANCING DEVICE.

Luther Read, Henderson, N. Y.—This invention consists in horizontal cups formed in the middle and upper parts, either or both, of each quarter of a millstone beneath the band, and provided with a hole leading into the upper part of the cups through the band, and closed with a screw. The cups are filled with shot to balance the stone. In case of old stones, the lower cups may be formed in the stone through holes cut in the band, which holes are afterward covered by patches secured to the band by screws. The upper cups may be formed by removing a part of the plaster, putting in the shot and replacing the plaster.

NEW MISCELLANEOUS INVENTIONS.

IMPROVED SCALE PAN.

Edward M. Whyler, Hays City, Kan.—The outer part or scoop of the pan is made in the general form of a section of a hollow cone, and the other part is made in the general form of a hollow cone, with a part of one side cut away. To the apex of the part cut away, and in the opening thus formed, is secured a short tube which serves as a funnel for pouring substances weighed into bags and boxes. For pouring substances into bottles, cans, and other narrow-mouthed vessels, a detachable funnel is fitted to the tube.

IMPROVED BATHING APPARATUS.

William J. Hill, Matteson, Ill.—The object of this invention is to provide a convenient portable bathing apparatus, which may be used in localities where water is not distributed throughout dwellings in pipes as in the larger cities and towns. A reservoir made of any suitable material is adjusted to any convenient height and is filled with water, when it is raised by means of a cord. The bather enters the tub and closes a movable port that permitted him to enter. By drawing a cord, a valve is opened and the water in the reservoir escapes through a sprinkler, the quantity being controlled by opening the valve more or less.

IMPROVED METHOD OF ORNAMENTS METALLIC SURFACES FOR JEWELRY.

Edward Huguenin, Philadelphia, Pa.—The object of this invention is to provide an improved method of ornamenting gold and other jewelry in highly artistic, durable, and multicolored designs, in perfect manner and without the old processes of cutting out and soldering on the ornaments, or of coloring by means of salts; and the invention consists in applying to a bottom plate of greater thickness, by soldering or rolling, a number of superimposed thinner plates of variously colored gold, silver, platinum, or other metal, and finishing the article made therefrom by hand or machine work, producing a large variety of effects, by cutting down to the differently colored plates. The advantages of this method over the old style consists in producing the color by very thin plates, but in larger or smaller surfaces, as required, and in flat, round, or other shape, the engraver getting readily to the colors required by cutting through to the required layer or color, and enabling him to work continually on a solid plate, without the uncertainties of the old soldered process, in which every ornament had to be cut out and soldered on, and which was liable, as well as the chemically produced colors, to work off by use.

IMPROVED MOP.

Edmund S. Ellis, Lynn, Mass.—This invention consists in the combination of a ratchet and pawl and a lever handle with a cylindrical rotating mop, for the purpose of squeezing the water out of the latter. The cylinder is perforated and has thrums or tufts of yarn fixed to it. A wringer roll is held in contact with the cylinder by means of a bow spring. By working the handle, the cylinder is rotated and by contact with the roll the water is squeezed out.

IMPROVED BAR FOR JAILS, PRISONS, ETC.

Thomas J. Tolan, Fort Wayne, Ind.—The object of this invention is to furnish bars, rods, and plates for jail and prison purposes, which shall be hard upon the outside, so that they cannot be filed or sawn, and at the same time tough so that they cannot be broken. The iron, in the shape of bars, rods, and plates of the required size and form, is carbonized by any of the well known processes upon its outer surface, while the interior is left in its natural state.

IMPROVED BAGGAGE CHECK.

Ray F. Livermore, Port Henry, N. Y.—It consists of two pivoted metal plates, that are connected by a lip of one plate binding on the other plate, and by the leather strap attached to a loop of one plate and passed through slots near the connecting lip of both plates. Notched station-indicating disks are set, by a center and circumferential pin, between the metal covering plates to the required points, which are read off by corresponding recesses of the metal plates. This invention facilitates the system of checking baggage from and to local and main stations over different roads. The trouble of exchanging checks is avoided, and the number of checks required for a station is lessened.

IMPROVED BASKET.

Charles H. Ball, New York city.—The object of this invention is to provide an improved basket of strong and durable construction that may be conveniently folded up after use into narrow compass, and instantly extended when desired; and the invention consists of a basket made of a flexible body, solid bottom, and top band, and with a swinging bail pivoted to the top band or hoop, and binding by curved spring extensions reaching the solid bottom, to retain the basket in expanded state. As the basket takes up a small space when folded, it is conveniently shipped and stored. As a lunch, market, and travelling basket, it combines cheapness, strength and durability.

IMPROVED FIREMAN'S SUIT.

John W. Oestberg, Stockholm, Sweden.—This invention consists in an air and water proof suit that covers the entire body, and is continually flooded with water, which is introduced by pipe connection with the hood, covering the headgear or helmet of the dress. The helmet is tightly applied to the body-covering dress, and the dress strapped to the body, air being supplied to the inside to keep out the smoke by an air supply pipe and pump. The helmet is provided with a hollow valve mask, through which the water is continually flowing, passing by a connecting tube to the hood that is fitted on the face mask and extended over the dress to shield the water over the same. The object of this suit is to protect the whole body against the influence of fire, smoke, and water, so that firemen may not only approach fire but pass through or into the same without being exposed to injury by fire or smoke.

IMPROVED PANTOGRAPH.

Elijah Ware, Omaha, Neb.—This is a pantograph for enlarging and reducing drawings. The device consists of a bent lever capable of universal motion, and carrying a tracing point and a pencil, both of which are arranged in the same axial line and work upon separate tables placed one above the other. The relative size of the copy and tracing may be varied by moving the table. Moving it up makes the tracing larger, and moving it down, smaller.

NEW AGRICULTURAL INVENTIONS.

IMPROVED GRAIN SEPARATOR.

William J. McCulla, Estherville, Iowa.—In this invention the separator is provided with two carrier belts, the primary one adjustably inclined with respect to the secondary one, and in the combination of a thrashing machinery made with a carrier having its upper end adjustable to and from the top of the casing of the machine. The shifting of the first carrier to a higher or lower position either retards or accelerates the motion of the straw, and adapts thereby the machine to the thrashing and separating of the different kinds and conditions of the grain.

IMPROVED ANIMAL STOCK.

John Bowman and Samuel C. Irving, Greenbush, Ill.—This invention consists in making an animal stock with independent foot rests to permit the feet of the animal to be operated upon at the same times by different persons. The shoes are applied to the feet when the animal is in hoisted position, and the nails clinched and the shoeing finished, or the animal may be lowered and the finishing operation completed when the same is in natural position. The apparatus is readily handled and the animal brought thereby fully within control without danger or trouble.

IMPROVED OX-BOW FASTENER.

Prescott Webb, Greenleaf, Minn.—A base plate is attached to the top of the yoke, and extends by a circular part around the hole provided for the passage of the bow end, and guides in a socket a sliding bolt that is moved by a stud and retained in locked position by an L-shaped slot. The bolt passes through a lateral hole of the bow and into a socket at a point diametrically opposite to socket. The bolt may be made spring-acted, if desired. This is a simple and reliable device for fastening ox bows to the yoke, so as to readily admit putting on of the bows to and taking off of the frame from the yoke and the necks of the oxen.

IMPROVED STRAW CUTTER.

George H. Keller, Shotwell, Mo.—This invention consists in the combination of connecting rods and a pivoted lever, a three armed lever, and pawls with ratchet wheels attached to the journals of the feed rollers and with the driving gearing of the machine. The lower feed roller is pivoted to the lower stationary part of the forward end of the feed box, and the upper feed roller is pivoted to the movable part of said end so that it may adjust itself to the varying thickness of the material. The feed rollers may be provided with teeth to prevent slipping on the material.

IMPROVED HARROW.

Frank Barnes, Fairmount, Neb.—This invention consists in the combination of two pairs of rods with the forward inclined bars of the two parts of the harrow frame; in the combination of the tongue with the two pairs of rods and two parts of the harrow frame; in the combination of the seat, the slotted seat board, the standards, and their braces, with the two parts of the harrow frame. The object of this invention is to furnish an improved harrow, simple in construction, convenient in use, effective in operation, harrowing the ground thoroughly with once passing over it.

IMPROVED GARDEN PLOW.

Thomas E. Smoot, Florence, Ala.—This invention consists in the combination with a garden plow having a front wheel, a shortened beam, and the usual handles; of a reversible push bar having breast piece and forked lower end pivoted directly to the axle of the same, the arrangement permitting the push bar to be reversed and used as a draft bar to equal advantage.

IMPROVED CORN PLANTER.

Frederick A. Hartnagel and John W. Hartnagel, St. Louis, Mo.—This invention is designed to furnish an improved corn planter, simple in construction, convenient in use, and reliable in operation, dropping the seed at regular intervals, and so constructed that when the dropping device is thrown out of gear the said device will continue to move on until just ready to drop the seed for another hill, so as to drop the seed as soon as it is again in gear.

IMPROVED WHEEL PLOW.

Ammon A. Amonett, Wrightsborough, Texas, assignor to himself and James E. Wells.—The object of this invention is to furnish an improved wheel or riding plow, which shall be simple in construction, convenient in use, easily guided and controlled, of light draft, and at the same time strong and durable. Trash may be cut by a circular or ring cutter attached to the near wheel in such a way that its edge projects two inches, more or less, beyond the rim of the wheel.

IMPROVED GATE LATCH.

Cyrus B. Austin and Milton S. Austin, Cuba, O.—This invention consists of an arc-shaped bolt attached to a pivoted arm, and provided with ratchet teeth, and operated by means of a lever carrying a pawl, which is capable of engaging either of the ratchet teeth of the bolt, as occasion may require; the object being to provide a simple latch for gates and doors that will automatically adjust itself to the distance between the gate and post or between the door and jamb.

IMPROVED HOG TRAP.

Charles R. Rutledge and John W. Rutledge, Shannondale, Ind.—This invention is designed to furnish an improved trap for catching hogs and holding them while being ringed. It consists in a slotted head block, a pivoted bottom board, cords, lever, and hook in combination with each other and with a box; and in the lever having its forward part bent into U shape, and provided with a cord, in combination with the slotted head block.

IMPROVED STRAW CUTTER.

Samuel Mephram, Fayette, O.—The standards that support the box for containing the straw or other feed to be cut also supports the journal boxes of the shaft. This shaft is arranged parallel to the side of box, and upon it, at the front end of the box, the wheel is secured, having knives, with edges that are convex in the direction of their length, attached, by means of bolts, to two opposite arms of the said wheel, and adjusted by set screws so as to lightly touch the lower side of the mouth of the box as the wheel is revolved.

NEW WOODWORKING AND HOUSE AND CARRIAGE BUILDING INVENTIONS.

IMPROVED MORTISING CHISEL.

George Buttler, New Brunswick, N. J.—This invention consists in a mortising chisel concaved upon its back and edge. The object of the invention is to furnish an improved chisel, which shall be so constructed as to work easier, and do better work than chisels constructed in the common way.

IMPROVED THILL COUPLING.

Julius T. Pomeroy, Edgerton, Wis.—The object of this invention is to provide a simple, effective, and safe thill coupling, by which the thills may be readily attached to and removed from a vehicle. The side pieces of the socket are connected by a rivet and have ribbed flanges in combination with a plate that is fastened to the thills upon which a sector-shaped bevel is formed. The thills are removed from the vehicle by raising them into a vertical position, when the head may be lifted from the socket.

IMPROVED THILL COUPLING.

Charles B. Post, New London, O.—This invention consists in the combination of a bolt or pin provided with a stop, a U-shaped recessed fastener, and a rubber block, with hooks formed upon the forward arm of the clip, and with the forwardly projecting end of the yoke. The object of this invention is to furnish a coupling that cannot become unfastened when the thills or pole are in a working position and so constructed as to be easily and quickly attached, and which shall be anti-rattling.

IMPROVED VEHICLE BRAKE.

William P. Pickard, Columbia, Tenn.—The object of this invention is to furnish an improved brake for wagons, drays, carts, and other vehicles, which shall be so constructed that the forward pressure of the vehicle against the horses may apply the brake, which will enable the draft of the forward horses of a four horse team to assist in applying the brake, and which will enable the brake to be applied by hand, when desired.

IMPROVED WAGON BED.

Wharton J. Kinsey, Denver, Col.—The sills of the wagon bed rest on transverse timbers that are fitted to the bolsters of the wagon, and are stayed by braces secured to the sills by bolts. The bed is made concave, which tends to hold the load centrally. The load is supported above the wheels, so that it may be loaded and unloaded with facility. The object of the invention is to provide a strong and convenient wagon bed for farm purposes and for hauling and transferring freight.