4 Sheets—Sheet 1.

F. A. PRATT & J. R. REYNOLDS.

MACHINE FOR VARNISHING THE INTERIOR OF CARTRIDGE SHELLS.

No. 189,057. Patented April 3, 1877.

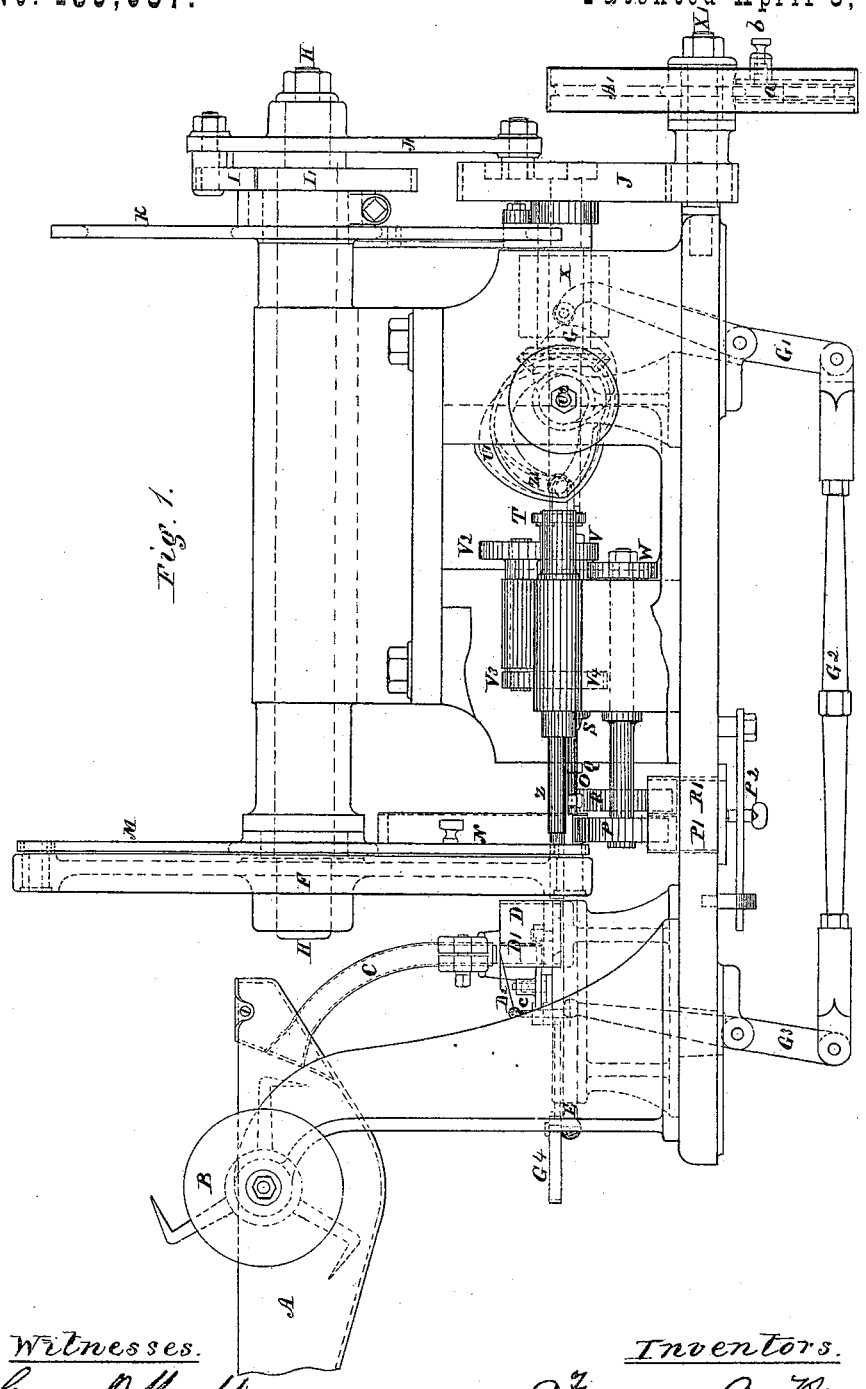

Fig. 1.

Witnesses.
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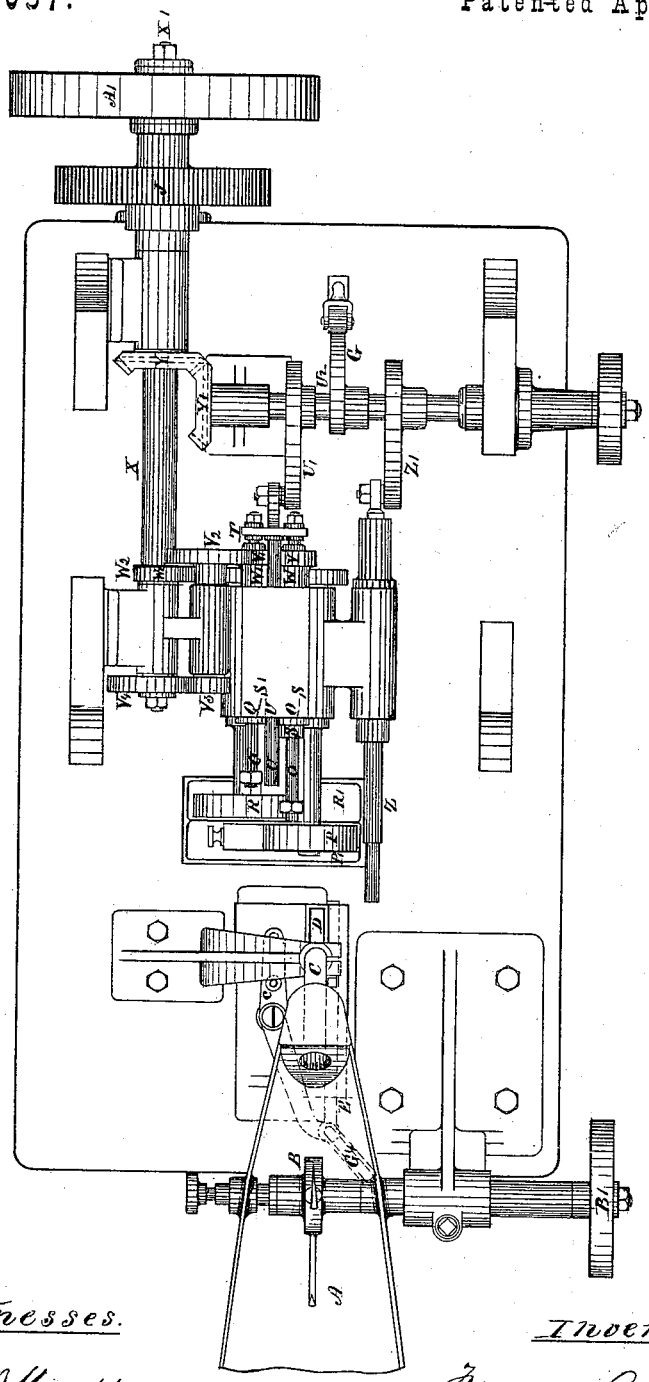

Fig. 2.

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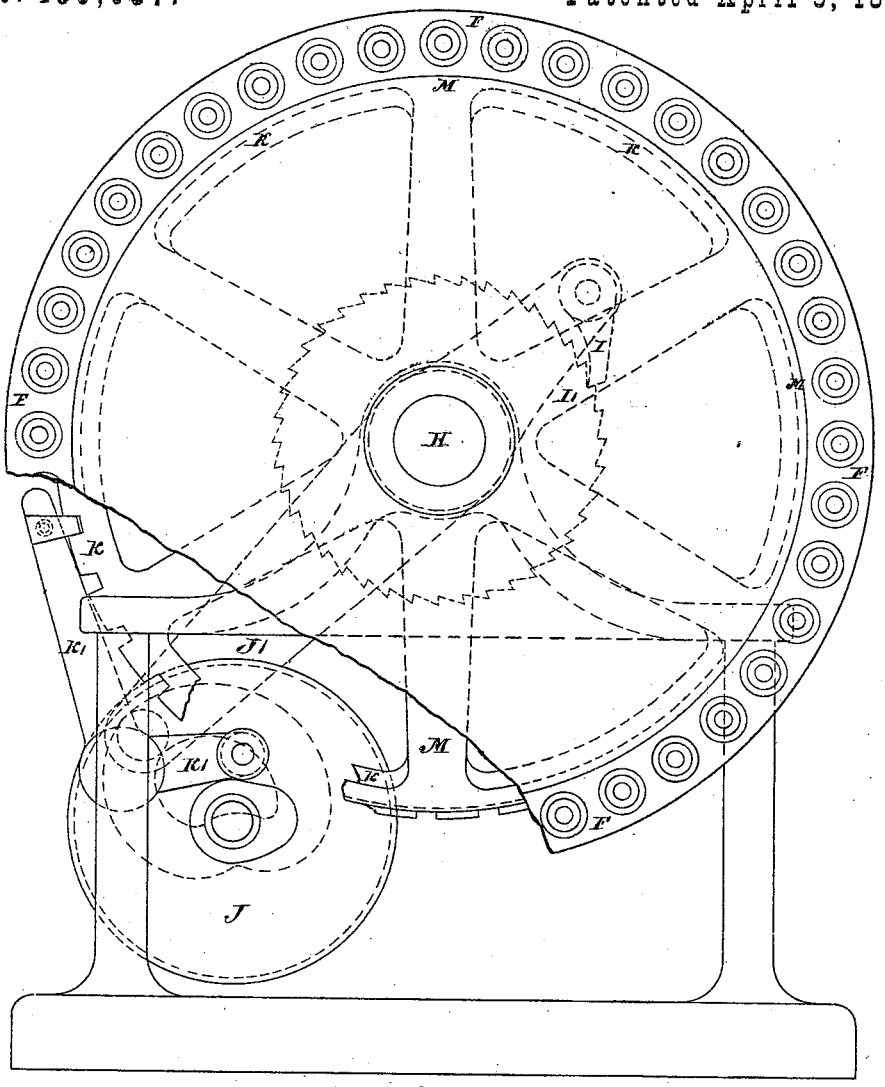

Fig. 3.

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MACHINE FOR VARNISHING THE INTERIOR OF CARTRIDGE SHELLS.

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Fig. 4.

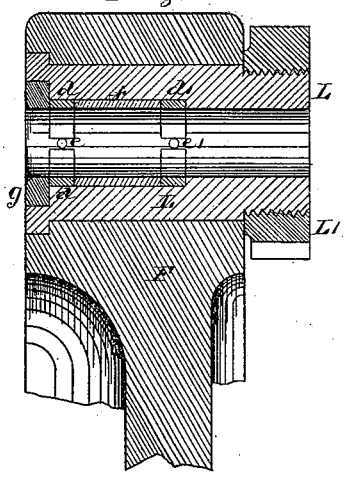


Fig. 5.

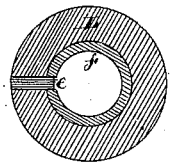
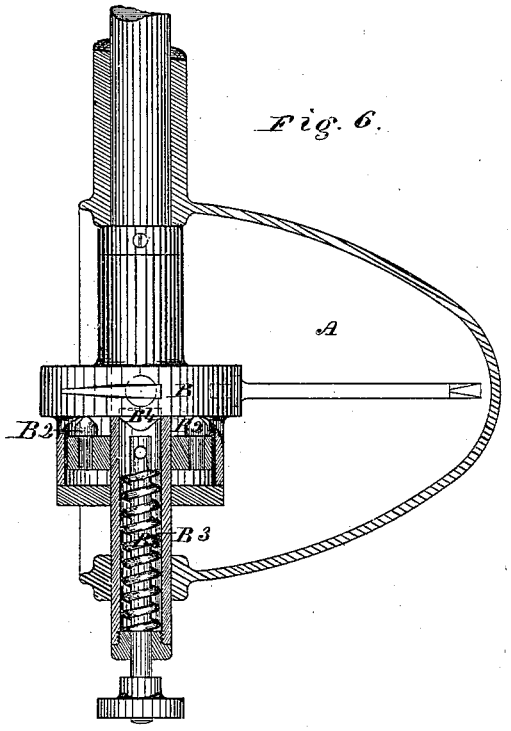


Fig. 6.



Witnesses.

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UNITED STATES PATENT OFFICE.

FRANCIS A. PRATT AND JOHN R. REYNOLDS, OF HARTFORD, CONNECTICUT, ASSIGNORS TO THE PRATT & WHITNEY COMPANY, OF SAME PLACE.

IMPROVEMENT IN MACHINES FOR VARNISHING THE INTERIOR OF CARTRIDGE-SHELLS.

Specification forming part of Letters Patent No. **189,057**, dated April 3, 1877; application filed February 2, 1877.

To all whom it may concern:

Be it known that we, FRANCIS A. PRATT and JOHN R. REYNOLDS, of Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Machines for Varnishing the Interior of Metallic Cartridge-Shells; and we do hereby declare that the following is a full, clear, and exact description thereof, whereby a person skilled in the art can make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

Like letters in the figures indicate the same parts.

Our invention has for its object the coating of the interior of metallic cartridge shells or cases with a suitable covering of varnish, to prevent any injurious action of the metal upon the powder or fulminate. This has heretofore been done by hand, and is a laborious process. There is also great uncertainty whether the work has been thoroughly performed and an even coating of varnish spread over the entire inner surface of the cartridge-case.

Our invention is intended to obviate these difficulties, and to perform this operation in a more rapid, thorough, and workmanlike manner.

The said invention consists in a machine, the construction and operation of which will be hereinafter described.

In the accompanying drawings, on four sheets, Figure 1 is a side elevation of our improved machine, showing the concealed parts in dotted lines. Fig. 2 is a top view, with part of the upper work removed, in order to show the varnishing and wiping mechanism beneath. Fig. 3 is a front view of the large disk for receiving, holding, and conveying the cartridge-shells during the operation of varnishing. Part of this wheel or disk is removed to show the parts back of it, and other parts are shown in dotted lines. Fig. 4 is a section through one of the cells for holding the cartridge-cases, showing the construction of the parts. Fig. 5 is a section through the rotating arbor which carries the shell. Fig. 6 is a vertical section through the shaft and hopper of the feeding mechanism, showing the details upon a larger scale.

A is a hopper, in which the shells to be varnished are placed. They are picked up by the revolving arranging mechanism B upon one of the hooks, and are dropped, head foremost, into the conveying-spout C. They are received in a sliding box, D, into which they fall, with the head resting upon a shelf or ledge, which extends under about half the width, to support the rear part and give a tendency to fall forward. The shell is held in this position by a partition in the box D, which is attached to the frame, and which does not move with the box, but passes through a slit in the side in the position marked D^1, in Fig. 1. The box then moves laterally to the right, leaving the partition D^1, and the shell falls over forward into a horizontal position, in which movement it is aided by the inclined wire D^2, against the forward surface of which the top end of the shell strikes as it moves to the right.

After the shell has fallen over into the bottom of the box D, with its head to the rear, the plunger E moves forward and pushes the shell into one of the cells in the large disk F. This plunger is operated by the cam G and the connecting rods and levers G^1 G^2 G^3, and the sliding box D is operated from the same mechanism by the lever G^4.

The wheel B, which picks up and drops the shells into the spout C, is driven by the pulley B^1, and is loose upon the shaft, to which it is connected by the engaging device shown more particularly in Fig. 6. B^2 B^2 are studs, which are pressed against the face of the wheel B by means of the spring B^3. These studs engage with projections B^4 upon the face of the wheel B, which are of such a form that any clogging of the wheel B will cause the spring to yield and allow the studs to pass over the projections. The spring can also be drawn back by hand and allow the wheel B to turn freely.

The projections B^4 are inclined on both sides, so that as the studs B^2 pass over them the pressure of the spring B^3 acts to throw the wheel B back and release any shell that is causing it to clog and stop.

The large rotating disk F is keyed to the shaft H, and receives an intermittent motion from the pawl and ratchet I I^1, which turn it

the distance between the cells at each movement. This pawl is operated by a cam in the wheel J, and a rocking lever, J^1, upon the shaft H. The shaft H also has keyed to it the locking-wheel K, which is provided with notches around its circumference, into one of which the pawl K^1 drops at each movement of the disk F, to lock it in exactly the proper position.

The disk has around its circumference a series of cells for holding the cartridge-shells while being varnished. They are constructed as shown in the enlarged views, Figs. 4 and 5. The hollow cylinder L turns in a socket in the disk F, and has upon its inner side the small gear-wheel L^1. This wheel runs in a rack upon the circumference of a circular plate, M, fixed to the frame of the machine, as shown in Fig. 1, so that as the disk F rotates all of the cells turn in their sockets.

To the plate M is attached a spring-plate, N, through the lower end of which is an orifice of the exact interior diameter of the cartridge-shell to be varnished. The ends of the shells which project a little beyond the face of the cells, pass under the lower end of this spring, and fit closely against it, the orifice in the spring being adjusted in such a position as to be exactly over the bore of the shell when it stops to be varnished. This is for the purpose of preventing any varnish from passing around the edges to the exterior of the cartridge-shell.

The varnishing mechanism consists of a rotating brush or swab attached to the spindle O, which enters the cartridge-shell as it stops in the proper position, and passes entirely down to the bottom while turning, thus completely covering its interior surface. The brush is charged with varnish by running upon the upper side of a roller, P, which dips into a box, P^1, containing a supply of the fluid. This box is removable when required by turning aside the bar P^2.

The wiping mechanism consists of a brush or swab attached to the revolving spindle Q, which enters the cartridge-shell after it has been coated with the varnish, and wipes out the end which is to receive the bullet to such a depth as may be desired. This brush is charged with alcohol or other fluid suitable for removing and dissolving the varnish, by running upon the top of the roller R, which dips into a box, R^1, containing the fluid, in the same manner as for the varnishing mechanism.

The spindles O and Q, which carry the varnishing and wiping brushes, receive a reciprocating motion back and forth through the rotating bushings S S^1. They are connected at the rear end by means of a cross-head, T, which also carries a guide-rod, U, and they are moved together by means of the cam U^1 upon the shaft U^2.

Upon the rear ends of the rotating sleeves S S^1 are the gear-wheels V V^1, which are driven by means of the gear-wheels V^2 V^3 V^4, to give them a rapid rotary motion.

The rollers P and R are hung upon shafts, which have at their rear ends the gear-wheels W W^1. These are driven by the wheel W^2 upon the main shaft X, which likewise drives the wheel V^4.

The shaft U^2 is driven from the shaft X by means of the bevel-gear wheels Y Y^1.

Z is a plunger for driving out the shell from the disk F after it has been varnished. It is operated by the cam Z^1 upon the shaft U^2, so as to advance and push out a shell each time that the disk F moves one space. The shells fall down upon the front side of the disk, and are carried to a proper receptacle by means of a spout.

The machine is driven by means of the wheel or pulley A^1 upon the shaft X^1. To prevent clogging and consequent breakage of any parts of the machine, the pulley A^1 is provided with a device for releasing it from the shaft whenever any undue force is required to drive the machine. *a* is a bolt with a wedge-shaped end, which enters the shaft X^1. This is forced out and is held by a pin, *b*, which enters a slot in *a* whenever the force required is too great. A similar contrivance is attached to the lever-arm which carries the box D. A pin, *c*, communicates motion to the box D; but when the box becomes clogged, the extra force required slips the pin out of its bearing by acting upon its taper point, and allows the lever to move without the box.

For the purpose of holding the cartridge-shell in the cell of the disk F, and giving it sufficient friction to prevent its turning in the socket during the operations of varnishing and wiping, above described, the following device is used, (see Figs. 4 and 5:) *d d'* are two split rings, into the split of which the pins *e e'* enter, to hold them from turning in the socket L. They are made with an opening a little smaller than the cartridge-shell, so that when it is pressed in it is held firmly by them.

f is a bushing between the rings to hold them in position. The rings and the bushing are retained in the socket by the ring *g*, which is secured in its place by screws.

The operation of our invention is as follows: The shells are placed in the hopper A, from which they are picked up automatically and conveyed by the spout C to the box D, whence they are inserted into the cells of the disk F, as before described. As the disk F rotates intermittently, the consecutive cells holding the shells stop opposite the varnishing and wiping brushes, which pass forward at the right time and enter the shell while the disk stops. Both operations are performed at the same time upon two adjacent shells. The shells remain in the cells of the disk, after the varnishing and wiping operations, while it makes nearly one revolution around to the extracting-plunger Z. While passing around the shells are constantly rotated on their axes

by the rolling of the small gear-wheels upon the rack around the rim of the wheel M. We thus prevent the running of the varnish, and cause it to dry evenly upon the inside of the shell.

The disk F is made sufficiently large to give the varnish time to dry while traversing the distance from the varnishing mechanism to the ejector.

When each shell reaches the position of the plunger Z it is pushed out and falls into a suitable receptacle.

Shells of different diameters and lengths can be varnished in the same machine by providing a disk, F, adapted for each size. The disks and brushes suitable for any shells can be substituted for each other in the same machine without difficulty within the ordinary differences of dimensions used.

What we claim as our invention is—

1. The rotating disk F with its revolving spring-cells for holding the cartridge-shells, substantially as herein described.

2. The disk F in combination with a varnishing and wiping mechanism, substantially as herein described.

3. The disk F in combination with an arranging, conveying, and feeding mechanism, substantially as herein described.

4. The disk F in combination with an ejecting-bar for removing the shells, substantially as herein described.

5. The combination of the mechanism for intermittently rotating the disk F, the mechanism for operating the varnishing and wiping brushes, and the mechanism for ejecting the shells with the disk, brushes, and ejecting-bar, substantially as herein described.

6. The spring-plate N in combination with the series of rotating cells in the disk F, substantially as and for the purpose herein described.

7. The conveying-box D and its operating mechanism, substantially as herein described.

8. The combination of the studs B^2 and the spring B^3 with the projections B^4 on the wheel B, as an engaging device, substantially as herein described.

9. The spring-bands $d\,d'$ in combination with the cells L, for holding the cartridge-shell, substantially as herein described.

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