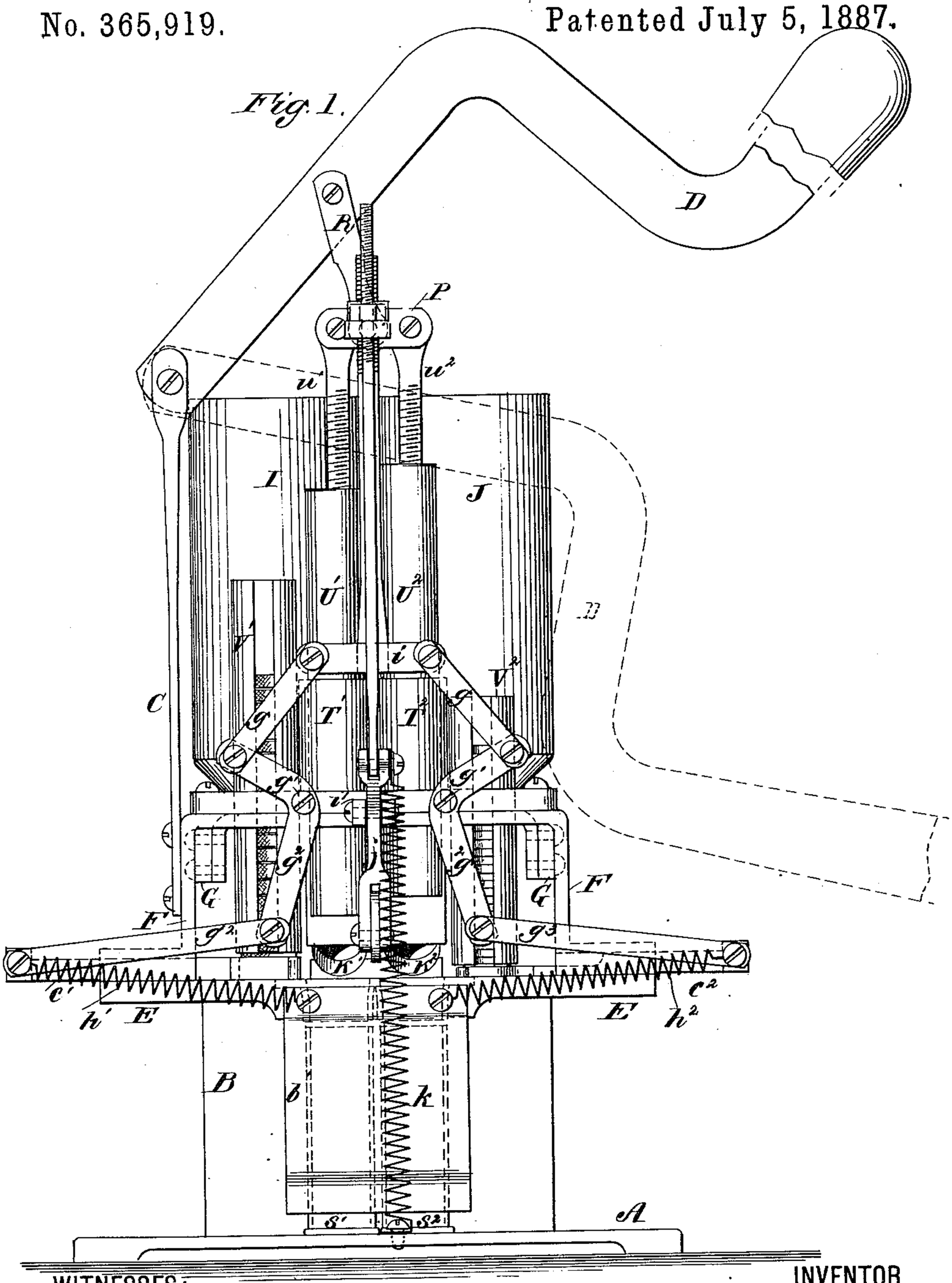
(No Model.) 4 Sheets—Sheet 1.

N. HARRISON.

CARTRIDGE LOADING MACHINE.

No. 365,919. Patented July 5, 1887.

Fig. 1.



WITNESSES:
Arthur C. Maclay.
Edgar S. Maclay

INVENTOR
Nathan Harrison
BY
Augustus T. Gurlitz
ATTORNEY.

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N. HARRISON.

CARTRIDGE LOADING MACHINE.

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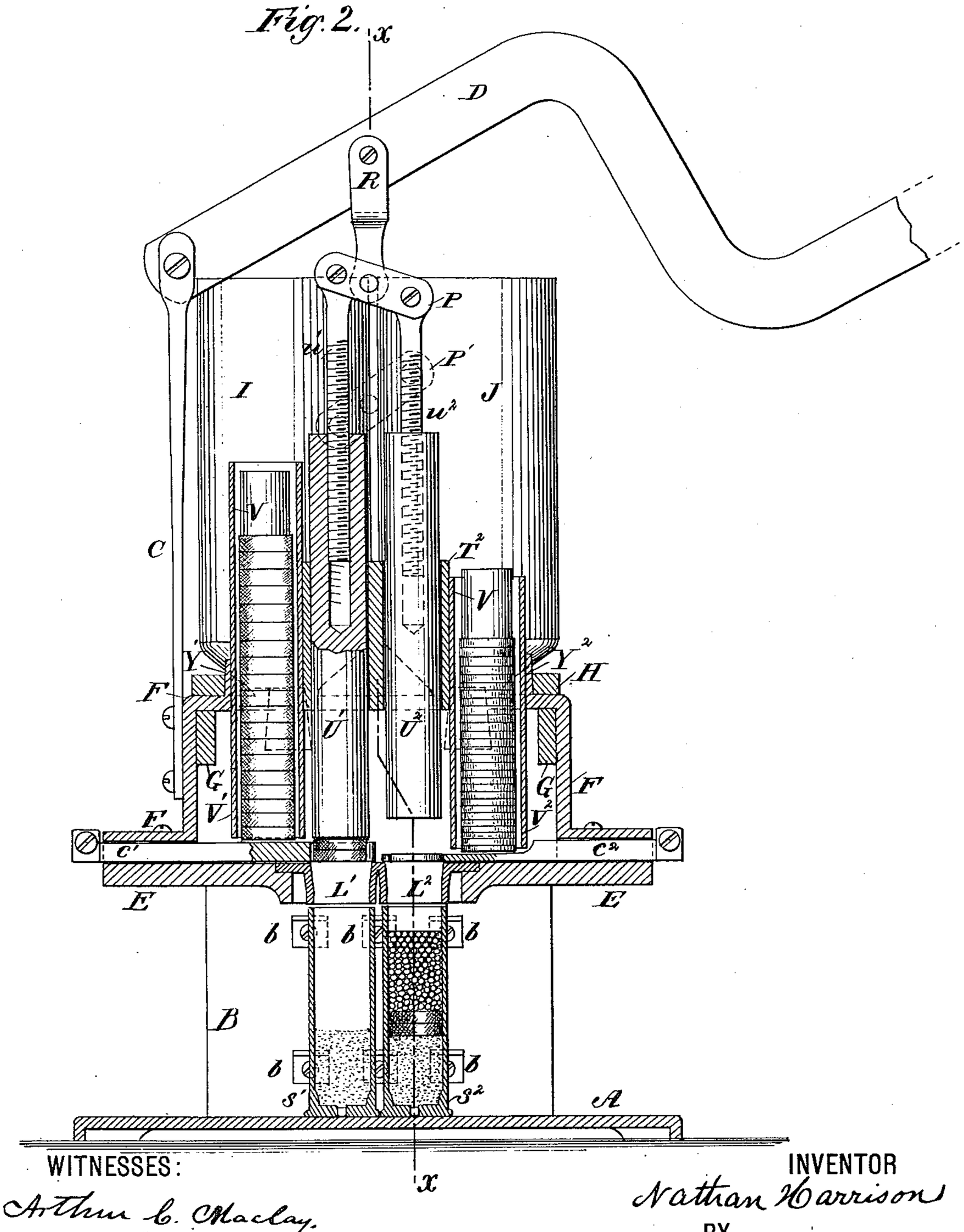
Fig. 2.



WITNESSES:

Arthur C. Mackay.

Edgar S. Mackay

INVENTOR

Nathan Harrison

BY

Augustus T. Gurlitz

ATTORNEY.

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N. HARRISON.

CARTRIDGE LOADING MACHINE.

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Fig. 3.

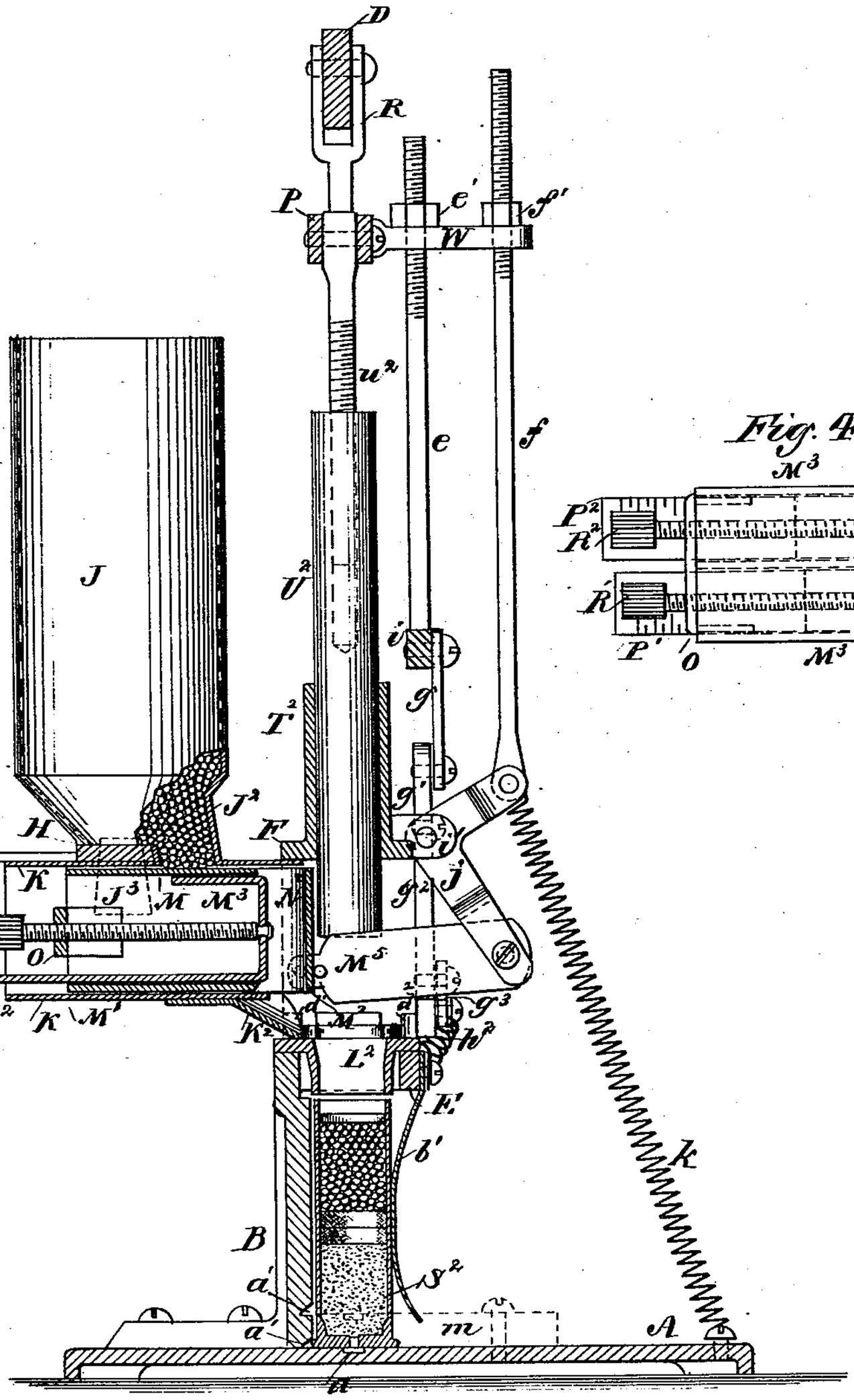

Fig. 4.

WITNESSES:

Arthur C. Maclay.

Edgar S. Maclay.

INVENTOR

Nathan Harrison

BY

Augustus T. Gurlitz

ATTORNEY.

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N. HARRISON.

CARTRIDGE LOADING MACHINE.

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Fig. 5.

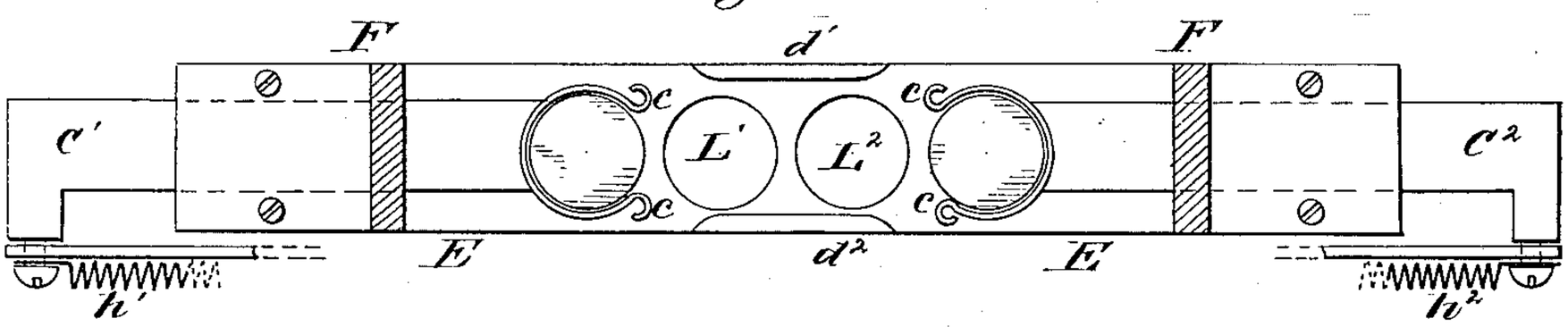
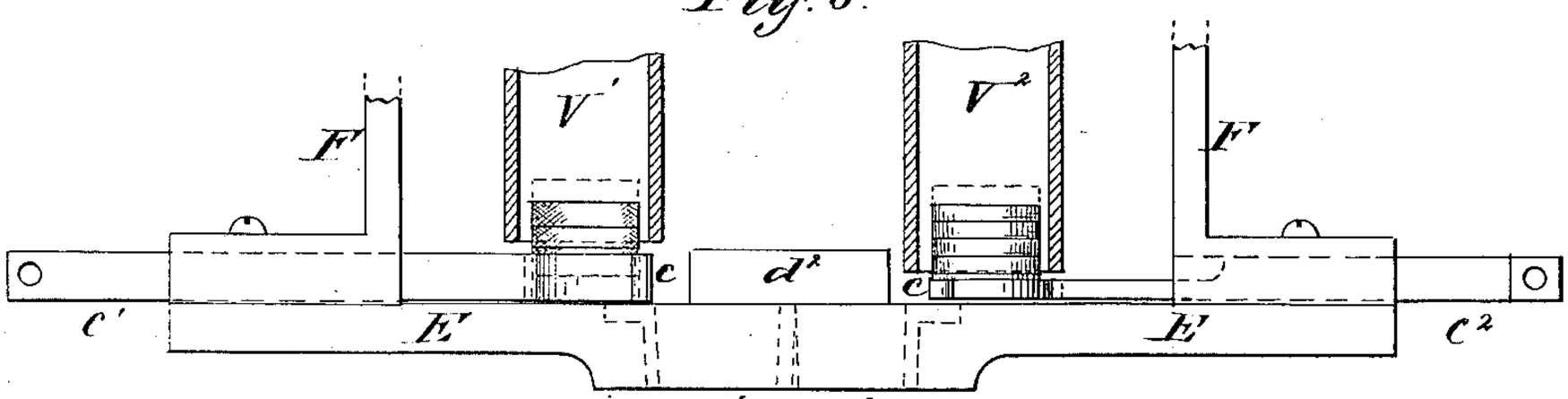
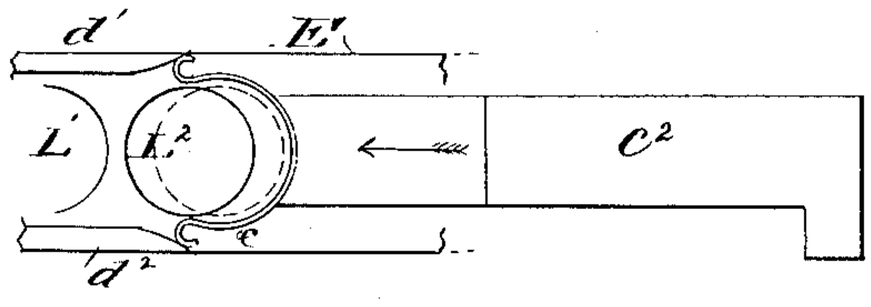


Fig. 6.



L' L²

Fig. 7.



WITNESSES:

Arthur C. Maclay

Edgar S. Maclay

INVENTOR

Nathan Harrison

BY

Augustus T. Gurlitz

ATTORNEY.

UNITED STATES PATENT OFFICE.

NATHAN HARRISON, OF MONTCLAIR, NEW JERSEY.

CARTRIDGE-LOADING MACHINE.

SPECIFICATION forming part of Letters Patent No. 365,919, dated July 5, 1887.

Application filed August 31, 1886. Serial No. 212,206. (No model.)

To all whom it may concern:

Be it known that I, NATHAN HARRISON, of Montclair, in the county of Essex and State of New Jersey, have invented a certain new and useful Cartridge-Loading Machine; and I do hereby declare that the following is a full, clear, and exact description of my invention, reference being had to the accompanying drawings, which form part of this specification.

This invention relates to a machine for charging the cartridge shells with powder, shot, and the required wads, which may be done after the necessary primers have been inserted therein; and its object is a light, simple, and cheap machine capable of performing quickly and exactly the required purposes by the exercise of but little power.

It consists, essentially, of suitable magazines for the powder and the shot chargers, which are capable of being adjusted to varying capacities to receive, convey, and discharge the same into the shells, tubes for the wads, means to discharge the wads upon the powder and upon the shot in the shells, suitable plungers to press the wads home in the shells, and supports to retain the shells in position, the operating devices being arranged to perform their functions so that the different acts will take place successively in due order, and a cartridge-shell be suitably charged with powder and one with shot upon a charge of powder at each operation of the machine after the work has been commenced.

In the drawings, Figure 1 is a front elevation of the machine, the lever raised to its utmost capacity, the chargers brought forward to the position of discharging their contents into the shells. Fig. 2 is a vertical longitudinal section through the center of the plungers, wad-tubes, and shells, showing the powder in one, the powder, powder-wads, and shot in the other, and the necessary wads moved forward to their position over the shells, with the plungers above them ready to drive them home by the further downward movement of the lever, the lever having been brought down only partially. Fig. 3 is a vertical transverse section through the machine, as indicated by the line *x x* of Fig. 2, the rods *e f*, arm W, the pull M^5, toggle *j*, and spring *k* being shown in the foreground. Figs. 4 to 7 are detail views of different parts.

Similar letters of reference indicate like parts in all the drawings.

A is a suitable base, upon which the parts are mounted; B, a frame for supporting the different parts; C, a standard for the lever, to which the lever D, for operating the mechanism, is pivotally connected. A suitable cross-piece, E, rests upon or is made a part of the frame B, and upon this cross-piece E an arched support, F, is secured, from which project arms G G to the rear, which support a cross-piece, H, upon which the powder and shot magazines are supported, and to the under side of which the charging apparatus is secured. The base A, frame B, standard C, cross-piece E, parts F, G G, and H may be made separately, or all of them, or some of them, cast as a single piece, whichever may be the most convenient in the manufacture of my machine.

Upon the cross-piece H are disposed the powder-magazine I and shot-magazine J. These may be cylindrical vessels provided with suitable feeding-tubes to feed their contents into the chargers, the tube for the shot-magazine being shown at J^2 in the broken-away part, Fig. 3, a similar tube for the powder-magazine being at a corresponding part of the same. The contents of the magazines are permitted to flow freely through these feeding-tubes. For convenience, the lower portions of the magazines I J are made conical, having an opening at their lowest part, which is closed by a suitable cork or stopper, as indicated by the dotted lines in Fig. 2 and shown at J^3, Fig. 3, through which openings their contents may be conveniently withdrawn, when desired.

The charging device consists of a slideway, K, (shown in section in Fig. 3,) which is secured to the lower face of the cross-piece H in any convenient manner, and is open at both ends, but inclosed on the sides, the bottom at the front being provided with discharge-chutes K′ K^2, which are situated in suitable positions to guide the powder and the shot into the feeders L′ L^2, as shown clearly in Fig. 2. Within the slideway K, and moving snugly therein backward and forward, is disposed a suitable charging-box, which is shown in plan in Fig. 4 and in section in Fig. 3. This consists of a box made of brass or other soft metal, having a top, M, bottom M′, front M^2, sides M^3, and

divided centrally by a partition, M⁴, and having openings passing through the top and bottom opposite each other, as shown at N′ N², into which the magazines discharge through their feeding-tubes J² and the corresponding feeding-tube of the powder-magazine I, when the charging-box is drawn back and the openings N′ and N² are in line with these feeding-tubes. Across the back of the charging-box is secured a strip, O.

Within each compartment of the charging-box is arranged a graduating device, which consists of a strip of metal, P′ P², of the width of the compartment, so as to move snugly therein, which strip of metal P′ and P² has a portion that lies on the bottom M′ of the charging-box, then a portion turned up vertically at right angles, and then a portion bent back again parallel to the top M of the charging-box. By the vertical part of these strips the backs of the openings N′ and N² are inclosed, these openings N′ and N² forming the chargers or parts of the machine which regulate the amount of powder and of shot to be loaded into the shells and carry the same to and discharge into the chutes K′ K². Set-screws R′ R² are journaled to the vertical portions of the strips P′ P², which screws are threaded to the cross-piece O, so that by turning these screws the pieces P′ P² may be projected or retracted, and thereby the capacity of the chargers N′ N² may be regulated and increased or diminished. On the face of the rear part of the strips P′ P² a graduating-scale may be marked off, as shown in Fig. 4, to indicate the capacity of the chargers as the same are increased or diminished. To the front of the charging-box a pull, M⁵, is pivotally connected, by which the same is moved backward and forward, as will be hereinafter described. A pin or screw, *n*, is placed in the rear of the charging-box, to limit its backward movement, as shown in Fig. 3.

Having described the magazines for the powder and the shot and the means for feeding, I will now describe the arrangement for packing the same into the shells. On the bottom of the base A a suitable groove, *a*, Fig. 3, is provided to receive the nipple of the primer of the shell if the same projects beyond its face, and a groove, *a′*, is made at the base of the frame B for the rim of the shell. To the face of the frame B are attached projections *b b* in such positions that the shells are supported thereby on their sides directly beneath the feed-mouths L′ L², as shown in Fig. 2, and in front of the shells is provided a spring-apron, *b′*, which presses against the shells from the front and holds them securely in position against the face of the frame B between the projections *b b*. In the cross-piece E are inserted the feed-mouths L′ L², which may be made together in pairs of varying sizes to suit the different-sized shells to be filled, and these feed-mouths are inserted into the cross-piece E in a suitable recess made therein and securely attached thereto, as by being screwed into place. The disposition of the shells by means of the projections *b b* and spring-apron *b′* is to be such that they will be directly beneath their feed-mouths. In the arched cross-piece F, and in line with the feed-mouths L′ L², are provided guides or sleeves T′ T², in which move the plungers U′ U², so that when they are projected downward they will pass through the mouths L′ L² and into the shells S′ S². These plungers are threaded to receive screw-rods *u′ u²*, by means of which their projection may be regulated. The plunger guides or sleeves T′ T² may be adjusted to plungers of varying sizes, if desired, by suitable bushings. In the arched cross-piece F, and on each side of the plunger-sleeves T′ T², are provided sleeves Y′ Y², which may be suitable holes formed in the arched cross-piece F, and in these sleeves are inserted the wad-tubes V′ V², which are open in front, being simply sheets of suitable metal curved to the proper size. By leaving them open in front they can be tightly inserted in the sleeves Y′ Y², having a spring-like action to retain their position in place, and having a slightly larger outside diameter than the sleeves Y′ Y², so that they are forced into the sleeves and may be moved up and down therein to the position that their lower edges will be of the proper height above the face of the cross-piece E to correspond to the thickness of the wads, as it is evident that if they project too far downward they will not permit the passage of the wads sidewise under them, while if they do not project downward far enough they will permit the passage sidewise of too many wads. The open front also permits the operator to see the supply of wads in them, so that when necessary it may be renewed. The size of the wad-tubes may be graduated by suitable bushings placed in the sleeves Y′ Y², or by making the tubes themselves of thicker or thinner material, as may be most convenient. The plunger-rods *u′ u²* are pivotally attached to a walking-beam, P, which in turn is pivoted to an arm, R, and that is pivoted to the lever D. The walking-beam P is pivoted to the part R out of its center and near the plunger U′, in order to exert most of the power of the lever on that plunger and drive it down with force onto the powder-wads, less force being desired for the shot-wads. Projecting forward from the walking-beam is an arm, W, Fig. 3, by which the charger-box and the wad-feeders are operated. As already described, the cross-piece E is provided with feeding-mouths L′ L², and these flare slightly at their upper parts, to receive the wads, which are generally a little larger than the shells in order to fit tightly therein. The arched cross-piece F is provided at its lower ends with laterally-projecting feet, which rest upon the cross-piece E and are screwed thereto. These feet are recessed out beneath, to receive the wad-slides C′ C², which move in such recesses. These wad-slides terminate in gripping-springs *c c*, which are of the requisite height to embrace their wads, the powder-wad springs being of nearly the height

of two powder-wads, as two powder-wads are generally used, and the shot-wad springs being of nearly the height of one shot-wad, as only one shot-wad is generally used. In using the machine the wads rest upon the top of the slides C′ C² until these slides are moved outward laterally, when they fall down into the gripping-springs *c c*, and as the wad-slides are moved inwardly toward the feed-mouths L′ L² the gripping-springs are forced between the projections *d′ d²* on the cross-piece E, (shown clearly in Fig. 5,) which compress them to hold the wads suspended over the feed-mouths when they reach that position.

The wad slides are operated by the following mechanism: Into a hole in the arm W a sliding rod, *e*, Fig. 3, is adjusted. This sliding rod moves freely up and down, its downward movement, however, being limited by the nut *e′*, which is screwed thereon, and which rests upon the top of the arm W. This rod *e* is connected to the wad slides by means of a set of joints, *g*, *g²*, and *g³*, pivoted to a cross-piece, *i*, on the lower part of the rod *e*, the joints *g²* being also pivotally secured at *g′* to the cross-piece F, or a corresponding stationary portion of the structure, in such a manner that when the rod *e* is raised the operation of these joints will be to force outward the wad-slides C′ and C². Attached to the front of the cross-piece E and to the end of the wad-slides C′ C² are spiral springs *h′ h²*, of sufficient power to draw the wad-slides inward when free to act.

The operation of the wad-slides is as follows: When the lever D is raised, the rod *e* is raised with it, being supported on the upper face of the arm W by the nut *e′*, drawing up the upper joints, *g g*, and forcing outward the toggle-joints *g² g²*, and thereby, and against the action of the spirals *h′ h²*, forcing outward the wad-slides C′ C² until they have passed beyond the wad-tubes V′ V². When they have moved to that point, the wads drop down onto the face of the cross-piece E within the spring-grippers *c c*. As the lever D is then brought down, the springs *h′ h²* draw the wad-slides C′ C² inward, and the wads are moved toward the mouths L′ L² until the spring-grippers strike against the bearings *d′ d²*, by which they are compressed and grasp the wads sufficiently to support them over the mouths L′ L², so that they will be driven down evenly by the plungers U′ U².

For operating the charger a rod, *f*, is inserted in the arm W, being supported on its upper face by the screw-nut *f′*. In suitable lugs, *i′*, projecting from the front of the arched cross-piece F, a toggle-joint, *j*, is pivoted, one arm of which is pivoted to the lower end of the rod *f*, and the other arm is pivoted to the charging box-pull M⁵. To one arm of the toggle-joint *j* a tension-spring, *k*, is attached, the other end of which is secured to the base A. This spring is of sufficient power, when free to act, to draw down the toggle-joint *j* and force back the charging-box. The operation of this portion of the machine is as follows: When the lever D is raised, the rod *f* is drawn up with it, being supported on the upper face of the arm W by the nut *f′*, drawing forward the charging-box until it is in position to discharge its contents into the chutes K′ K², as indicated in Fig. 3. As the lever D is brought down, the spring *k* draws down the toggle-joint to which it is attached, thereby forcing back the charging-box to its position under the magazines. It will be seen that the upward scope of motion of the charger-rod *f* and the wad-slide rod *e* is adjustable by means of the screw-nuts *e′ f′*.

The operation of the machine is as follows: The chargers are to be regulated to the desired capacity by means of the screws R′ R². This is conveniently done by means of the graduating-marks on the slide strips P′ P² while the charging-box is in position in the slideway K; or, if desired, the pin or screw connecting the pull M⁵ to the toggle *j* may be withdrawn, and the screw *n* also taken out, when the charging box may be taken out of the slideway K K, and, after adjusting it, replaced therein and attached to the toggle. Then the shot and powder magazines I J are to be filled, which will fill the chargers also. The proper wads are placed in the wad-tubes V′ V², and empty shells are pushed behind the spring-apron *b′* by hand, so that they rest between the projections *b b* and under the feed-mouths L′ L². The lever D is then raised, which will draw forward the charging-box, causing the contents to flow down the chutes K′ K² and into the shells through the mouths L′ L². As the charging-box is moved forward, its top M, moving along under the top of the slideway K, cuts off the openings J² in the magazine feeding-tubes, so that no more of the contents of the magazines can escape. As the lever D is drawn up, it forces outward the wad slides C′ C², which receive their wads, as already described. The shell S² should then be removed, as it will contain a charge of shot only, which may be poured back into the shot-magazine J. The lever D is then forced downward, the effect of which is, first, to bring forward wad-slides C′ C² with their wads until they reach their appropriate positions over the feed-mouths L′ L², (the charging-box being at the same time forced back to the position where the magazines will again supply the chargers,) and, secondly, when the wads are in the appropriate positions, the plungers U′ U² will reach them and, as the lever D proceeds in its downward course, will force the wads downward. The shell S′ will then be charged with powder and powder-wads. It is then moved to the right, to the position at first occupied by the shell S², and an empty shell is placed in the left-hand position. Then the operation is repeated, resulting in a full-charged shell on the right and a powder-charged shell on the left. The operation being continued at each downward movement of the plungers, the shell on the right will be fully charged, the one on the left charged with powder and powder-wads only.

In feeding the shells it is only necessary to place a shell in a perpendicular position to the left of and behind the spring-apron b', and push it to the right with the hand, the spring-apron b' being made sufficiently elastic to allow the shells to pass by the projections b b in moving them along from left to right, and sufficiently stiff to sustain the shells in the required positions under the feed-mouths L' L². When it is desired to load shells so short that the charges may not enter the shells properly, a plate, *m*, to raise the shells (shown by the dotted lines in Fig. 3) may be secured to the base A, beneath the feed-mouths L' L². Such plate is to be provided with a groove similar to the groove *a*, for the primer, and a groove, *a'*, should be made at the proper part of the support B, for the rim of the shells, as indicated in Fig. 3.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A cartridge-loading machine arranged to load one shell with powder and one shell with shot upon powder simultaneously and provided with magazines I J, provided with feeding-tubes J², a suitable charging-box disposed beneath said tubes and adapted to convey the charges from the magazines to the shells, wad-tubes V' V², arranged above the cross-piece E, to discharge the wads thereon, slides C' C², operating upon the cross-piece E and adapted to forward the wads from the tubes and support them above the shells, plungers U' U², disposed above the shells and adapted to force the wads into the shells, suitable supports for the shells to sustain them in position beneath the plungers, and a lever, D, pivotally supported above the plungers and carrying the beam P, rod *f*, and joint *j*, pivotally connected, the rod *e*, and joints *g*, *g*², and *g*³, pivotally connected to each other and to the slides C' C², and the springs *h'*, *h*², and *k*, all adapted to operate substantially as described and shown.

2. In a cartridge-loading machine arranged to charge two shells simultaneously, supports for the shells adapted to retain them in position beneath the plungers U' U² while being charged, the magazines I J, disposed above the shells, a suitable charging-box adapted to receive the charges from the magazines and convey them to the shells, wad-tubes V' V², arranged to discharge the wads upon suitable ways above the shells, slides C' C², adapted to forward the wads upon said ways to the shells, and plungers U' U², arranged in suitable sleeves above the shells and adapted to force the wads into the shells, in combination with suitable mechanism to operate the same, substantially as described and shown.

3. In a cartridge-loading machine, the magazines I J, provided near their lower ends with feeding-tubes J², in combination with a charging-box operating beneath said feeding-tubes and divided into compartments, and having the graduating-strips *p' p*², adapted to receive a charge of powder in one compartment and a charge of shot in the other compartment and forward the same to the shells disposed beneath said charging-box, in combination with a suitable device to reciprocate the charging-box, substantially as described and shown.

4. In a cartridge-loading machine, the plungers U' U², supported above the shells and connected to the walking-beam P pivotally, to adjust them to the varying planes of the fully and partially charged shells, and the lever D, pivotally connected to the walking-beam P, in combination with the sleeves T' T², adapted to guide the plungers, and a support for the lever D, substantially as described and shown.

5. In a cartridge-loading machine, a suitable base, A, adapted to support the operating parts, projections b b on the frame B above the base, and spring-apron b' on the cross-piece E, forward of the frame B, adapted to support two shells in position on the base beneath the charging mechanism, in combination with suitable devices adapted to charge the shells simultaneously, substantially as described and shown.

6. In a cartridge-loading machine arranged to charge two shells simultaneously, the wad-tubes V' V², adapted to discharge separately powder-wads and shot-wads upon a suitable way by the side of and above the shells, in combination with the slides C' C², adapted to forward the wads along such way from the wad-tubes to and support them above the shells, substantially as described and shown.

7. In a cartridge-loading machine arranged to charge two shells simultaneously, the slides C' C², operating on the ways E E, and adapted to forward the wads from the wad-tubes to the shells, provided with grippers *c c*, and suitable projections, *d' d*², in the path of said grippers for compressing the same as they reach the mouths of the shells, in combination with the joints *g*, *g*², and *g*³, the rod *e*, connected to the arm W and lever D, and operating to move the slides in one direction, and suitable springs, *h' h*², attached to the outer ends of said slides and to a stationary portion of the structure, and operating to move them in the opposite direction along said ways E E, substantially as described and shown.

8. In a cartridge-loading machine such as described, a suitable charging-box disposed beneath the magazines and adapted to receive a charge of shot and a charge of powder in separate compartments from the magazines and discharge into the shells beneath the charging-box, and provided with a pull, M⁵, in combination with the toggle-joint *j*, rod *f*, and a lever adapted to move such box from the magazines to the shells, and a suitable spring, *k*, connected with said box to move the same in the opposite direction, substantially as described and shown.

9. In a cartridge-loading machine adapted to charge two shells simultaneously, the plungers U' U² and guides T' T², arranged above the shell-supports, in combination with the

walking-beam P, arranged above and pivotally connected to such plungers and adapted to adjust the same automatically to the different levels of the charges in the shells, and the lever D, disposed above and pivotally connected to the walking-beam, substantially as described and shown.

10. A cartridge-loading machine arranged to charge two shells simultaneously, as described, having suitable magazines above the shells for shot and for powder and for shot and powder wads, and suitable devices for forwarding the same from the magazines to the shells, and suitable supports beneath such forwarding devices to retain the shells in position to receive their charges, and plungers U' U², and suitable guides for the same disposed above the shells, in combination with the lever D and walking-beam P, disposed above the plungers and pivotally connected to each other and to the plungers, and arranged to adjust the plungers automatically to operate upon a charge of powder and upon a charge of shot upon powder in the different shells simultaneously, substantially as described and shown.

NATHAN HARRISON.

Witnesses:
EDGAR STANTON MACLAY,
NELSON ZABRISKIE.