

## PENNSYLVANIA STATE FAIR, 1886. SECTION I.

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The society's exhibition this year, as a whole, has undoubtedly been the best it has ever given. The buildings were filled with a choice collection of exhibits, which were generally displayed to better advantage than usual, and it is a matter for congratulation that so many of the exhibitors responded so willingly to the request to show their manufacturing processes and machinery in motion. Everything of that kind adds to the attractiveness of an exhibition, increases its popularity, and makes it more instructive to visitors. Those exhibits where any manufacturing was carried on or machines were shown in operation were those which attracted the most attention, left a lasting impression on those present, and should be encouraged as much as possible. The following report will be restricted to a reference to some of the improvements patented or brought out since the last exhibition:

### DEPARTMENT III.—Implements and Machinery for Transportation and for Agriculture.

#### GROUP XVI—Transportation.

#### GROUP XVII—Miscellaneous.

#### AGRICULTURAL IMPLEMENTS AND MACHINERY.

In these groups, embracing wagons and vehicles of all descriptions, machines for preparing the soil, planting, fertilizing, harvesting, and preparing for market, the exhibits were numerous and varied; most of the improvements, however, were of a minor character, and not radically different from those referred to in former years, except in details difficult to explain without voluminous illustrations and descriptions.

The exhibits of harvesting machinery, including mowing-machines, reapers, and binders, was large, varied, and very creditable to the exhibitors, but there were comparatively few radical departures from the forms shown last year and others described in former annual reports, but there were some decided improvements in some of the machines, in the materials used and in details of construction. In some cases, steel and malleable iron were substituted for wrought-iron and cast-iron formerly used, making the frames and parts lighter, stronger, and more durable than formerly.

The opportunities which exhibitions such as this afford to manufacturers of being able to show to the users the machines and articles which are best adapted to their needs, is illustrated by the statement of the sales made by one alone of the most striking and notable, that of the "CHAMPION" harvesters, made by WHITELEY, FASSLER & KELLY, Springfield, Ohio; L. H. LEE & Bro., Baltimore, and A. A. HAMILTON, 3302 Lancaster avenue, Philadelphia, agents, who state that they sold on the fair-grounds, from September 6 to 18, 1886, one hundred and



thirty-seven "Champion" machines, aggregating about fourteen thousand (14,000) dollars, for the 1887 harvest, and gives hint to exhibitors having the best machinery improved to meet the demands of buyers of the advantages derived from a proper exhibit at the Pennsylvania State fair.

The magnitude of the "Champion" exhibit can only be correctly conceived by the fact that it comprised seven (7) car loads, or one hundred and sixteen machines, with tents and motive power. Their machines were constructed of steel and malleable iron, with a number of improvements in details, displaying much ingenuity, excellent workmanship, and adaptation to the purposes for which they are designed.

The Walter A. Wood Mowing and Reaping Machine Company, Hoosick Falls, N. Y., W. F. Lippincott & Co., agents, made another handsome display of their mowers, reapers, and binding harvesters, in which many minor improvements have been recently made.

The new Enclosed Gear Light Reaper, Fig. 1, is unique in several respects. It weighs no more than many mowers, yet has all the usual

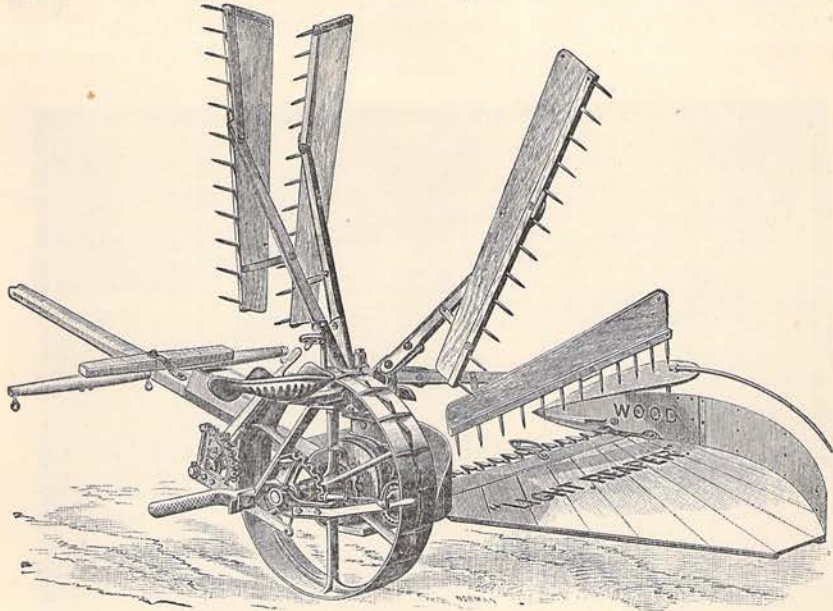


FIG. 1.

reaper adjustments and parts. The enormous amount of harvesting machinery manufactured in this country may be judged from the statement of this firm, that during the past thirty-four years they alone have placed six hundred and twenty thousand six hundred and nine of the Wood machines in the hands of the farmers.

The Berry Harvester Company, of Chester, Pa., showed their new straw binder, which attracted much attention. The machine uses a single band or simple wisp of straw. They select the largest untangled grain in the field, and cut it before it is too ripe, and use it for bands. The band reservoir will need to be filled once for each acre cut, as grain is ordinarily cut; it is claimed these bands will cost absolutely nothing, and will not be threshed out.



The inventor prefers the small bundles made necessary in using the single band above, rather than to manipulate the straw in forming larger bands, for, by so doing, the machinery would be more complicated, and probably thresh out the grain. He claims that this machine will separate each bundle from the rest completely and thoroughly in the most tangled grain, and will save, at the present price of twine, about twenty-five cents per acre, or from fifteen to fifty dollars per year for each machine.

## SECTION II. DEPARTMENT IV.

### MINERALS, METALS, MACHINERY, AND TOOLS, GENERAL.

#### GROUP XVIII—Minerals and Metals.

The Hartman Steel Company, (Limited,) Beaver Falls, Pa., Hicks & Dickey, agents, 413 Commerce street, Philadelphia, made a large display of steel wire nails, cold die rolled steel, for shafting and piston rods, steel signs, and their patent steel wire door-mat, Fig. 2, made from steel wire, with steel frame and steel braces, all perfectly galvanized.

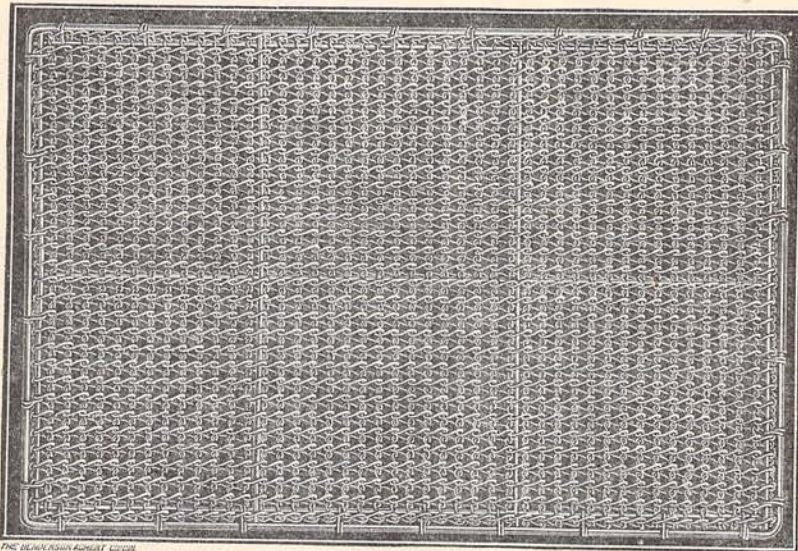


FIG. 2

The manufacturer claims that these mats are self-cleaning and require no shaking; that they cost one third to one half less than the corrugated rubber mat of equal thickness, and are adapted for any and every place where a mat or a matting is needed, and are specially adapted for railway and street car floors, steamboats, hotels, offices, stores, residences, elevator floors, etc. They are made of six standard sizes, from sixteen inches by twenty-four inches to thirty-six inches by forty-eight inches, special sizes and shapes being made to order.

The Cortright Metal Roofing Company, office and factory southwest corner Broad and Race streets, Philadelphia, Pennsylvania, showed a small house covered with their metallic plates.

The following cuts illustrate some of the strong points of this system of metal plate roofing. Among the claims for this system, are the great simplicity of construction, the perfect protection from storms of all kinds, and the expansion and contraction amply provided for, all the shingles being nailed independently to the sheathing-boards, and all joints being so locked that a solid and tight roof is secured without the use of solder. The shingles being laid with the points down, the flow is always away from the joints. Another great point in the system is the fact that the shingles are laid beginning at the comb and working downward, thereby allowing the workman to scaffold always over the rough sheathing-boards, instead of over the finished work, as in all other slate, tile, or shingle roofs.

Fig. 3 shows fold and nailing-flange in ridge-coping.

Fig. 4 shows ridge-coping in place, and shingle inserted in fold.

Fig. 5 shows manner in which the shingles are laid downward from the comb.

Fig. 6 transverse vertical section of roof, showing joints and shingles, allowing for expansion and contraction.

Fig. 7 shows the manner of locking the shingle to the Cortright valley.

The latest improvements in this system are covered by patents dated June 15, 1886.

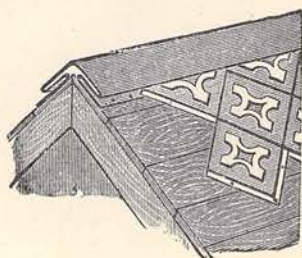


FIG. 4.

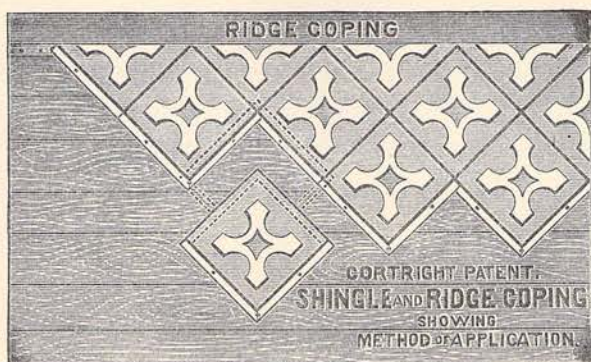


FIG. 5.





FIG. 6.



FIG. 7.

**GROUP XIX—Motors and Means for Transmitting Power.**

Several types of horizontal high-speed steam engines were shown, among them the Progress Engine and Machine Works, Summerfield, Maryland, showed one of their Progress automatic cut-off engines, shown in Figs. 8, 9, and 10, in operation. It was well finished and ran very smoothly and steadily.

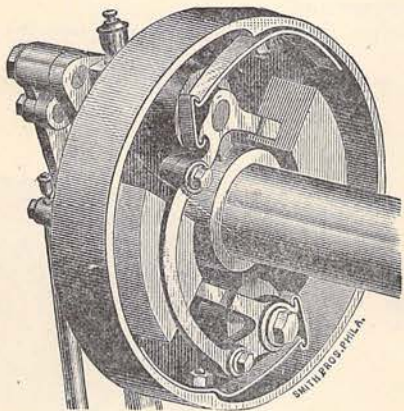


FIG. 9.

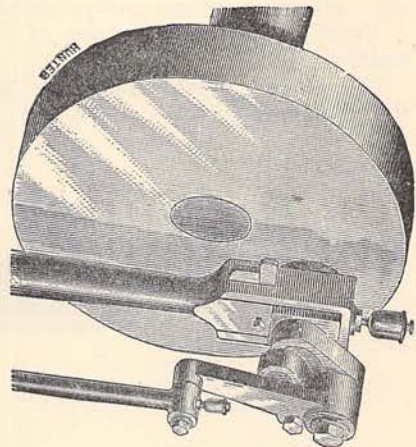


FIG. 10.

The governor is located in the crank disc, and has communication with the valve through the crank pin by means of a shaft and eccentric; the eccentric is connected to a rock-arm to which the valve rod is connected. While this governing arrangement is entirely different in construction from any other, it produces the same result as the best of those used on modern high-speed single-valve automatic engines, it weighs the load and instantly sets the valve to suit it.

The Foundry and Machine Department, Harrisburg Car Manufacturing Company, Harrisburg, Pa., also exhibited one of their Ide automatic cut-off engines, with their most recent improvements. It was well designed and constructed, and handsomely finished. Figs. 11, 12, and 13 will give an idea of the appearance of this engine.

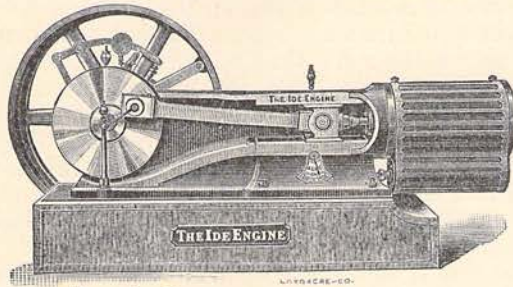


FIG. 11.—LONGITUDINAL ELEVATOR.

The automatic safety governor is shown in position in the fly-wheel, Fig. 13.

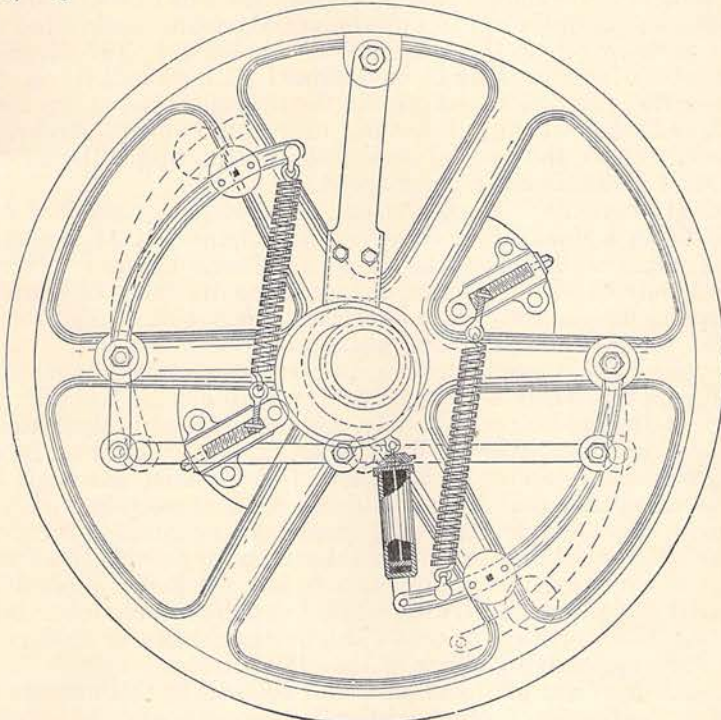


FIG. 13.—GOVERNOR.

The eccentric has a pocket projecting from the lower side to which a steel arm is bolted. This arm is pivoted near the rim of wheel. Opposite to this arm is a lug to which two steel arms are connected. These arms are connected to two bent steel levers, on which the fly-weights are placed. As these arms move out into the position shown by the dotted lines, the eccentric is carried across the shaft.

The movement of the eccentric is obtained from the centrifugal



force of the balls, which movement is controlled by the spiral springs. The speed of the engine may be changed to suit requirements by shifting the weights, or by tightening or slackening the springs. The springs hold the eccentric at a point which gives the valve full throw, until the engine is up to its speed, when the centrifugal force of the weight is greater than that of the springs, and the weights fly out, moving the eccentric into such a position that it shortens the throw of the valve, and at the same time advances the lead. The dash-pot attached to the end of one of the levers controls the movements of the weights, preventing any sudden movement or jumping of the weights when a large change of load occurs suddenly, and by its use a more sensitive adjustment of the springs and weights can be made, and a closer and more perfect regulation of speed can be obtained; it also holds the eccentric in a comparative rigid position to overcome the rapid alternating resistance in moving the valve.

When the engine is running without a load, the valve opens to admit steam at full boiler pressure exactly on the center, and closes before the piston has moved one half an inch. Steam is allowed to follow at full boiler pressure further and further as the load is increased. When the maximum load is reached, the full throw of the valve is given, and in order to keep up the speed, steam is admitted at full boiler pressure up to three fourths of the stroke. The large ports allow a very large opening to be obtained with a small travel of the valve, giving full boiler pressure in the cylinder even at such a high speed, and when steam is following over three fourths stroke. The valve will close and cut off steam at a point that will just do the work, and maintain the regular speed.

S. C. Harbert, 1907 Market street, Philadelphia, exhibited one of Wood, Taber & Morse's four driver traction engines Fig. 14, in operation.

On engines of this class, the propelling power has heretofore been applied only to the rear axle, owing to the difficulty of connecting the driving mechanism with the forward axle, which changes its lineal position when turning to travel around curves.

The objects of these improvements are to increase the efficiency of said engines in their self-propelling operation, and to obtain better control of the guiding of the same, and consist essentially in the combination with the forward or steering truck, of a counter shaft having a flexible joint, to allow one end thereof to accommodate itself to the oscillations of the axle. This combination, in connection with a semi-spherical step on axle, and with compensating gears to furnish the drivers differential movements, enables them to provide the first road engine which has the power practically and efficiently applied to the four drivers simultaneously, and while so applied, each driver pulls in traveling either forward or backward, in straight line or on curve, entirely independently of either of the other drivers.

The entire weight of the engine and boiler is in this manner made useful to the traction power, and the traction power is made most efficient by being distributed upon four drivers.

The result is to increase the traction power because the forward drivers assist proportionately to the load upon them, instead of being an obstruction to be pushed along.

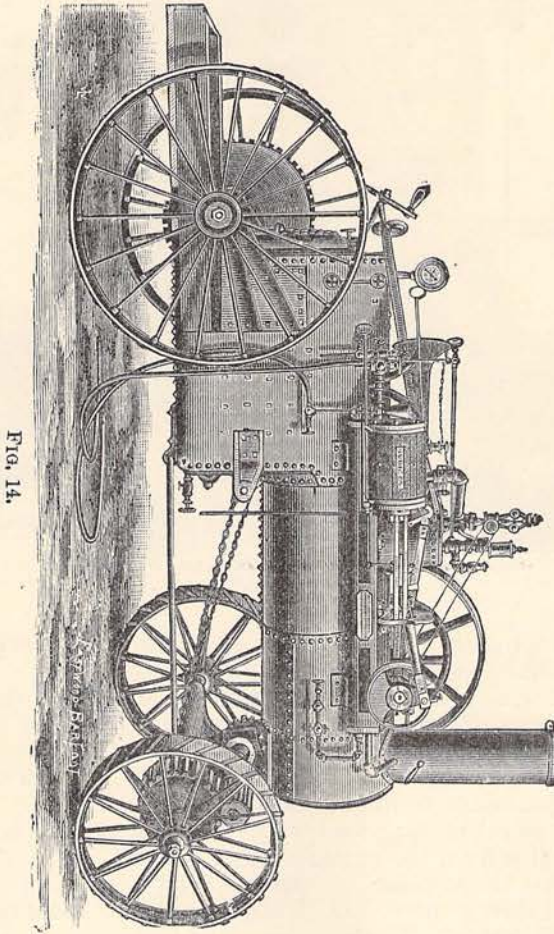
The result of loading the forward drivers is also of the utmost value in securing positive control and ease in steering on loose, stony, slippery, uneven, and otherwise difficult ground to travel.

The traction attachments take power by a friction wheel applied by



clutch, and rod and hand wheel, at pleasure of the engineer, to inside rim of the fly wheel, and the friction wheel has a pinion attached to its hub, from which pinion power is conveyed by train of gears, and through compensating gears to the rear axle.

As a traction engine, this engine has the peculiar and decided ad-



vantage over others in being free from the liability of being caught on the center, and is at all times entirely at the control of the engineer; it can be moved instantaneously forward or backward. The improvements are secured by patents dated March 11, 1884, October 27, 1885, January 19, 1886, May 11, 1886.

The Shipman automatic oil-burning steam Engine, Rochester model, exhibited by C. D. Young & Bros., 42 North Fourth street, Philadelphia, attracted much attention, being shown in operation, and they claim that their recent improvements render the boiler and engine absolutely safe against explosion, and well adapted to light manufacturing purposes, steam yachts, &c., the engines being now made from one to five horse-power, with boiler and engine combined.



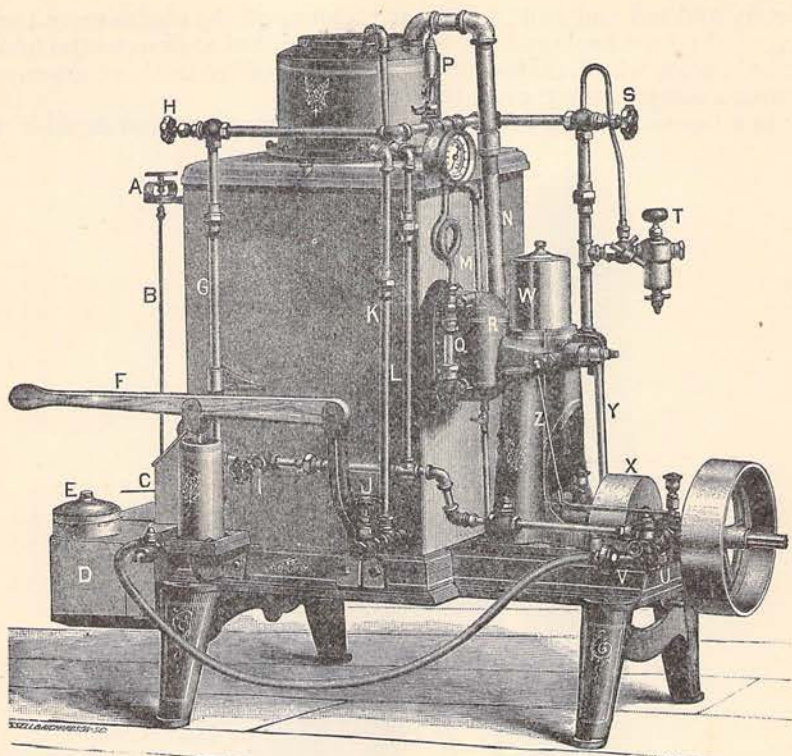


FIG. 15.

*Fig. 15* represents both the one and two horse-power Rochester Model Shipman Engine.

*A.* Diaphragm. *B.* Pipe connecting Diaphragm to Atomizer.

*C.* Atomizer. *D.* Oil tank.

*E.* Lamp or torch. *F.* Air-pump handle.

*G.* Pipe connecting air-pump to the boiler. *J.* Blow-off valve.

*K.* The drain-pipe from exhaust steam heater.

*L.* The pipe connecting feed-water pump to the heater.

*M.* Drip-pipe from the exhaust steam heater.

*N.* Exhaust steam-pipe. *O.* Steam-gauge.

*P.* Pop or safety valve. *Q.* Water glass. *R.* Float chamber.

*S.* Throttle-valve. *T.* Swift sight-feed lubricator to the cylinders.

*U.* Feed-water pump. *V.* Strainer to feed-water pump.

*W.* Brass cylinder cap. *X.* Shield to the governor.

*Y.* Steam-valve eccentric connecting to the governor.

*Z.* The perpendicular rod operated by float in float-chamber to cut off the supply of water to the feed-water pump.

The boiler is sectional, with tubes screwed into the back. Each tube is tested before use to four hundred pounds pressure to the square inch, and the boiler, when completed, is also tested to the same pressure.

A pop or safety valve is attached to the boiler, of the same principle as that used upon locomotives.

A coil-pipe heater delivers water into the boiler at a temperature of one hundred and eighty-degrees or more. The water supply is reg-



ulated by a float in the float chamber, connected with valve at the pump, which opens and closes automatically, and thus keeps a uniform supply of water in the boiler.

The fuel is kerosene. Quality, one hundred and ten or one hundred and fifteen test. Cost by the barrel, about seven and one half cents per gallon. By the use of kerosene as fuel, small amount of storage room is required, and the services of a fireman, and the dirt from coal or wood are avoided.

The fire is formed by the pressure of steam flowing through an atomizer, which throws the kerosene in a very fine spray into the fire-box. This causes an intense blast of fire. In this way the oil is consumed without the agency of wicks. The combustion of the fuel is so perfect that there is little or no smoke, and the full value of the heating qualities of the fuel is obtained.

The diaphragm is constructed especially for this engine. It controls the fire so that any given pressure of steam can be carried at all times.

The oil tank holds about two gallons. This tank has a water space between the oil and the fire-box, and this space is filled with water from the feed-water supply, and thence pumped into the boiler. In this way there is a constantly changing jacket of water three fourths of an inch thick in front of the oil, thus making it impossible to heat it.

The pump is made of brass in regular engine-pump form, with lift and force valves; the plunger is connected to the main shaft by an eccentric, and is constantly working when the engine is in motion, and, in connection with the water regulator, keeps a uniform supply of water in the boiler.

An automatic governor on the shaft increases or decreases the opening of the steam ports, and thus keeps a uniform speed of the engine with a varying load.

The cylinders are kept lubricated with a self-oiler. The shafts have oil cups. The connecting rods are automatically oiled.

The wrist pins are hardened steel. The piston has packing rings, and all parts are provided with means of adjustment for wear.

McGahan's patent lightning boiler tube and flue cleaner, manufactured by the United Manufacturing Company, 49 South Front street, Philadelphia, Pa.

Among recent inventions shown in operation, we find this simple, automatic, mechanical device. The cleaner connections to the boiler, where good, live steam is obtainable, are all of iron pipes, connected by patent adjustable folding brass joints, permitting a free and easy movement of the cleaner in all directions, thereby avoiding the use of hose, which is liable to wear out, burst, and scald the operator. The cleaner is durable in all its parts.

The merit of this cleaner lies largely in the automatic jet-head, the steam pressure keeping same closed, until, on pressing it against the end of each tube, we have a sudden blast of four jets of live steam, quick and effective, equal to the explosion of powder in a gun, and carrying soot and scales before it. A quick, sudden blast is claimed to be much more effective than a steady flow of steam.

The steam being shut off the instant the pressure is removed, in changing from tube to tube, none is wasted, and no soot and dirt are blown back into the operator's face. The operation on each tube is so quick and perfect that no condensation of steam is made to dampen and cake the soot.



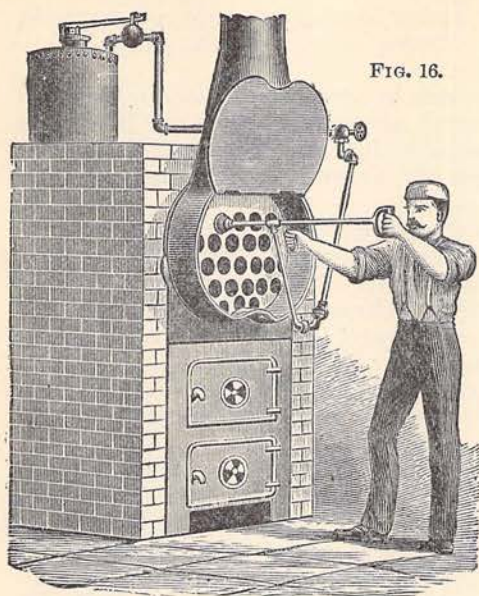


FIG. 16.

Fig. 16 shows the cleaner as connected to a boiler with their patent folding pipe joints, these joints permitting the movement of the cleaner in any direction.

The same company also exhibited McGahan's swivel pipe union for connecting sprinkling hose to the water-supply pipe. See Fig. 18.

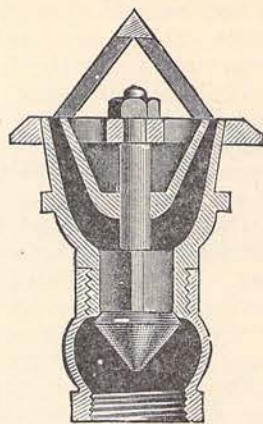


FIG. 17.

Sectional view of the automatic jet-head. Fig. 17 is a sectional view of automatic jet-head, showing two interior compartments connected by a passage which is closed by a sliding valve, to which is attached the conical guide-plate.

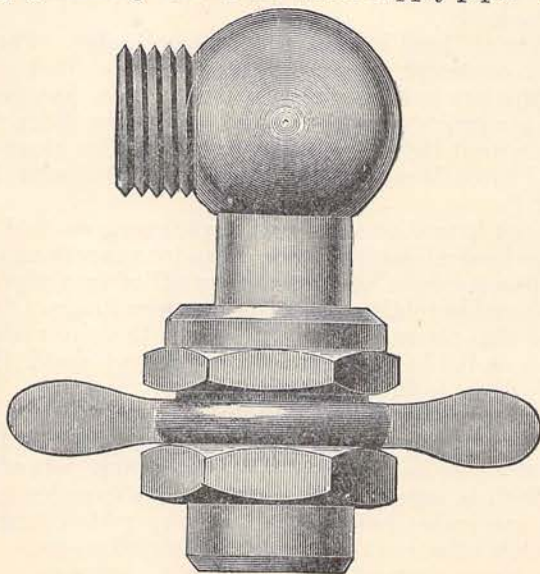


FIG. 18.

It is claimed that it saves the hose by preventing it from breaking at point of connection; that its movable parts work free and easy, and that it can be connected or disconnected in a moment without the use of a wrench.

**GROUP XX—Pumps and Blowers.**

The Philadelphia Exhaust Ventilator Company, 121 North Fourth street, Philadelphia, exhibited several styles of the Amherst water motors, a piston motor in which important improvements have been made during the past few months. The sizes regularly made run from one eighth to eight horse-power, for running sewing machines, dental engines, printing presses, organ blowing, &c., larger sizes for special purposes being made to order.

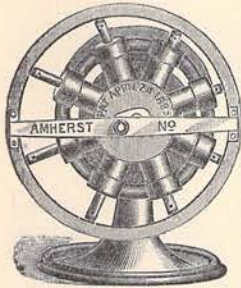


FIG. 19.

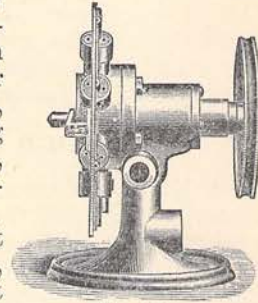


FIG. 20.

Fig. 19 shows a front view, Fig. 20 a side view, and Fig. 21 the different parts of the No. 1 and No. 8 motors and the balance governor valve for organ blowing. *A* represents the cylinders, *B* the valve and shaft, *c* the piston, and *H* the ring connecting the pistons to the crank, all of the No. 8 motor. *d* represents the cylinders, *e* the valve and shaft, and *f* the piston, of the No. 1 motor. *G* is the balance governor valve for organ blowing.

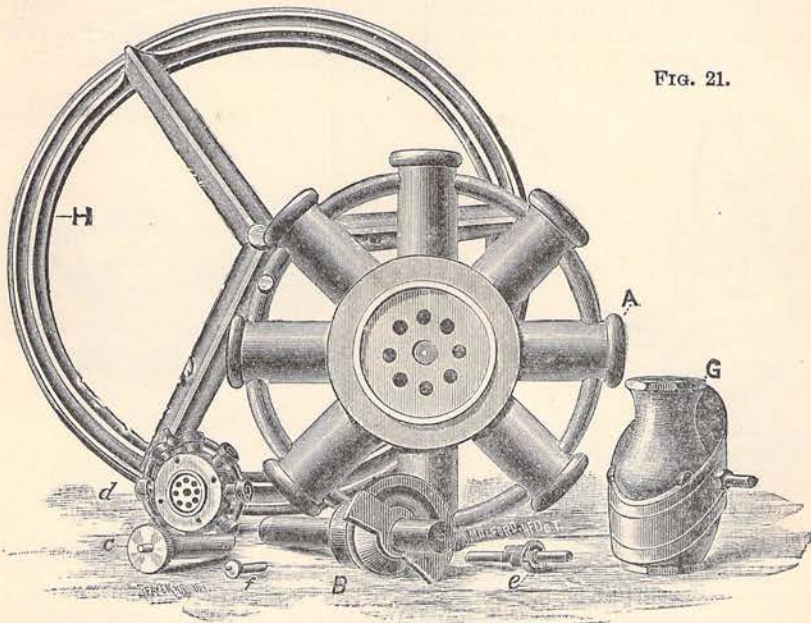


FIG. 21.

Eight cylinders, radiating from a common center, with corresponding pistons and rods, constitute the principal working parts of the motor.

By means of a single rotary valve, the water is admitted to four of the cylinders. These, being single acting, continually shut off and admit the water in the direction of rotation, thereby keeping four cylinders constantly at work in a line at right angles to the crank. Frictionless bearings connect the ends of the piston rods to the ring



which surrounds them. Through this ring power is transmitted to the crank shaft.

The ring serves the double purpose of receiving and transmitting the power from the pistons on the pressure side and of returning the pistons to their places on the exhaust side.

The power is constantly communicated to the crank-pin in a direction at right angles with the crank, thus avoiding all dead centers.

By attaching a register, it becomes a water meter, and records the amount of water passing through it.

### GROUP XXI—Working Wood and Metal.

The displays of wood-working machinery made by two of our manufacturers attracted very much attention, the band saws being shown in operation.

E. & T. GLEASON, north-west corner American street and Susquehanna avenue, Philadelphia, showed their latest improved *band saw*, (Fig. 22,) having a ring guide adapted to the finest blade, as well as the widest, giving the blade the same support on the back and sides. The *swivel box* on bottom shaft, as well as on the top shaft, enables the operator to run the blade on any part of the wheel without injury to the rubber covering on the wheel.

Their new *jointing machine* (Fig. 23) has *both* tables adjustable by hand-wheel; has an independent movement on the tables to maintain parallelism between cutter-head and tables; has an adjusting screw on front table for the purpose of making hollow or straight joints.

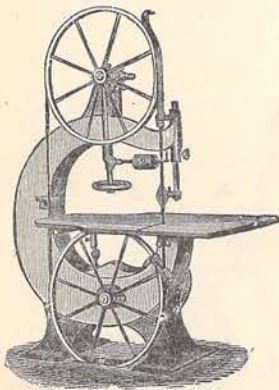


FIG. 22.

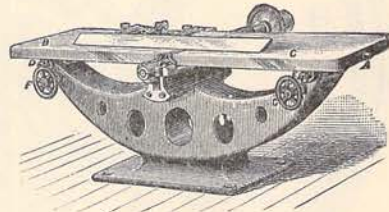


FIG. 23.

In their *improved pony planer*, (Fig. 24,) the improvement consists in raising and lowering the bed by means of a worm and large screw under the bed, the screw having a diameter equal to the length of the rolls or cutter-head, thus giving a good support to the bed.

GOODELL & WATERS, 3103 Chestnut street, Philadelphia, showed two of their improved band saws, with wheels on their improved "bicycle" plan, having double spokes with glued-up wooden rims, the sections breaking joints and covered with pure gum. They are also supplied with a patent compensating weight and rubber cushion to maintain a uniform tension of the saw blade. A new saw guide has also been added.

C. G. POULSON, Linwood, Delaware county, Pennsylvania, exhibited his patent *mower and reaper knife-grinder*, (Fig. 25,) with his latest improvements.

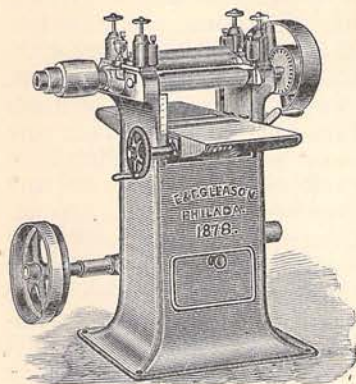


FIG. 24.

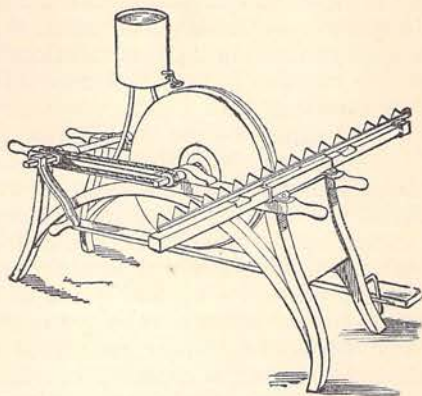


FIG. 25.

This machine is constructed as follows :

Two stones are hung on a shaft in same manner as an ordinary grindstone, except that an open space of one fourth inch is left between the two stones, which prevents all cutting of the bar on which the knives are riveted. The two stones are beveled to correspond with the bevels on the knives. The knives are placed flat on the stones, and two contiguous edges, or the equivalent of one knife, is ground at one operation. The crank is geared back out of all reach of the knives.

The following figures show the comparative cost of grinding by the two methods—the old and the new :

The inventor claims that it takes by the old process from forty-five minutes to one hour to grind a set of mower and reaper knives, and, be as careful as we may, it is impossible to do it perfectly.

On this machine it takes fifteen minutes to grind a set of knives down the first time to the shape of the stone; after the first time, it takes an average of five minutes to grind the set perfectly.

*Old Process.*—Grinding one hundred sets of knives at forty-five minutes each, four thousand five hundred minutes, being seventy-five hours at forty cents per hour for two men, thirty dollars.

*New Process.*—Grinding one set of knives first time to shape of stone, fifteen minutes.

Grinding ninety-nine sets of knives after first time, at five minutes each, four hundred and ninety-five minutes, being eight and one half hours at forty cents per hour for two men, three dollars and forty cents.

That they find the wear of the stones to be about three eighths of an inch in grinding one hundred sets of knives. At that rate of wear the stone will last many years, as they are twenty inches in diameter.

Several varieties of wire fencing were shown, as well as some machines for its manufacture in operation, that of the GAUTIER STEEL DEPARTMENT of the CAMBRIA IRON WORKS, Johnstown, Pa., being the most recent, and forming a *link barb wire*. The machine is very ingeniously constructed, each link with its barbs being formed of one piece of wire. The Cambria link barb wire is a perfect chain of gal-



vanized wire, with barbs, the principle being a chain of steel instead of a strand of twisted wires, and the barbs are so arranged that they can be made to point all one way, so that the smooth side will be next to the field, and the cattle can rub against the wire without scratching themselves in the slightest manner; at the same time the wire is a perfect protection against interlopers from the outside. The great objection to most barb wire fences is the inability to make gates in them. The Cambria link is so constructed as to permit a gate to be made without injury to the wire (Figs. 33 and 33*a*) by simply bracing any particular post, carrying the wire to the next post, and hanging it on hooks and throwing the linked wire to one side as you would any chain, when an opening in the fence is required. Another great advantage that we notice is that it does not tangle or kink like ordinary barb wire, but pulls out straight and as easily as a watch-chain. It looks to be very easy and quick to erect, as it does not require to be pulled out by stretchers to get it straight. The Cambria Iron Company have twenty-four machines in operation at their works, each machine having a capacity of eighteen thousand yards daily. The link barb wire is reeled on spools, containing seven hundred to fifteen hundred feet respectively, and weigh about a pound to every fifteen feet, this being a handy size for transportation.

It does away with the objection that fences of this character injure cattle, as it is easily seen, and the points of barbs can be permanently arranged at any angle desired. The wonders of machinery are surely great. The following cuts show the link barb in its different processes of manufacture, Figs. 26, 27, 28, 29, 30, 31, and 32.

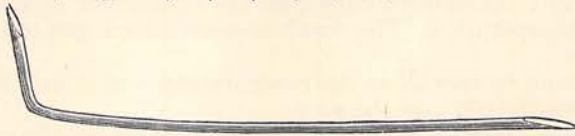


FIG. 26. FIRST FORM. ON ENTERING MACHINE.



FIG. 27. SECOND FORM. BEFORE MAKING LINK.

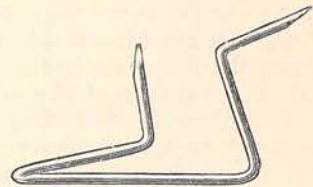


FIG. 28. THIRD FORM. LINK HALF COMPLETED.



FIG. 29. FOURTH FORM. LINK COMPLETE, READY TO FORM THE BARB.



FIG. 30. FIFTH FORM. LINK AND BARB COMPLETE.



FIG. 31. THE COMPLETE CHAIN, WITH BARBS

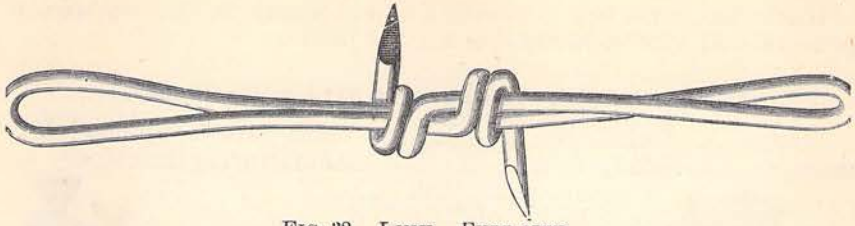


FIG. 32. LINK. FULL SIZE.

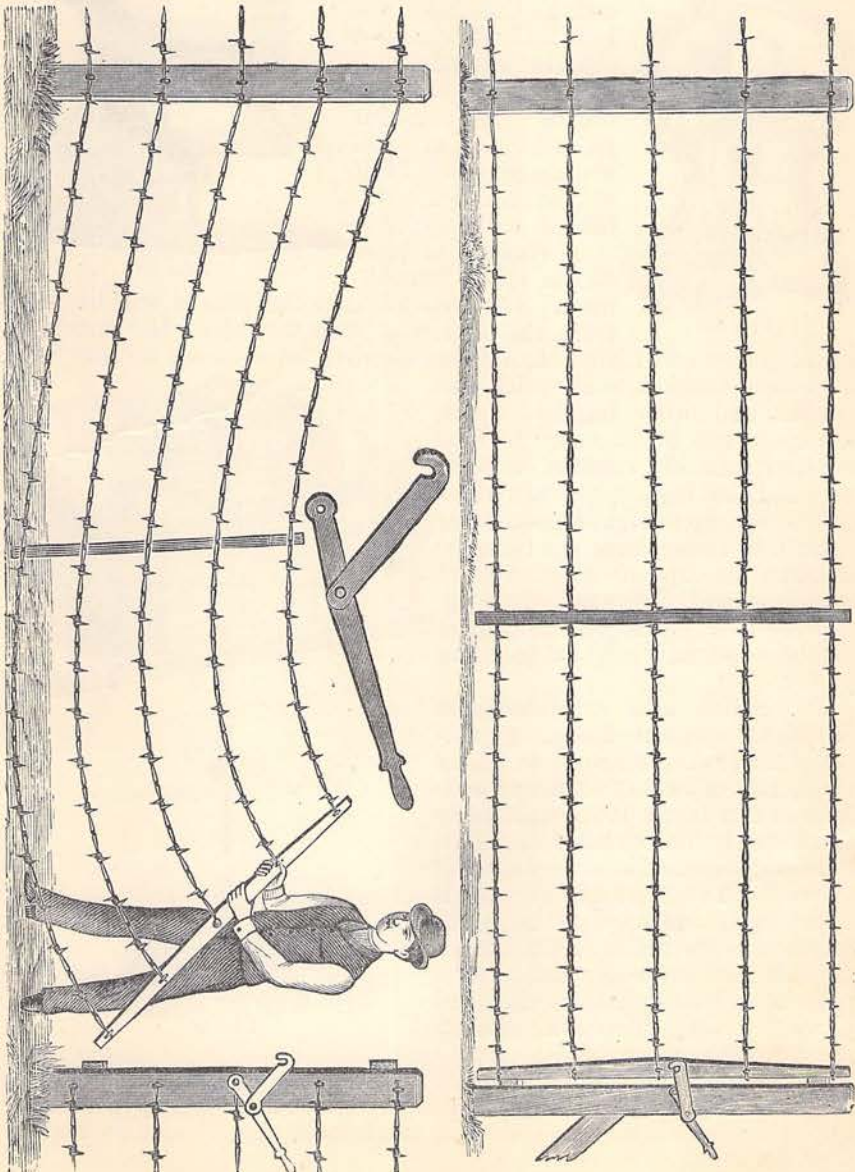


FIG. 33. LINK BARB GATE, OPEN.

FIG. 33a. LINK BARB GATE, CLOSED.



Where the barbs are considered objectionable on the top wire, a plain twisted wire without barbs may be used.

### GROUP XXIII—Leather and Textile Machinery.

George A. Smith, No. 17 South Fourth street, Philadelphia, made an interesting display of shoe manufacturing machinery in

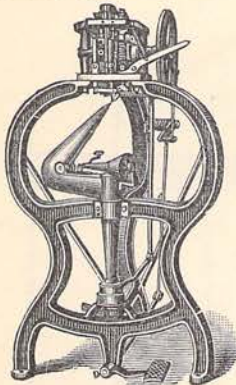


FIG. 34.

connection with the exhibits of The Day Sewed Shoe Manufacturing Company, and Frank D. Weylman & Co., of Philadelphia. Among the machines shown was an improved McKay sole sewing machine (Fig. 34), with an improved bobbin with a continuous thread, in place of the spool formerly used. The great advance that this is will be seen

could not be run higher than three hundred stitches per minute with a perfect tension, while with the bobbin and other improvements, the speed can be increased to four hundred and fifty stitches per minute, and the high speed machines can be run up to eight hundred per minute or faster, thus doubling or trebling the capacity of each machine, and the work done by one operator, making the improved machine specially adapted to steam power.

Mr. Smith also exhibited the Standard button-fastening machine for sewing buttons on shoes at the rate of twenty thousand buttons in ten hours more uniformly and securely than by hand, each button being fastened independently of the rest. The machine (Fig. 35) is a very ingenious one, and the recent improvements make it automatically adjustable for any size of shoe button, as well as render the feed movable, vastly increasing the efficiency of the machine.

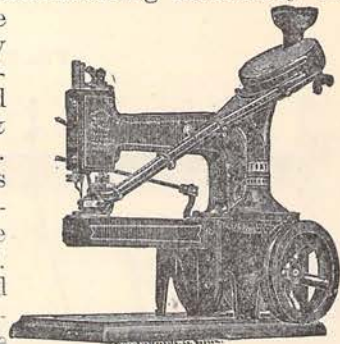


FIG. 35.

from the fact that with the spool the machine

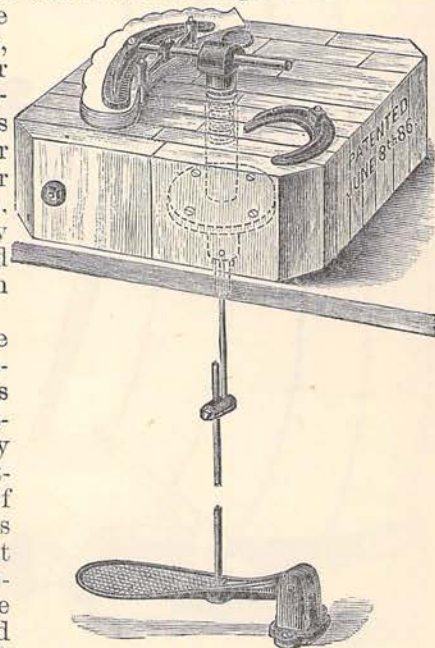


FIG. 36.

The same exhibitor also showed J. W. White's new shoe scalloping machine, Fig. 36, a very simple and ingenious machine, by which the uppers for shoes may be scalloped much more rapidly and accurately than by hand.

Wheeler & Wilson Manufacturing Company, 1312 Chestnut street, Philadelphia, exhibited their new "D. 10" machine, Fig- 37, specially adapted to the manufacture of boots, shoes, clothing, and every



FIG. 37.—D. 10 MACHINE.

other kind of stitched goods, which, although of the dimensions and general appearance of their "No. 10" machine heretofore in use, is in construction and mode of action a radically new machine.

While the advantages of rotary motion are retained, the threads are interlocked by a new device whereby the upper thread is carried around the lower without meeting with any resistance.

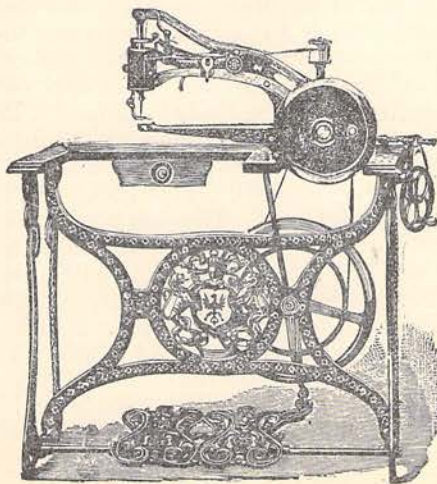


FIG. 38.

The bobbin holds over one hundred yards of No. 70 cotton, having



about twice the capacity of the largest bobbin heretofore in successful use in any lock-stitch machine.

This machine handles with the utmost facility every quality of thread—cotton, silk, or linen—on every kind of stitchable material.

It uses a short needle, has a positive feed, is fitted with either the drop (four motion) feed or the wheel feed, as may be required, and is furnished to order with seam trimmer, blind stitch attachment, and other appliances for special work.

The same company also exhibited the German universal feed cylinder sewing machine, Fig. 38. The thread passes through the center of the needle bar, and the arm is so small that you can sew a patch on any part of a child's shoe, as it feeds in any direction.

New elastics can be put in old shoes, leather patches on cloth or woolen mittens or gloves, and a variety of work done.

The same machine is also constructed with an automatic device, an improvement which once set allows the duplicating in any number of patterns of circular stitching, such as is used in box-toe and similar work.

These machines were shown in connection with the shoe manufacturing exhibit of Frank D. Weylman & Co., Philadelphia.

## DEPARTMENT V—Manufactures—General.

### GROUP XXVIII.—Skins, Horns, and Feathers, and their Manufactures.

The Day Sewed Shoe Manufacturing Company, W. W. Apsley, manager, 23 North Eighth street, Philadelphia, made an exhibit of great interest. In the space set apart for it, the whole process of making shoes by this new and improved method was carried on in the presence of the public.

The Day sewed shoe is the result of several years' invention. Mr. George W. Day, of Haverhill, Massachusetts, was the originator of the idea, and he has matured it by long and careful study, many experiments, and the experience which comes from many failures brought to successful issues. A few months ago, the Day Sewed Shoe Manufacturing Company, organized in Philadelphia by a Philadelphian, and consisting mainly of well-known citizens of Philadelphia, opened a store at No. 23 North Eighth street, of that city, and put the shoes before the public with every facility for judging of their merits. The result has been most gratifying. The beauty, finish, and excellence of their work are beyond all question, while the comfort of the shoes, their durability, and their reasonable price daily recommend them to new wearers. The special merit of the new method is that it does away with the use of the welt, long considered indispensable in shoe-making, and only to be avoided by this process. The welt, required in the old method, separated the inner and outer sole at the edge, leaving a space which must be filled with some foreign substance. In the best shoes, this consisted of leather scraps and shreds, but it necessarily added to the stiffness and weight of the shoe, while it increased the liability of breaking out, and rendered the inside of the shoe more or less seamy or uneven. In the cheaper shoes, this filling was less carefully selected, and in the very lowest grades, it was a gather-

ing together of refuse scarcely more pliable than chips, and about as durable as coarse brown paper. The inside of these old-fashioned shoes was always a little rough under the lining, while some of them were a perfect hot-bed of torture from tacks, nails, knots, or wax-threads, and hard, rough seams. As the lining wore away or curled up from the heat of the foot, these discomforts increased, and hundreds can testify to years of suffering from such a cause. In the Day sewed shoe this is all done away with. The sole is split along the edge, turned back, and sewed. Then the split piece is drawn carefully together over the stitches, and firmly secured by a cement which remains unaffected by the heat of the foot or dampness. There is no filling, of course, and the inside of the shoe is as smooth as glass, unmarred by a seam, and it remains so until the shoe is entirely worn out. Machine-sewed as it is, there is no doubt that it equals any hand-sewed shoe.

FIG. 39.

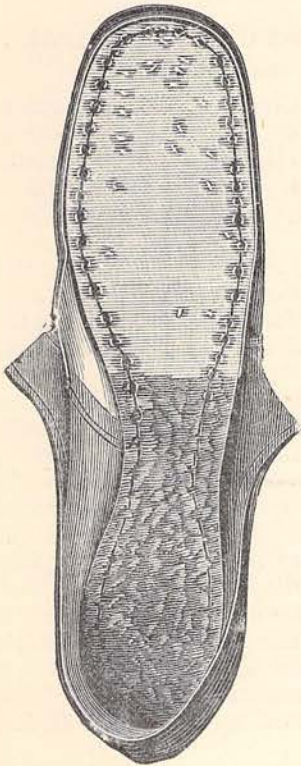


FIG. 40.

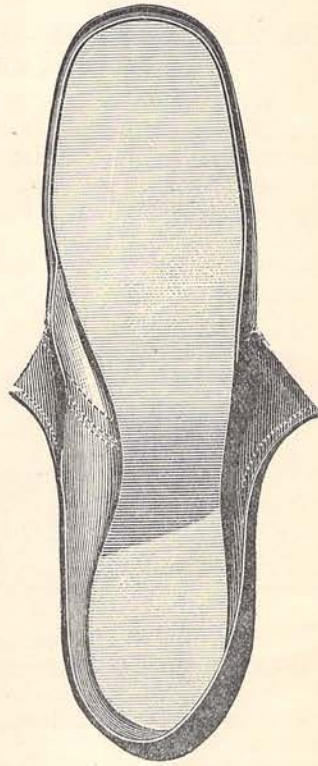


Fig. 39 shows the inside of the old sewed boots and shoes. Full of tacks, nails, and threads. Fig. 40, inside of the new Day sewed boots and shoes. No tacks, nails, or waxthreads, easy and comfortable to the feet, equal to custom-made.

The special machinery used in the manufacture of the Day sewed shoe is of recent date, the Day insole channeling machine having been patented in September, 1885, and introduced within the past few months.



**GROUP XXX—Paints, Drugs, Chemicals, and Spices.**

The Weikel & Smith Spice Company, No. 133 North Front street, Philadelphia, exhibited a large and varied assortment of very fine and valuable spices, both in their natural condition and conveniently prepared for family use. The collection comprised samples from the islands of Ceylon, Sumatra, and various other spice countries, and showed much taste and ingenuity in their arrangement. It also included a display of Lemberger's American oil polish paste blacking.

They also showed in operation Smyser's new automatic package-making and filling machine, the only machine of the kind on exhibition. It accomplishes as much work as eight expert packers, neater, more correct, and more uniform than can be done by human hands.

It pastes, folds, weighs, fills, and closes—in fact, makes and turns out packages complete, without being touched by human hands, at the rate of about ten a minute, attracting large crowds of visitors to witness its work, making the exhibit one of the most attractive in the main building, and reflecting much credit on the firm showing it.

**DEPARTMENT VI.—Home and Social Improvement.****GROUP XXXII—Household Machines.**

The Wheeler & Wilson Manufacturing Company, 1312 Chestnut street, Philadelphia, showed a large number of sewing-machines for family use and manufacturing purposes, with their late improvements, driven both by foot and steam power, in their special building and on the space of Frank D. Weylman & Co., shoe manufacturers, of Philadelphia.

Among those deserving special mention, are the New No. 8, with automatic tension, Fig. 41, intended for family use. It is the only lock-stitch machine in which no shuttle is used.

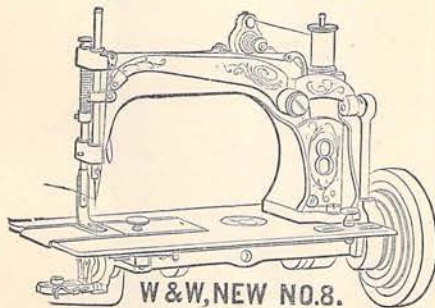


FIG. 41.

In this machine the threads are interlocked by means of a rotary-hook which constantly revolves in one direction and obviates the shocks which are produced at every stitch by the forward and backward movement of a shuttle. The needle-bar rises and falls with a regular motion, and does not stop in its upward movement to wait for the passage of a shuttle through the loop. These regular and easy movements, in connection with the excellent materials and perfect workmanship, secure the highest degree of speed, durability, and ease of action. Figs. 42 and 43 show the bobbins.

Radical improvements have just been completed, whereby it is rendered greatly superior to the recent style of machines bearing the same name.

It makes the lock-stitch which is alike on both sides of the work and does not rip or ravel, and produces a seam unrivalled for regularity, strength, and beauty. It will do all

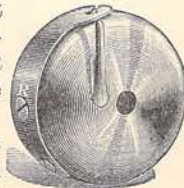


FIG. 42.

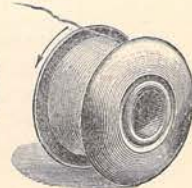


FIG. 43.

kinds of sewing, from the lightest gauze to the heaviest overcoat. If the machine be accidentally turned backward while sewing, the thread is not broken, nor is any harm done to the seam or to the machine.

The Keystone Manufacturing Company's (119 Craven street, Philadelphia, Pa.,) culinary beaters, of different sizes, were shown in operation and attracted much attention. Fig. 44 represents their No. 2 Universal Whip and Mixer.

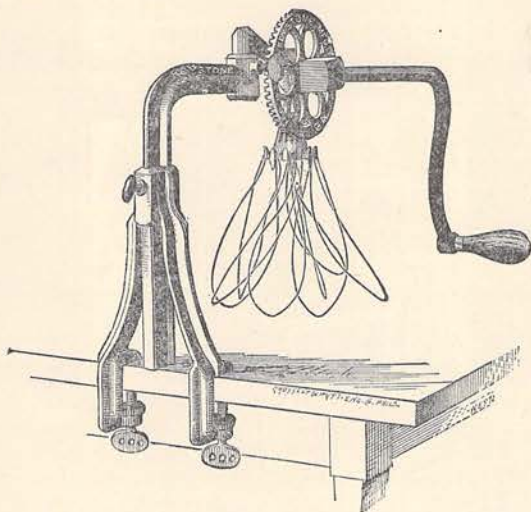


FIG. 44.

The operation of the beaters might properly be termed "a multiplied hand-method," as it simply employs a considerable number of pendant steel-spring-wire whips, and gives to them a motion from twenty to thirty times faster than the hand movement, in a vessel confining the batter. In other words, there are sixteen whips revolving at a speed of ten to twenty times per second. And each whip, being loose at its lower end, has a variety of additional movements, dependent upon the velocity of motion, and the varying resistance of the batter. The result is the greatest possible action on the batter. Added to this, the centrifugal force of the revolving whips concentrates the batter in their path near the sides of the vessel. The result is almost instantaneous mixing, and reducing to smoothness all batters, fruits, vegetables, &c.

But in the egg beater even greater action is obtained. An angular vessel is employed, by means of which the flow of the egg, or other liquid, is checked, while the whips dash forward through it. The angles or corrugations of the vessel communicate an additional irregular churning movement to the whips. It will be readily seen why the Keystone egg beater whips an egg stiff in one fourth of a minute.

The machine is readily cleaned after use, and may be used as an egg beater, fruit whip, churn, universal mixer, potato masher or whip, cake beater, vegetable whip, cream whip, vegetable defibrinator, culinary creamer.



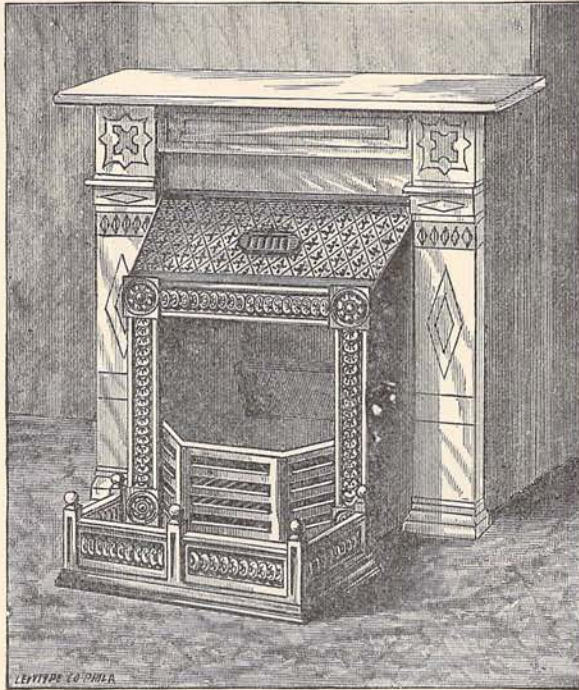
**GROUP XXXIII—Heating, Cooking, Ventilating, and Lighting.**

FIG. 45.

The Philadelphia Exhaust Ventilator Company, 121 North Fourth street, Philadelphia, also exhibited in operation Patton's patent hot water grate, a new apparatus heating several rooms with one fire, shown in Fig. 45, as a cheap method of heating with hot water. The apparatus represented above is an open or low-down grate, finished in different styles, for all grades of houses; is placed in the dining-room or parlor finished in plain, bronze, or nickel-plated front, different patterns, to set flush with the wall or against it. When the apparatus sets out from the wall, we get greater heat, thereby heating a greater space than ordinary low-down grates.

The apparatus represented above is a hollow casting on the sides, top, and back; as the hollow space is not large, the water is soon heated when the circulation begins. In setting the apparatus, two pipes are led from the casting to the rooms to be heated, through the flue to the radiator or coil of pipe, connecting them with wrought-iron pipes at the top and bottom, making a complete circulation of water as soon as the water in the apparatus is heated, which, being lighter than cold water, ascends through the pipe to the radiator, and maintains the circulation long after the fire is out. The moment the water gets cool, it returns to the bottom of the apparatus to be heated over again. Steam cannot be generated in the apparatus, as a small tank is placed at the highest point connecting with the return pipe.



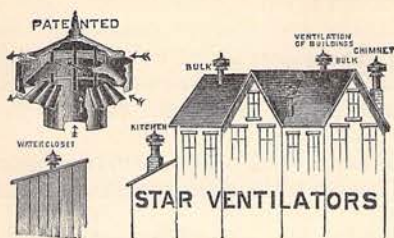


FIG. 46.

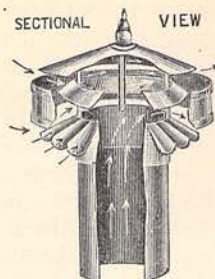


FIG. 47.

Star Ventilating Company, 6, 8, 10, and 12 Fetter Lane, Philadelphia, exhibited a number of their improved Star ventilators of different sizes for ventilation of churches, schools, factories, stables, residences, kitchens, bulks, bath-rooms, water-closets, out-buildings. They are well designed and constructed, and from experiments made with a small one, seem well adapted to the purpose for which they are designed. They are represented in elevation in Fig. 46, and in transverse section in Fig. 47, which convey a good idea of their construction and use.

**GROUP XXXVI—Education and Natural Science.**

The Polygraph, exhibited by the Polygraph Company, E. M. Goldsmith & Co., proprietors, Sixth and Arch streets, Philadelphia, is a new and ingenious invention, shown in Fig. 49, which also shows the mode of using it. By its aid drawings can be produced which formerly required long months of study and preparation. At the same time its accuracy and convenience render it of much practical use, as it combines in itself the qualities of straight and curved rules, dividers, protractor and scale, besides other auxiliary figures which enable one to produce many results, which could hitherto only be brought about by the use of complicated instruments. Its greatest advantage is the phenomenally short time in which designs may be drawn, thus suggesting and encouraging ideas of art. After following the intricate rules for constructing regular polygons of three, four, five, six, eight, ten, and twelve sides, the student finds great difficulty in obtaining correct results, while with the polygraph they can be accurately made, and in an incredibly short space of time.

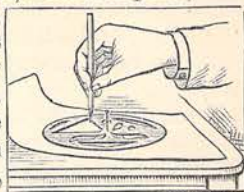


FIG. 49.

The American Machine Company, north-east corner Lehigh avenue and American street, Philadelphia, made a large and interesting display of their hardware specialties, among them the new "Perfection Scales," a very ingenious and convenient invention, dispensing with the use of movable weights, and made in a large number of different styles, one of which is seen in Fig. 50, showing the arrangement of the self-acting weights.

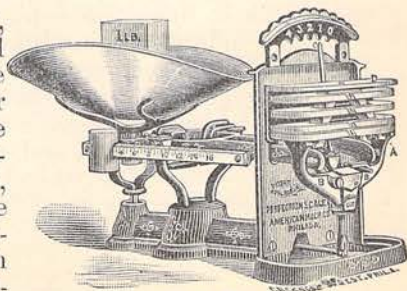


FIG. 50.

1, 2, 3, etc., are the weights suspended on a bracket and held one above another, with regular intervals of space between them, and



just above and in position to be acted upon by the weight jack, B B, resting on the lever pivots. The arrangement is such that, as goods are placed in the scoop the lever will turn, first raising the bottom weight off its seat, A, and then adding the others, one after another, until the lever turns sufficiently to raise them all off their seats on the bracket, when they will be resting on the lever.

The index finger is so arranged that it will move from one figure on the dial to the next just at the precise time such weight is balanced with goods and raised.

Thus, in the cut one pound placed in the scoop just raises weight 1 off its seat, A, and moves the index finger slowly up to figure 1 on the dial. Should another pound now be added to the scoop, it would raise weight 2, with the first, and bring the index finger to the figure 2 on the dial, and so on.

In use, exact weight is when the index finger moves very slowly up to the figure on the dial representing the weight required. It stands still before and after weight is obtained.

Intermediate or fractional weights are determined on the brass beam.

The hood, D, completely covers the weights, securing them in their position and also protecting them from dirt, etc.

Another form is the "Automatic Perfection Postal Scale," shown in Fig. 51, and designed to facilitate the weighing of mail matter of all classes. It is provided with a series of small automatic weights, and when letters or small packages are placed on the scale, the pointer instantly, and without vibration, indicates the weight on which postage must be paid, always including the fractional part of a unit as a full unit.

Thus, when the unit is one ounce, any parcel weighing one ounce or less will bring the pointer to the one-ounce mark; more than one and not more than two ounces, to the two-ounce mark, and so on. The one-fourth and one-half pound scale require no poise weight, the automatic weights balancing the entire capacity of scale.

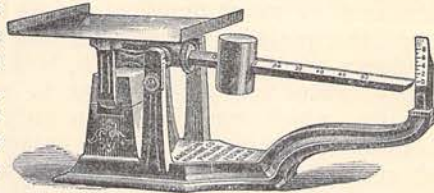


FIG. 51.

The poise weight on the beam of four pounds scale is movable only to multiples of the amount of the series of weights, and is to be used only when weighing heavy packages. Then, by moving it to the proper notch to bring the automatic weights into action, the pointer will at once indicate the additional weight of the package.

Thus, in the scale shown in the above cut, there are eight one-ounce automatic weights, which are indicated at the end of the beam, and the beam is notched at each eight ounces only. In weighing a parcel of more than thirteen ounces, and not more than fourteen ounces, the poise weight must be moved to the eight-ounce notch, when the end of the beam will at once point to the six,  $8 + 6 = 14$  ounces, which is the weight for postage.

#### GROUP XXXIX—Unclassified.

Charles Schaal, 405 North Thirteenth street, Philadelphia, exhibited a novel bedding for horses, peat moss stable bedding, imported

from Germany, which is now used in Europe most extensively, the city of London alone having consumed forty thousand tons during the last year.

The exhibitor claims that peat moss deodorizes the manure and thereby produces pure air so necessary to the health of the animals, who have otherwise to inhale the obnoxious ammonia gas. It makes a soft, clean bed, and horses' feet undergo a radical change, inasmuch as they become soft where they had been hard. Horses require less grooming, owing to the cleansing properties of the peat moss. When ignited, it only smoulders and does not, by flaming up like straw, endanger the lives of horses and cattle, as well as the building. It is a disinfectant. It yields a rich fertilizer.

That, if properly used, less than five hundred pounds will suffice for one horse per year; that its lasting qualities alone make it worth double the price of rye straw, and that horses lying or rolling in peat moss will turn out bright and clean.

#### DIRECTIONS FOR USE.

Put the peat moss into the stalls in small lumps, they will soon break up.

Make a bed eight inches deep.

Remove the dung, using shovel and wooden rake.

Mix the wet and the dry daily, and you will have a spongy bed, through which the air passes freely, and the bed remains in good condition for several months.

As the peat moss soaks in all liquid, there is no necessity for sewers, and where they are they should be plugged up.

It is imported in bales of two hundred and three hundred and fifty pounds, and it might be a profitable discovery, if it could be found in this country.