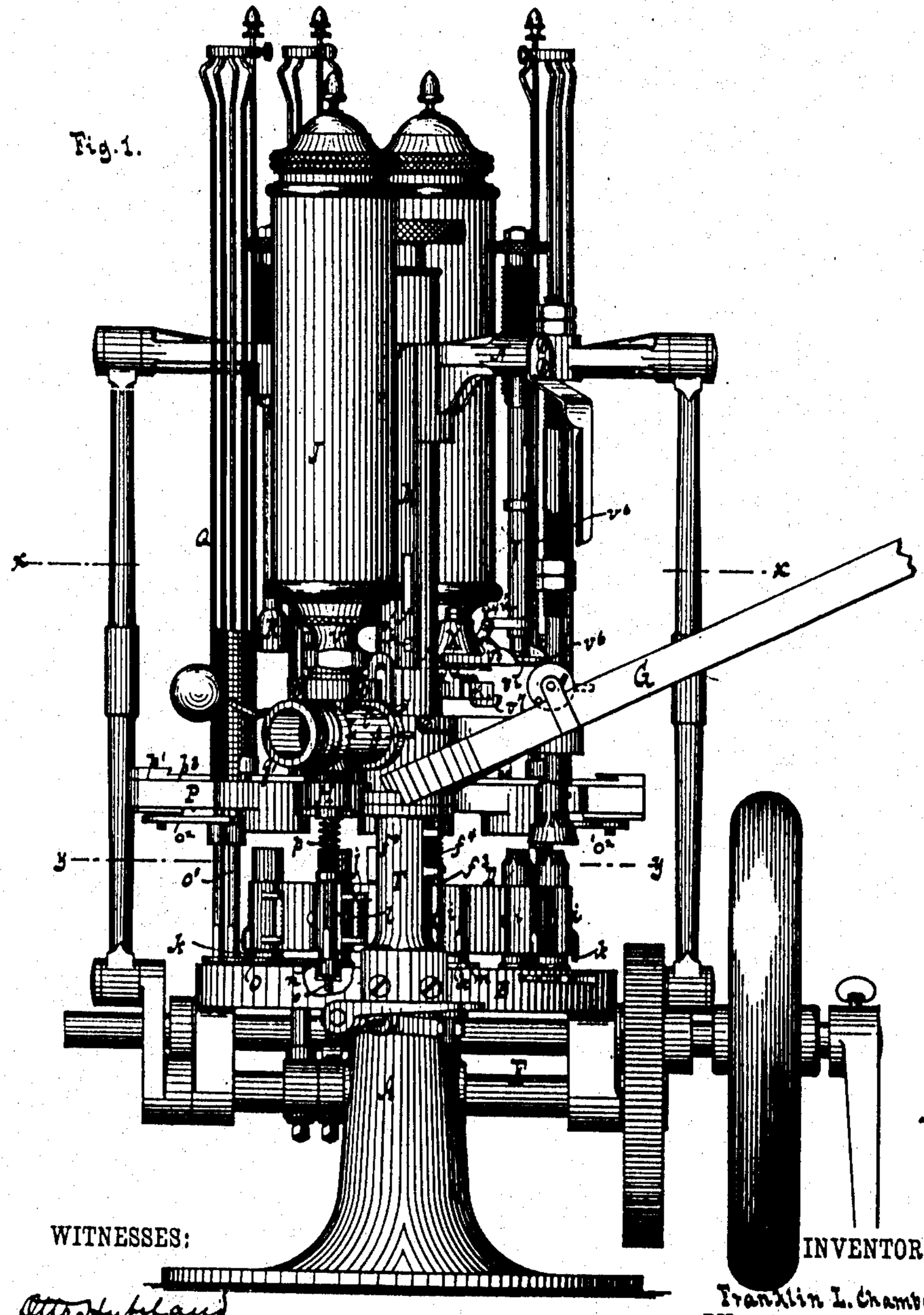
(No Model.) 5 Sheets—Sheet 1.

F. L. CHAMBERLIN.

CARTRIDGE LOADING MACHINE.

No. 336,384. Patented Feb. 16, 1886.

Fig. 1.



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F. L. CHAMBERLIN.

CARTRIDGE LOADING MACHINE.

No. 336,384. Patented Feb. 16, 1886.

Fig. 2.

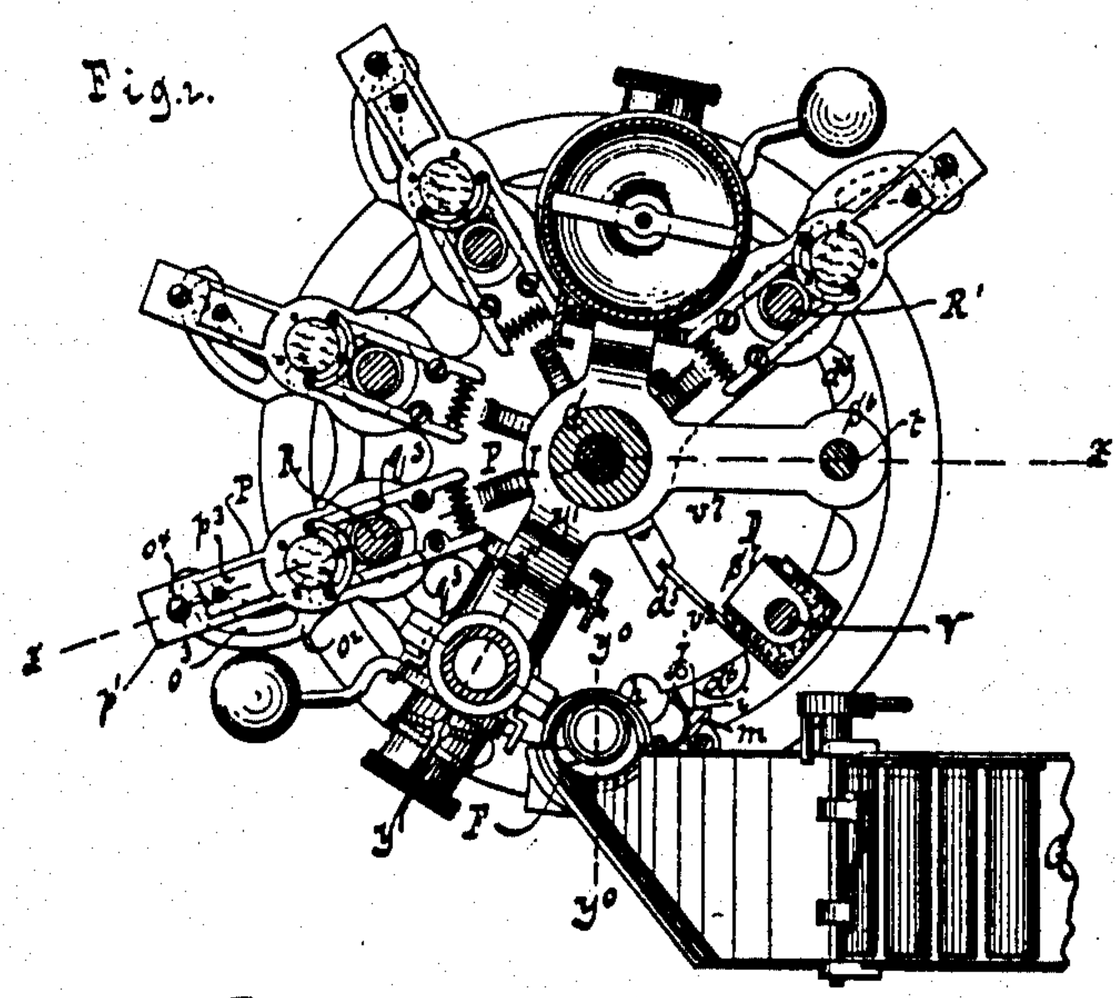
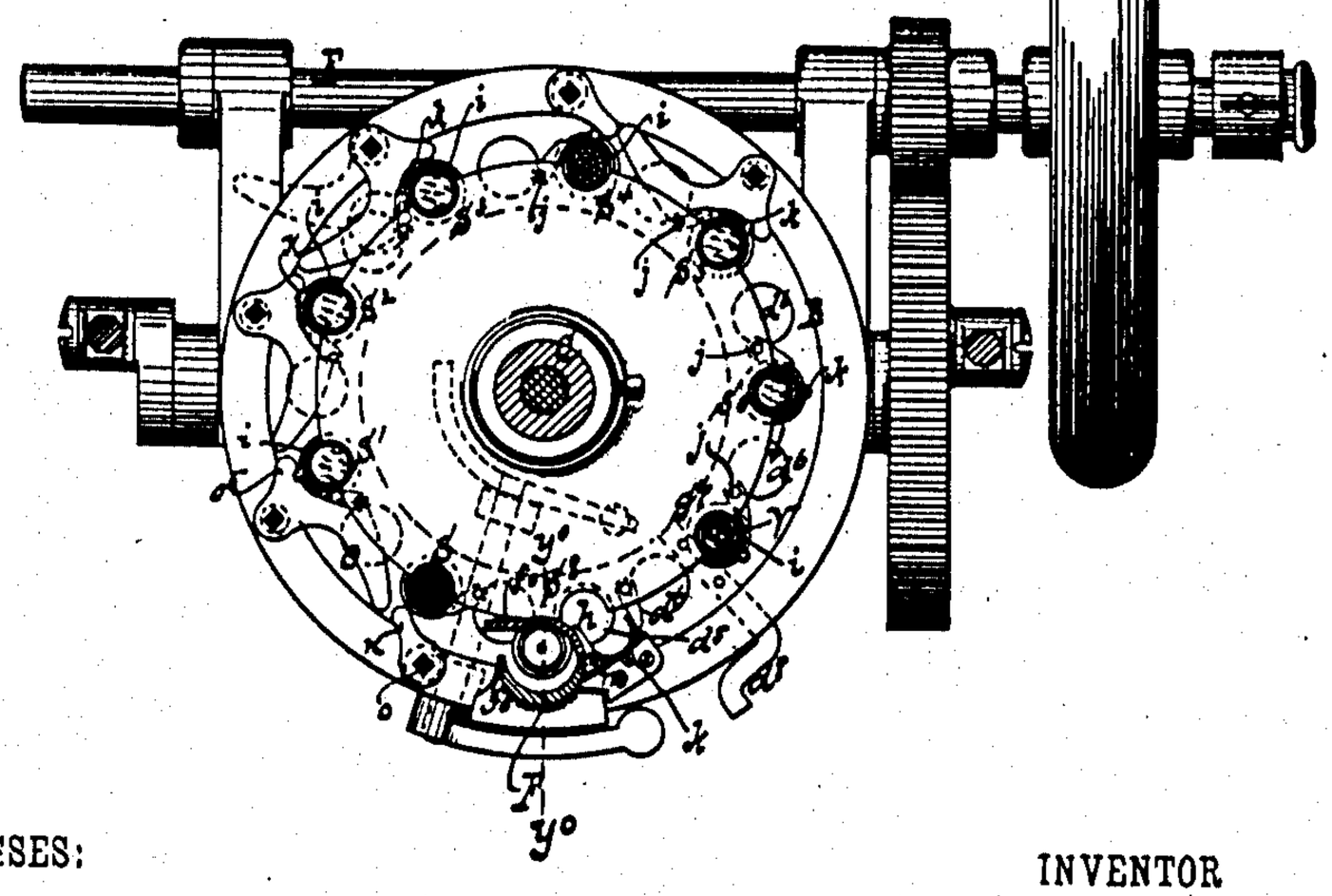


Fig. 3.



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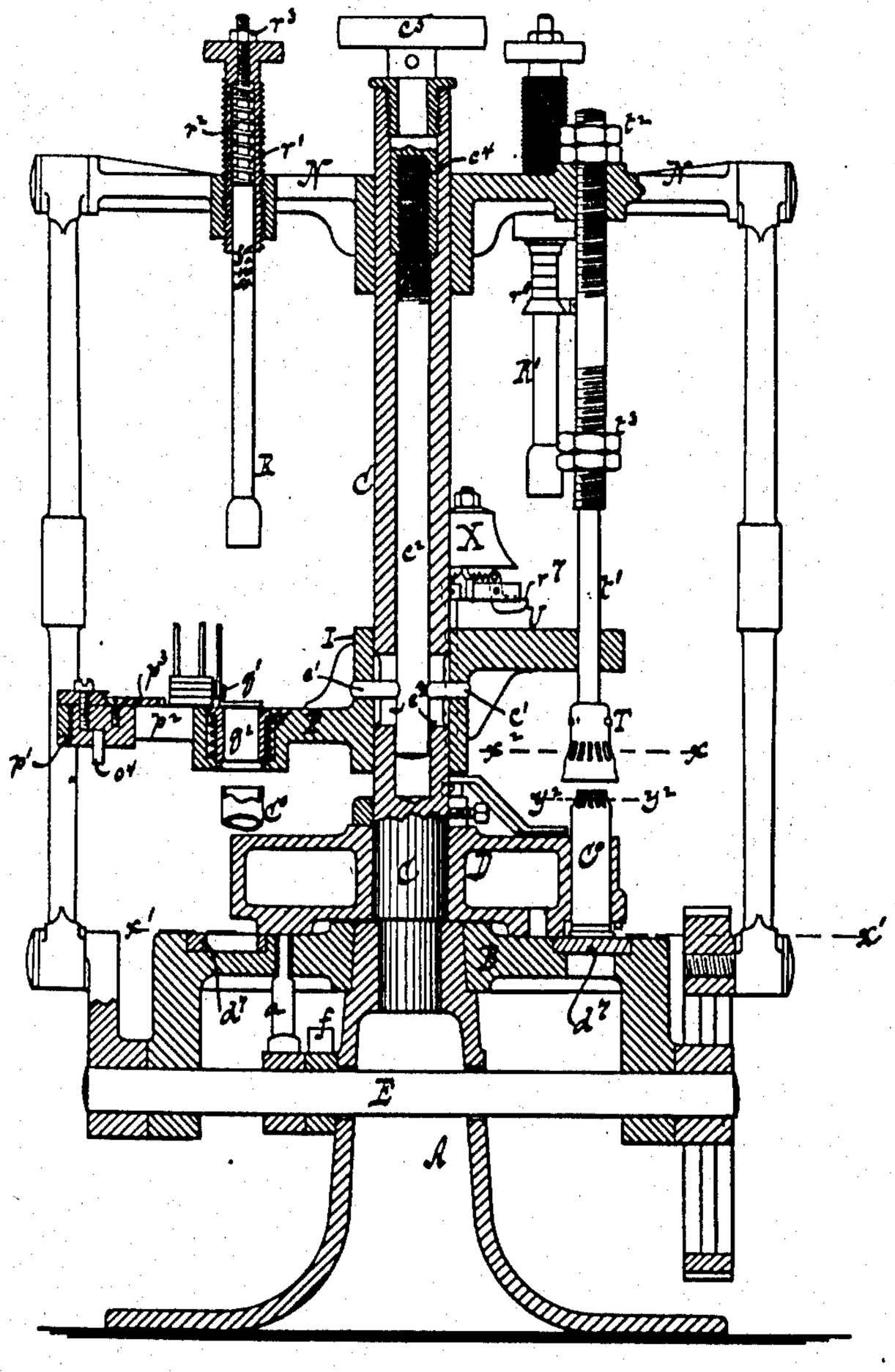
(No Model.) 5 Sheets—Sheet 3.

F. L. CHAMBERLIN.

CARTRIDGE LOADING MACHINE.

No. 336,384. Patented Feb. 16, 1886.

Fig. 4.



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F. L. CHAMBERLIN.

CARTRIDGE LOADING MACHINE.

No. 336,384. Patented Feb. 16, 1886.

Fig. 5.

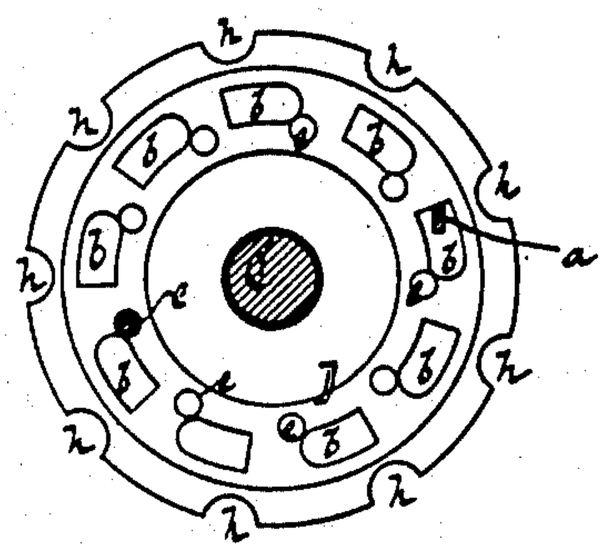

Fig. 6.

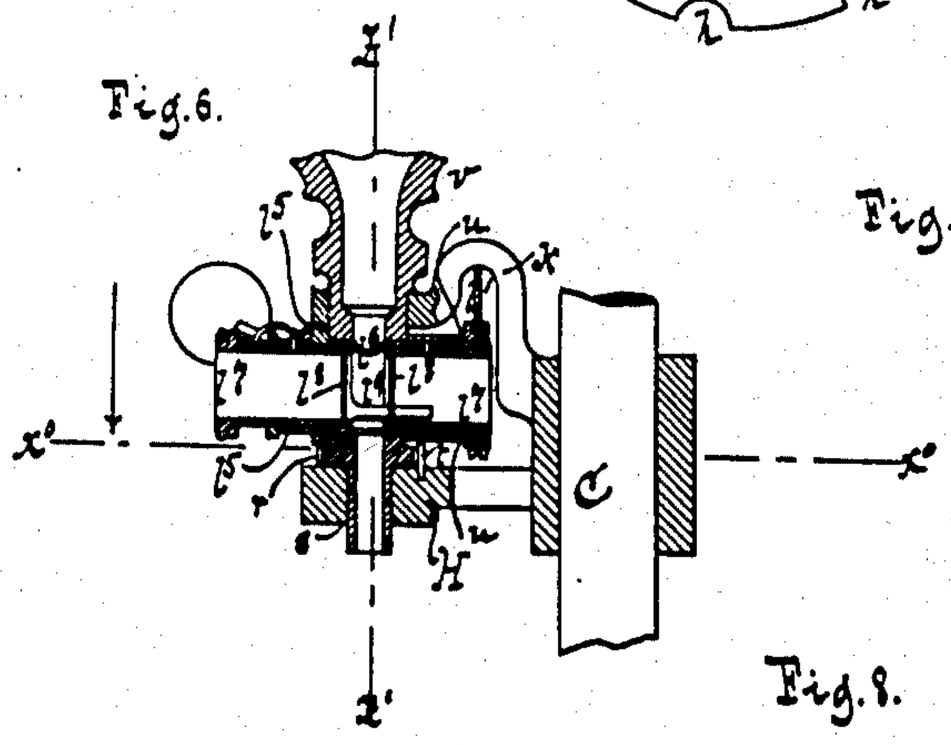

Fig. 7.

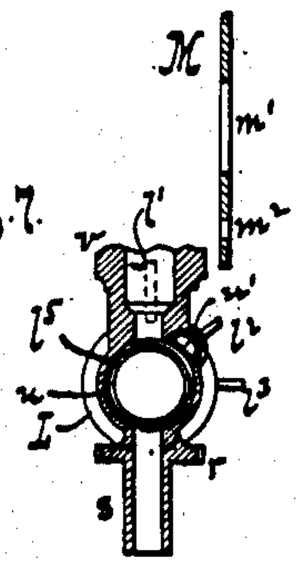

Fig. 7.*

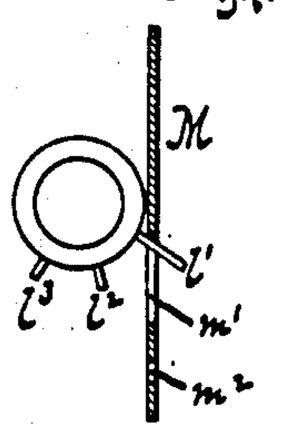

Fig. 8.

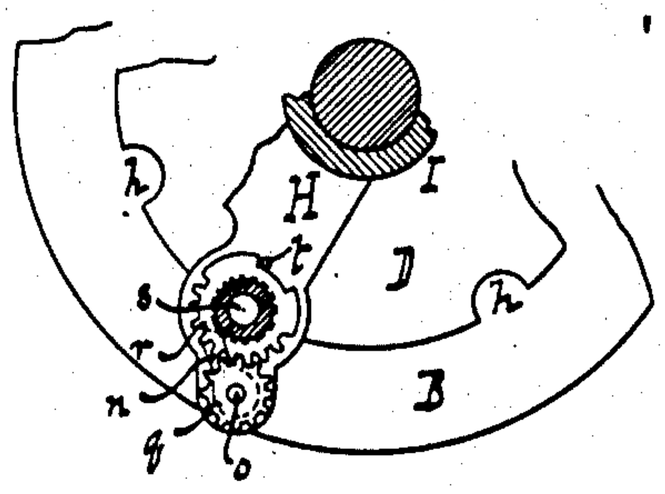

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Fig. 10.

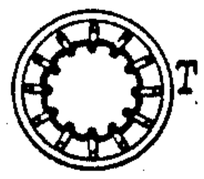


Fig. 11.

Fig. 12.

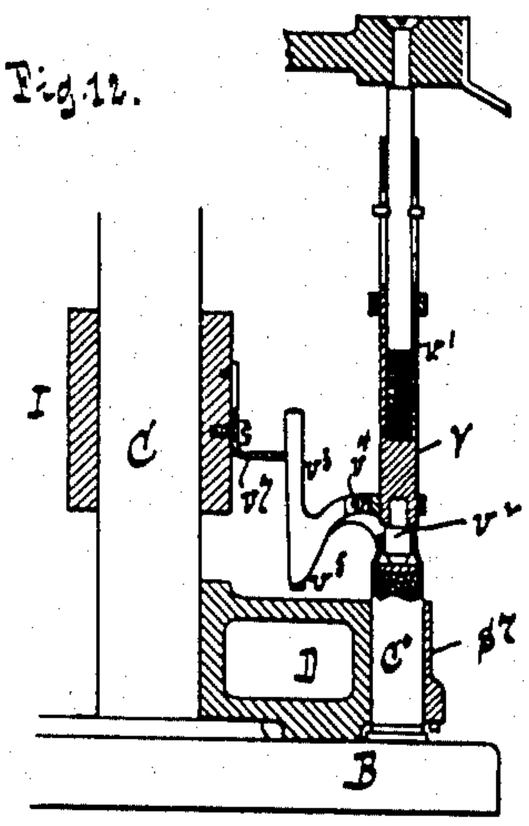
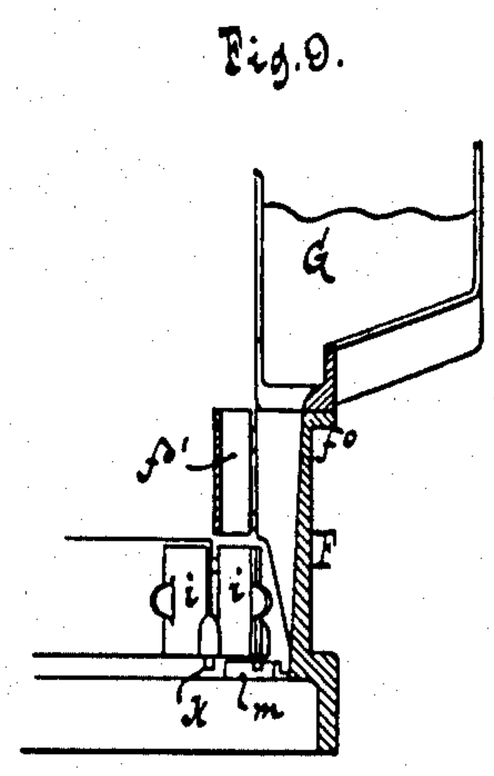


Fig. 9.



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UNITED STATES PATENT OFFICE.

FRANKLIN L. CHAMBERLIN, OF CLEVELAND, OHIO.

CARTRIDGE-LOADING MACHINE.

SPECIFICATION forming part of Letters Patent No. 336,384, dated February 16, 1886.

Application filed May 28, 1885. Serial No. 166,004. (No model.)

To all whom it may concern:

Be it known that I, FRANKLIN L. CHAMBERLIN, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga, in the State of Ohio, have invented new and useful Improvements in Cartridge-Loading Machines, of which the following is a specification.

This invention relates to certain improvements in machinery for filling cartridge-shells, the nature of said improvements being pointed out in the following specification and claims, and illustrated in the accompanying drawings, in which—

Figure 1 represents a front view. Fig. 2 is a horizontal section in the plane *x x*, Fig. 1. Fig. 3 is a similar section in the plane *y y*, Fig. 1. Fig. 4 is a vertical section in the plane *z z*, Fig. 2. Fig. 5 is a horizontal section in the plane *x' x'*, Fig. 4, looking upward. Fig. 6 is a vertical section of the powder or shot discharge in the plane *y' y'*, Fig. 2. Fig. 7 is a vertical section in the plane *z' z'*, Fig. 6, when the discharge is closed. Fig. 7* is a similar view when the discharge is in position to be opened. Fig. 8 is a horizontal section in the plane x^0 x^0, Fig. 6. Fig. 9 is a vertical section in the plane y^0 y^0, Figs. 2 and 3. Fig. 10 is a transverse section of the crimper in the plane x^2 x^2, Fig. 4. Fig. 11 is a transverse section of the cartridge-shell when crimped in the plane y^2 y^2, Fig. 4. Fig. 12 is a sectional view of the marking device.

Similar letters indicate corresponding parts.

In the drawings, the letter A designates a column which supports the platform B, and in which is firmly secured the vertical spindle C.

D is the shell-carrier, which rests upon the platform B and turns loosely upon the spindle C. A step-by-step movement is imparted to the carrier by any mechanism suitable for this purpose—such, for instance, as a dog, *a*, which extends from the main shaft E, Figs. 1 and 4, and which engages with a series of cavities or recesses, *b*, Fig. 5, in the bottom surface of the carrier. After each forward movement the carrier is locked by a stop-pawl, *c*, Figs. 1 and 5, which engages with one of the holes *e*, and which is thrown out of such hole by a cam, *f*, Fig. 1, which is mounted on the main shaft, and acts upon a lever, *g*, just before the next forward movement of the carrier is to take place. The lever *g* can be depressed by hand so as to release the carrier whenever it is desirable. In the circumference of the carrier are a series of semicircular recesses, *h*, which correspond in number and position to the number and position of the propelling-cavities *b*. In the example shown in the drawings nine such cavities are shown, so that for each revolution of the main shaft the carrier is turned one-ninth of a whole revolution. Each of the semicircular recesses *h* in the carrier is provided with a semicircular door, *i*, which swings on a vertical pivot, *j*, Figs. 1, 2, and 3, and which is provided with a pin, *k*, Figs. 1 and 3, projecting beneath its bottom edge. The door is normally retained in a closed position by a spiral spring, *l*, wound round its pivot, (see Fig. 1;) but as the carrier revolves the pin *k* of each door engages with a stationary cam, *m*, (see Figs. 1, 2, and 9,) which is firmly fastened to the platform B in close proximity to the tube F, through which the cartridge-shells are fed to the machine. The tube F consists of a stationary section, f^0, which is firmly secured to the platform B, and the lower portion of which is cut away to such an extent that it permits the door *i* to pass on its inside. (See Fig. 9.) That portion of the stationary section f^0 which is situated above the carrier D is semi-cylindrical, (see Fig. 3,) and the movable section f^w is hinged thereto by a vertical pivot, f^3, round which is coiled a spring, f^4, Fig. 1, which has a tendency to keep said movable section closed, so that the same, together with the stationary section f^0, forms the tube F. A cartridge-shell dropped into this tube rests upon the platform B in a vertical position, and as the carrier D revolves in the direction of the arrow, (shown near it in Fig. 3,) the door *i*, next to the tube F, is gradually opened by the cam *m*, so that it passes in front of the shell situated in the tube F, and when the pin *k* of the door has passed the cam *m* the door closes and forces the shell into the recess *h* of the carrier. The motion of the carrier is so timed that the carrier remains stationary in the position shown in Fig. 3, the door *i* of the recess *h* being partially open. On the next forward movement of the carrier the recess *h* is moved beyond the tube F, and during this

movement the door *i* closes upon the shell in the tube, and as the motion of the carrier continues, the movable section f^{6} of the tube F is forced open against the action of its spring, and the shell is carried to the position indicated by the letter S in Fig. 3, and hereinafter designated as the "first station." Immediately after the shell has passed out of the tube F the movable section of this tube closes, leaving the tube in the proper condition for the reception of the next shell.

The shells may be dropped into the tube F by the person tending the machine, or they may be fed to said tube over a chute, G, such as shown in Figs. 1 and 3. When the chute is used, it is made long enough to receive a large number of cartridge-shells, and it is provided with an automatic cut-off which permits the shells to drop into the tube F successively at the proper intervals. As the shell contained in the tube F is carried out of this tube to the first station, S, Fig. 3, its rim acts upon a lever, *n*, which is firmly mounted upon a vertical spindle, *o*. The foot of this spindle has its bearing in a socket formed in the platform B, and it extends up through an arm, H, which extends from a hub, I, mounted upon the vertical spindle C. (See Figs. 1, 6, and 8.) Round the spindle *o* is coiled a spring, *p*, Fig. 1, which has a tendency to throw the lever *n*, Fig. 3, inward toward the carrier D; and on the upper end of said spindle *o* is mounted a pinion, *q*, which meshes into a segmental gear, *r*, mounted on a vertical tube, *s*. (See Figs. 6, 7, and 8.) The movement of the segmental gear *r* is limited by a stop, *t*, Fig. 8. The tube *s* has its bearing in the arm H, and it extends from a shell, *u*, from which rises the cup *v*, which supports the powder-container J. The neck of the cup *v* fits a socket formed in the end of an arm, K, which extends from the hub I, so that when the lever *n* is moved outward by the action of the shell in the first station, S, Figs. 3 and 8, the powder-container is swiveled into the position shown in Figs. 6, 7, 7*, and 8. The object of this movement of the powder-container is to throw the powder-discharge L in gear with the mechanism which serves to open the same at the proper time. This powder-discharge consists of a tube, l^{5}, which fits the shell *u*, and is provided with a segmental opening, l^{6}. By turning the tube l^{5} in the shell *u* the opening l^{6} can be brought in position to communicate with the cup *v*, or with the discharge-tube *s*. In the tube l^{5} are fitted the measuring-tubes l^{7}, the heads l^{8} of which leave a space, l^{9}, which, whenever the opening l^{6} communicates with the cup *v*, becomes charged with powder, and when the tube l^{5} is turned in the direction of the arrow marked near it in Fig. 7, so that the opening l^{6} communicates with the discharge-tube *s*, the powder contained in the measuring-space l^{9} flows out into the shell beneath.

For the purpose of turning the tube l^{5}, whereby the powder-discharge L is opened, I use a bar, M, which is provided with two slots, m' m^{2}, and which is secured to a cross-head, N, which is guided on the central spindle, C, and to which a rising-and-falling motion is imparted from the main shaft E. From the tube l^{5} extend three pins, l' l^{2} l^{3}, and when the powder-discharge is in the position shown in Figs. 6, 7, and 7* the plate M, on its downward movement, first strikes the pin l^{3} and turns the tube l^{5}, so as to throw the pins l^{2} l' in gear with the slots m^{2} m', respectively, and to bring the opening l^{6} over the discharge-tube *s*. The slot *m* is of such a length that the opening l^{6} remains over the discharge-tube *s* a sufficient length of time to allow all the powder contained in the space l^{9} to flow down into the shell. On the upward movement of the bar M the tube l^{5} is turned back to its normal position. It will be seen from this description that the powder-discharge L will not be opened if it is not turned into position to bring the pins l' l^{2} l^{3} in gear with the bar M, and since this movement is produced by the action of the shell which is to receive the powder, no powder will flow from the discharge unless the shell which is to receive the same is in the proper position. By placing the operation of opening the powder-discharge under the control of the shell to be charged the danger of spilling the powder over the machine during the operation of loading the shells is avoided, and the operation of loading the cartridges by means of my machine can be carried on with perfect safety, whereas if the operation of opening the powder-discharge is controlled by means independent of the shell to be charged, and it happens that no shell is in position to receive the powder, when the discharge is opened, such powder will be spilled over the machine, and may be liable to cause an explosion.

The shot-discharge is constructed precisely like the powder-discharge. The shell *u*, Fig. 7, may be provided with a packing, *w'*, so as to prevent the powder or shot from passing between said shell and the tube l^{5}. The cartridge-shell, after having been charged with powder, is moved to the second station, S', by the next movement of the carrier, and as soon as the shell releases the lever *n*, the spindle *o* follows the action of the spring *p*, and the powder-discharge is returned to its normal position, in which it is not affected by the bar M. As the shell is being carried from the first to the second station its rim acts upon the lever O, which is mounted upon a vertical spindle, *o'*. This spindle has its bearings below in a socket in the platform B, and above in an arm, P, which extends from the hub I, Figs. 1 and 3. On the spindle *o'*, near its upper end, is firmly mounted a lever, o^{1}, with a curved slot, o^{2}, which engages with a pin, o^{4}, Figs. 3 and 4. This pin projects from a carriage, *p'*, which moves in a radial slot, p^{2}, in the arm P, and which carries the wad-pusher p^{3}. The wad-container Q consists of a series of vertical rods, or of a tube, and it is provided with a gate, *q'*, which can be adjusted so that the

lowest wad in the wad-container can be pushed out by the pusher p^3. As the rim of the shell passes the lever O the pusher p^3 is forced inward by the slotted lever o^2 and the lowest wad is carried over the thimble q^2, Fig. 4, where it is retained by two spring-jaws, q^3, Fig. 2. The pusher p^3 is immediately drawn back by the action of the rim of the shell upon the nose o^5 of the lever O, Fig. 3, whereby the spindle o' is turned back to its normal position. The shell has now reached station S', right beneath the thimble q^2, Fig. 4, and the wad situated upon said thimble is driven down into the shell by the rammer R. The thimble q^2 is fitted into a socket in the arm P, and it is supported by a spring, q^4, Fig. 4, so that when the rammer R strikes the wad upon the thimble the spring yields and the thimble is driven down, so as to embrace the mouth of the cartridge-shell C' and prevent the same from being spread by the entrance of the wad. The rammer R is fitted into a hollow screw-spindle, r', which screws into the cross-head N. In this hollow spindle is placed a spiral spring, r^2, which acts upon a shoulder of the rammer, and the tension of which can be adjusted by a nut, r^3, fitted upon the upper end of the rammer, which extends through the top of the screw-spindle r'. On the rammer are marks indicating the pressure to which the rammer is adjusted. In the example shown in the drawings, Fig. 4, it is adjusted to twenty pounds pressure, and when it drives the wad into the shell the powder contained therein is compressed with a pressure equal to twenty pounds. By turning the screw-spindle r' this pressure can be increased or diminished. By the subsequent movements of the carrier D the shell is moved successively to the stations S^2 S^3, in each of which it receives an additional wad. Then it is moved to station S^4, in which it receives the shot, which is introduced into the shell from the shot-container J', precisely in the same manner in which the powder is introduced from the powder-container J. After the shell has been charged with shot it is moved by the carrier to the station S^5, in which it receives a wad, and then it is moved to station S^6, in which it is crimped. This operation is effected by means of the crimper T, the form of which is shown in Figs. 1 and 4. It consists of a thimble which is provided on its inner surface with a series of inwardly-projecting ribs, (see Fig. 10,) which compress the mouth of the shell C', in the manner indicated in Fig. 11. In the example shown in the drawings, Fig. 4, the crimper is secured to a rod, t', which passes loosely through an arm, U, extending from the hub, and also through the cross-head N, and which is provided with two stops, t^2 t^3. In the example shown in the drawings these stops are formed by nuts, so that they can be adjusted toward or from each other. When the cross-head occupies its highest position, the crimper is sustained by the stop t^2 at a slight distance above the shell, and when the cross-head descends the crimper catches over the mouth of the shell, and by the action of the cross-head upon the stop t^2 the crimper is depressed and the mouth of the shell is crimped, as already described. By the next movement of the carrier D the shell is moved to station S', where it is exposed to the action of the marker V. This marker consists of a tubular rod, v', which is secured to the cross-head N, and of a die, v^2, which is inserted into the bottom end of the rod v'. (See Figs. 1 and 2.) On the rod v' is secured a tray, v^3, which swings on pivots v^4, and which contains the inking-pad v^5. A spring, v^6, retains the inking-pad in contact with the die. When the cross head descends, the tail end of the tray v^3 strikes a stop, v^7, which extends from the hub I, Fig. 12, and by these means said tray is turned so as to allow the die v^2 to act upon the wad contained in the top of the shell. The rod v' is made telescopic, and the lower portion thereof is exposed to the action of a spring, so that the die acts upon the wad with a yielding pressure. After the wad in the top of the shell has been marked the carrier D is moved forward so as to move the shell to station S^1. At this station the door i, which retains the shell in the cavity h of the carrier, is opened by the cam n and the loaded cartridge drops down through an opening, d^5, in the platform B, Figs. 2 and 3, into a chute or hopper, which conducts the same into a suitable receptacle. The movements of the carrier D take place when the cross-head N has reached its highest position.

In the platform B are a series of openings, d^5, one at each of the stations S S' S^2, Figs. 2, 3, and 4, and these holes are normally closed by the ring-plate d^7, which contains a series of holes, d^6, and which is fitted into a recess in the platform. In the normal position of the ring-plate the holes d^6 are intermediate between the stations; but if this ring-plate is turned by means of the handle d^8, Fig. 3, so as to carry the holes d^6 over the holes $d^{6'}$ in the platform, any of the shells may be dropped down by opening the door i, which retains the same in the carrier. The hub I fits the central spindle, C, loosely, Fig. 4, and it is supported by a pin, c', which extends through a rod, c^2, and two slots, c^3, in the central spindle, C, the upper portion of said spindle being bored out to receive the rod c^2. The upper end of this rod is provided with a screw-thread which engages with a tubular nut, c^4. This nut is fitted into the upper end of the spindle C, and it is provided with a head, c^5, by means of which it is turned. The object of this arrangement is to provide means for adjusting the various devices supported by the arms which extend from the hub I, and to bring said devices in the proper relation to the shells to be loaded, since my machine can be used for loading shells of different lengths.

X is an alarm, which is in position to be actuated by the rammer R', Fig. 4, which drives a wad into the shell. On the rammer is secured a collar, r^4, and if the shell has not been

correctly charged, so that the rammer enters the shell to a depth beyond the point which it would reach if the shell had been correctly charged, the collar r^6 strikes the lever r^7 and the alarm is sounded. The shell is then removed from the carrier in the manner already described before it is exposed to the action of the crimper and the marker, and after its contents have been removed it can again be fed into the machine to receive a correct charge. The collar r^6 is adjustable on the rammer.

What I claim as new, and desire to secure by Letters Patent, is—

1. The combination, substantially as hereinbefore described, of the intermittently-rotating carrier D, the powder-feeder having a rotating powder-discharge provided with radiating pins, and a vertically-reciprocating plate or bar having slots which are adapted to engage said pins and rotate the powder-discharge, one of said slots being elongated, whereby a period of rest is allowed the discharge to insure the complete delivery of the powder to the shell, substantially as described.

2. The combination, substantially as hereinbefore described, of the intermittently-rotating carrier, the powder-feeder communicating with a rotating powder-discharge, a lever rigidly mounted on the axis of a gear meshing with a segment-gear upon the powder-discharge tube, said lever lying in the path of the shells as they are advanced by the carrier, pins radiating from the powder-discharge, and a vertically-reciprocating plate having slots which engage with said pins when the latter are turned into position by the action of the shell upon the lever.

3. The combination, substantially as hereinbefore described, with the intermittently-rotating carrier, of the wad-feeder, a sleeve tapped through a thimble in the cross-head, a rammer mounted in said sleeve, a spring coiled on the diminished end of said rammer, and a nut turned upon the projecting end of the latter, whereby the tension of the spring may be adjusted, suitable graduations being marked upon the rammer-spindle as a guide in making such adjustment.

4. The combination, substantially as hereinbefore described, with the intermittently-rotating carrier, of the wad-holders, the wad-pushers, the radial arms upon which the wad-pushers are mounted, the curved and slotted levers engaging with pins upon said carriages, the spindles upon which said slotted levers are mounted, and the operating-levers O, which are moved by the advance of the shells.

5. The combination, substantially as described, with the intermittently-rotating carrier, of the vertically-moving non-rotating crimper having ribs upon its inner face, the cross-head in which the threaded spindle of the crimper is supported, and stops adjustable upon said spindle above and below the cross-head, substantially as described.

In testimony whereof I have hereunto set my hand and seal in the presence of two subscribing witnesses.

FRANKLIN L. CHAMBERLIN. [L. S.]

Witnesses:
WALTER A. BIDDLE,
H. CLARK FORD.