No. 695,075. Patented Mar. 11, 1902.

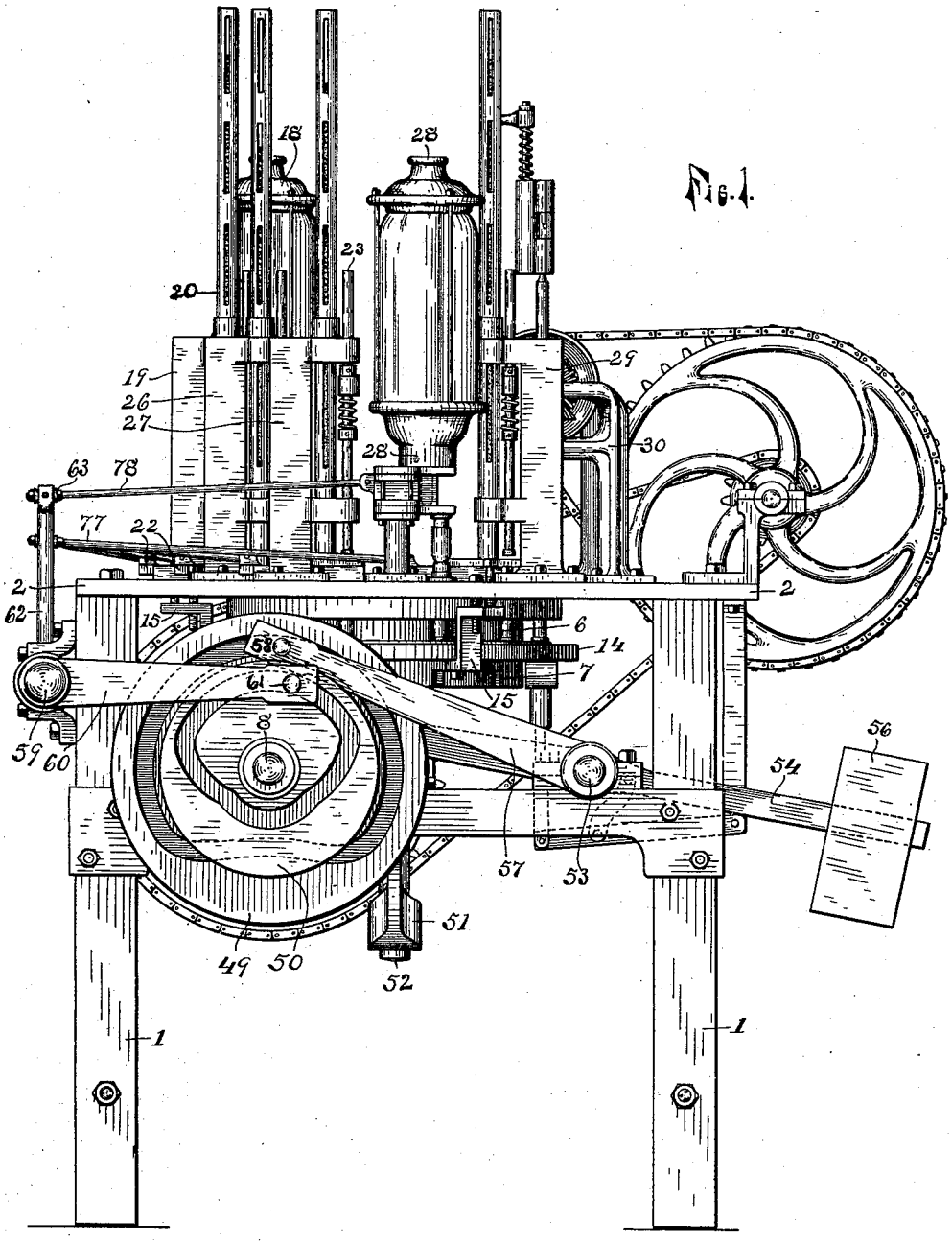
T. & W. H. NICHOL.

CARTRIDGE LOADING MACHINE.

(Application filed Oct. 10, 1901.)

(No Model.) 3 Sheets—Sheet 1.

Fig. 1.



WITNESSES.

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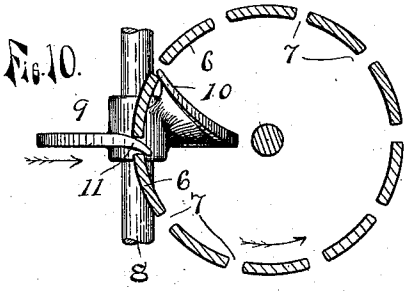
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Fig. 10.



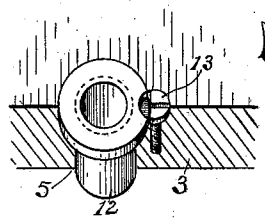


Fig. 8.

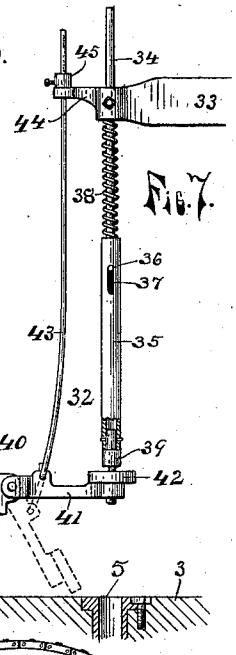


Fig. 7.

Fig. 9.

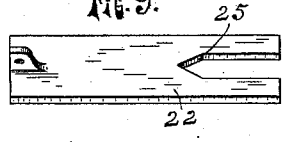


Fig. 2.

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(No Model.) 3 Sheets—Sheet 3.

Fig. 3.

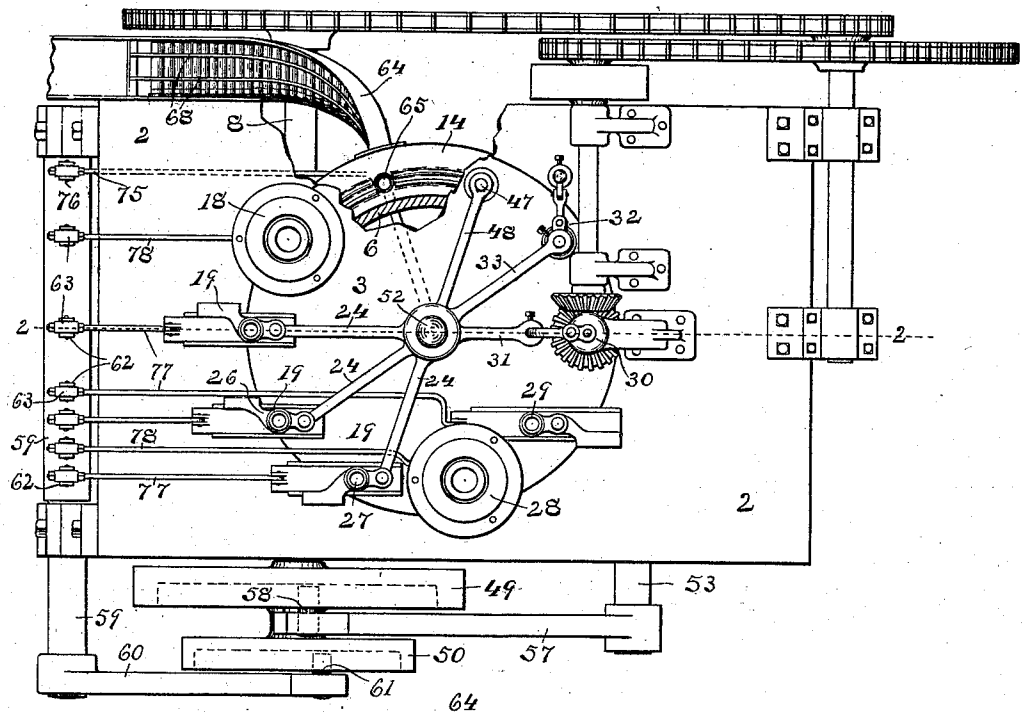


Fig. 4.

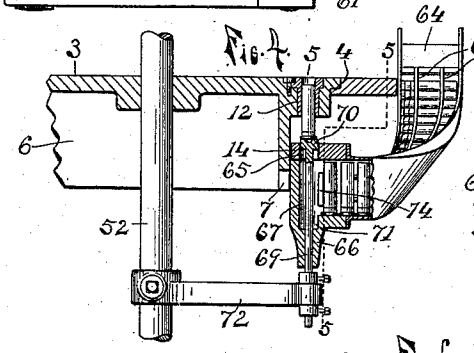


Fig. 5.

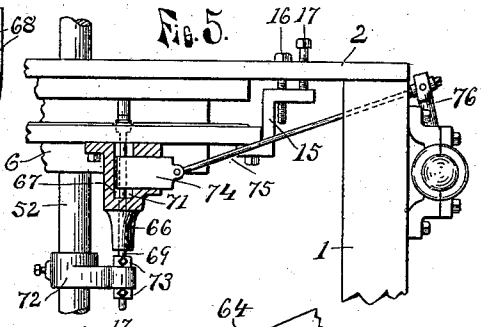
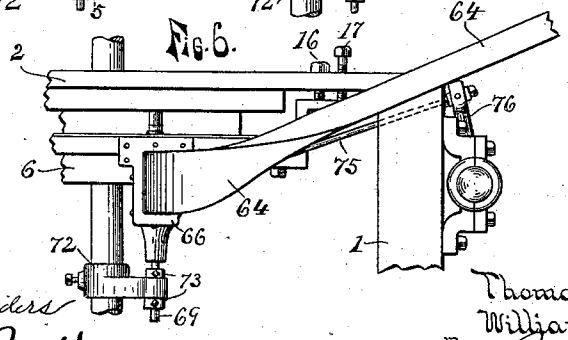


Fig. 6.



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UNITED STATES PATENT OFFICE.

THOMAS NICHOL AND WILLIAM HENRY NICHOL, OF CHATHAM, CANADA.

CARTRIDGE-LOADING MACHINE.

SPECIFICATION forming part of Letters Patent No. 695,075, dated March 11, 1902.

Application filed October 10, 1901. Serial No. 78,231. (No model.)

To all whom it may concern:

Be it known that we, THOMAS NICHOL and WILLIAM HENRY NICHOL, subjects of the King of Great Britain, residing at Chatham, in the county of Kent and Province of Ontario, in the Dominion of Canada, have invented certain new and useful Improvements in Cartridge-Loading Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

Our invention relates to improvements in cartridge-loading machines, and especially to that class of such machines in which the empty shells are automatically fed to a circular shell-carrying table having a series of openings to receive the shells, where they receive the charges as the carrier is intermittently revolved, a powder-charge-feeding device, wad-feeders, a shot-charge-feeding device, a crimper, and a printing device being secured *seriatim* to a stationary table, each above an opening in the shell-carrier and conjointly operating to automatically load and prepare the cartridges for the market; and the object of our invention is to provide suitable mechanism for delivering the shells to the table and inserting them within the openings therein, to provide a machine which is adjustable so that any size of cartridge may be loaded, to provide a peculiar arrangement and construction of driving mechanism for the shell-carrier and also for the charge and wad feeders, so that their concerted action may be accurately timed and a simple, strong, and compact machine secured, and to provide the device with certain other new and useful features hereinafter more fully described, and particularly pointed out in the claims, reference being had to the accompanying drawings, in which—

Figure 1 is a side elevation of a device embodying our invention. Fig. 2 is a vertical section of the same on the line 2 2 of Fig. 3. Fig. 3 is a plan view with a portion broken away to show the construction. Fig. 4 is a sectional detail of the shell-feeder and adjacent parts of the machine on a line running through the axis of the shell-carrier and the feed-opening in the track. Fig. 5 is the same on line 5 5 of Fig. 4. Fig. 6 is a detail showing the same in side elevation. Fig. 7 is a detail of the printing device. Fig. 8 is a perspective view showing the manner in which the bushings for the openings in the shell-carrier are secured in place. Fig. 9 is a perspective of one of the wad-feeding slides, and Fig. 10 is a detail showing the operation of the screw-wheel for driving the shell-carrier.

Like characters refer to like parts in all of the figures.

1 is the machine-frame, to which is secured the stationary table 2, in which is a circular opening to receive the rotary table or shell-carrier 3. Said shell-carrier is supported at its periphery in said opening, with its upper surface in the plane of the surface of the table, by a flange 4 on the table, which engages the under side of the shell-carrier, said carrier being fitted within the opening to prevent any lateral movement. Openings 5 for the reception of the empty shells are provided in the shell-carrier near its periphery, and extending downward from its under side is the circumferential flange 6, provided with notches 7, corresponding in number to the number of openings 5 in the carrier. A transverse power-shaft 8 is journaled on the machine-frame beneath the table, and on this shaft is secured the screw-wheel 9, which is adapted to engage the notches 7 and intermittently rotate the shell-carrier. As shown in Fig. 10, the flange of the screw-wheel is divided from its circumference to its hub and the forward end 10 of the flange set off laterally a distance sufficient to engage the next succeeding notch 7 as the wheel is revolved and forms a spiral which extends about one-fourth of the distance around the circumference of the wheel, the remaining portion being straight. Thus the operation of turning the shell-carrier is performed during one-fourth of the revolution of the wheel by the spiral portion of the flange, and said carrier is held firmly from rotating in either direction during the remainder of the revolution of the wheel by the straight portion of its flange. A short lateral bend 11 is provided at the rear end of said flange, which starts the carrier forward just before the end 10 of the flange engages the next succeeding notch, so that said end 10 will enter freely and the jar and strain caused by the sudden striking of the flange into the notch prevented.

To provide for the loading of shells of dif-

ferent diameters, we provide the openings 5 in the shell-carrier with bushings 12, (shown in Fig. 8,) which may be removed and others having openings of larger or smaller diameter inserted. Each of these bushings is provided with a flange at its upper end, which is let into the surface of the carrier and is held in place by a screw, the head of which lies within a countersink in the flange and surface of the carrier and is so positioned as to be adapted to engage the flange at one side and is cut away at the opposite side of the shank to allow the removal of the bushing when the screw is turned with the cut-away side of its head toward the bushing.

The shells are held in the openings 5 in the shell-carrier as the carrier is intermittently rotated by means of a ring-track 14, upon which the shells slide. This track encircles the flange 6 and engages the same at its inner edge, thus also serving as a guide for the shell-carrier, and is supported by brackets 15, adjustably secured to the table by bolts 16 and 17. The track is raised or lowered by slackening the bolts 16 and turning the bolts 17 to provide for the loading of shells of different lengths, it being necessary that the shells project into the openings in the carrier a certain distance only.

There are preferably ten of the openings 5 in the shell-carrier 3, and there are a corresponding number of stations for said shell-carrier or stops made during each of its revolutions. An empty shell is first inserted in one of the openings by means hereinafter described and the shell-carrier turned to bring this shell beneath a powder-charge-feeding device 18 of well-known construction, consisting of a magazine containing the powder, a slide beneath the magazine to receive the charge and deliver it to a spout directly beneath which the shell is stopped, and at the same time a second empty shell is inserted in the next opening. The next movement of the table brings the first shell opposite a wad-feeding device 19, consisting of a vertical-tube wad-holder 20, supported by a suitable bracket, a way 21 beneath said wad-holder, which way extends over the carrier and is provided with an opening above the opening 5 of the carrier, and in which way a slide 22 is longitudinally movable, a plunger 23 above said opening in the way to ram the wad, which is moved forward by the slide 22 into the shell, and an arm 24, which operates the plunger. As shown in Fig. 9, the slide 22 consists of a plate slitted inward from one end, the sides of the slit converging abruptly near their inner ends at 25 and meeting at the middle of the slit. When the slide is drawn back, a wad drops into the slit, and when moved forward the wad is brought to the center of the slide by the converging sides 25, and so no matter what the diameter of the wad may be it will be carried by the slide directly over the center of the shell, and the slide being slitted inward from its end allows the dirt which accumulates therein to escape, and by reason of the formation of the inner end of said slot any such accumulation of dirt lying between the wad and said end will not prevent the wad from seating against the converging sides and being accurately centered, as any such accumulation escapes into the apex of the acute angle formed by the meeting of said sides. At the two succeeding stops 26 and 27 are wadders of the same construction as the one just described; but at the third stop 28 a charge of the shot is fed into the shell by a device similar to the powder-feed 18. A wad is next placed in the shell by another wadder 29, and the next movement of the carrier places the shell beneath a crimper 30 of well-known construction, which is forced down upon the shell by the arm 31. At the next station the cartridge is printed by a device 32. (Shown in detail in Fig. 7.) Secured in an eye in the end of the arm 33 is a vertical rod 34, upon which is sleeved the tube 35, held therein by a pin 36, which engages a slot 37 in said tube, and a spring 38, sleeved on said rod between said arm and tube, exerts a force to hold the pin 36 in engagement with the upper end of its slot. Secured in the lower end of the tube is a type-block 39, and pivoted on a post 40, extending upward from the table 2, is an arm 41, provided at its outer end with an inking-pad 42 and near its pivot with an ear, to which one end of an operating-rod 43 is secured, said rod extending upward and having its upper end passed through an eye-bracket 44 on the arm 33, a stop-collar 45 being adjustably secured to the rod above said bracket 44. It will thus be seen that when the operating-arm 33 descends the ink-pad will fall by gravity to the position shown in dotted lines in Fig. 7, and said arm continuing to descend the rod 43 will slide up through the bracket 44 and the type-block 39 be brought in contact with the last wad of the cartridge, the slot 37 allowing the tube 35 to be moved upward against the pressure of the spring 38 by such contact. The collar 45 is so adjusted on the rod 43 that on the return movement when the arm 33 has reached its highest point said rod will have raised the ink-pad to bring the same in contact with the type. After the cartridge has been charged, crimped, and printed the next movement brings it over the discharge-opening 46 in the track and is ejected by the plunger 47, secured to the arm 48.

To operate the devices for charging, crimping, printing, and ejecting the cartridges and that the different movements may be timed in accordance with the movement of the shell-carrier, we secure to power-shaft 8, near its outer end, the cam-wheels 49 and 50. Extending vertically through the axis of the shell-carrier and longitudinally movable therein and in a bearing 51 is the shaft 52, in the upper end of which is a head, integral with which head are the arms 24, operating the wad-plun-

gers 23, the arm 31, operating the crimper, the arm 33, carrying the printing device, and the arm 48, to which the discharge-plunger is secured. Journaled in bearings on the frame is the rock-shaft 53, extending parallel with the power-shaft 8, to which is secured intermediate its ends the weighted lever 54, the inner end of said lever being connected to the vertical shaft 52 by a link 55 and its opposite end being provided with a weight 56, which weight counterbalances the weight of said shaft 52 and the head, arms, and plungers connected thereto and holds the same in their elevated position or at the upper end of the stroke. On the outer end of the said rock-shaft 53 is the rocker-arm 57, in which is journaled the roll 58, which roll engages the cam-groove in the cam 49 and rocks the said rock-shaft to lower the vertical shaft 52 and operate the devices connected therewith against the action of said weight 56.

Journaled in bearings on the side of the machine-frame opposite the rock-shaft 53 is a horizontal rocker-bar 59, which is provided with a rocker-arm 60, having a roll 61 engaging the cam-groove of the cam 50, and adjustably secured in openings in said rocker-bar by means of set-screws and extending upward therefrom are the posts 62, which posts are forked at their upper ends to receive the blocks 63, pivoted therein and to which the rods 77 and 78 are secured, the rods 77 being connected at their opposite ends to the slides 22 of the wadders and the rods 78 to the slides of the powder and shot charge feeding devices. It will thus be seen that the concerted movements of the shell-carrier, the slides for feeding the powder, shot, and wads, and the downward movement of the plungers for ramming the wads and operating the crimping and printing devices are all taken off the one power-shaft 8 by direct and positive connections therewith, and therefore the different movements may be easily and accurately timed.

To feed the empty shells to the shell-carrier 3, an inclined trough 64 is provided, into which the shells are placed, with their butt-ends all toward the side of the trough adjacent to the machine and down which they are fed by gravity. In the ring-track 14 is the feed-opening 65, and bolted to said track beneath this opening is a casting 66, in which is formed a pocket 67 to receive the shells in an upright position. To the casting 66 and over the outer end of the pocket 67 is bolted the end of the trough 64, which trough is curved laterally inward beneath the table 2 at its lower end and at the same time giving a quarter-twist, so that the shells as they roll down the trough are up-ended and fed into said pocket in an upright position, the open top of the trough, which becomes the side thereof at its lower twisted end, being provided with two longitudinal wires 68 to prevent the shells from falling out. The inner end of the pocket 67 is semicircular in form and of the same diameter as the feed-opening 65, said opening being large enough to allow the shell to freely pass therethrough, and longitudinally movable in said inner end of the pocket is a ram 69, provided with a head 70, which is adapted to be withdrawn into a recess 71, with its upper face below the bottom of the pocket 67 to engage the butt-end of a shell. To operate said ram 69, a rigid arm 72 is secured to the vertical shaft 52 at one end and provided with an eye at the opposite end to receive said ram, adjustable collars 73 being secured to the ram above and below the arm. To prevent the shells from moving forward and getting under the head 70 when the ram is up, a slide 74 is provided, which slide is projected through an opening in the side of the casting 66 by a rod 75, which rod is pivoted thereto at one end and at the opposite end to a post 76 on the rocker-bar 59, said post being of the same construction as the posts 62.

As shown in Fig. 4, when the shaft 52 is at the upper end of its movement the ram has also reached the upper end of its stroke and has forced the shell up into one of the openings 5, with the lower end of the shell in the plane of the face of the track 14. The ram is held at the upper end of its stroke until the shell-carrier has been turned, moving the shell from the head of the ram and along the track to the powder-charge-feeding device. The shaft 52 then descends, carrying the ram with it, the head 70 receding into the recess 71 and allowing the next empty shell to move forward, the slide 74 having been withdrawn by the operation of the rocker-bar 59 during the downward movement of said ram. Upon the return movement of the shaft 52 the ram is carried upward, forcing the shell up through the opening 65, and at the same time the return movement of the rocker-bar 59 projects the slide across the pocket 67 ahead of the train of shells in the trough and prevents the same from moving forward into contact with the ram.

Having thus fully described our invention, what we claim is—

1. In a cartridge-loading machine, in combination with a rotary shell-carrier provided with a series of openings to receive shells, and a stationary table having an opening to receive said carrier and within which it is supported, a ring-track beneath the openings in said carrier to support the shells, brackets secured at one end to said track, and screws engaging the opposite ends of said brackets to adjustably secure the same to the table and support the track.

2. In a cartridge-loading machine, in combination with the frame thereof, a stationary table, a rotary shell-carrier having a series of openings to receive shells, powder and shot charge feeding devices secured to said table above two of the openings in said carrier, each provided with a slide to admit the charges into the shells, wad-feeding devices secured to said table and provided with slides and

plungers, a horizontal power-shaft beneath said carrier, a downwardly-extended flange on said carrier provided with notches, a screw-wheel on said power-shaft to engage said notches and rotate the carrier, cams on the power-shaft, a horizontal rock-shaft journaled on said frame, a vertical shaft longitudinally movable in the axis of said carrier and provided with arms connected to said plungers of the wad-feeding devices, a weighted lever secured on said rock-shaft and pivotally connected to said vertical shaft, a rocker-arm on said rock-shaft having a roll to engage one of said cams and operate the said plungers, a horizontal rocker-bar journaled on the frame having upwardly-projecting posts, rods connecting said posts and the slides of said wadders and powder and shot feeding devices, and a rocker-arm on said rocker-bar having a roll to engage the other cam to operate the said slides.

3. In a cartridge-loading machine, the combination with a wad-feeding device provided with a wad-holder, a way beneath said holder, and a plunger, of a slide longitudinally movable in said ways and adapted to move the wads, one at a time, from the holder to beneath the plunger, said slide being provided with a slot extending inward from one end of the slide and terminating at its inner end with converging sides forming an acute angle.

4. In combination with a cartridge-loading machine, having a series of wad, powder and shot charge feeding devices, and vertically-movable arms for operating the same, a vertically-movable arm, a rod secured to the outer end of said arm, a type-block secured to the lower end of said rod and adapted to be brought into contact with the wad of a cartridge when lowered by the downward movement of said arm, a stationary post, a pad-arm pivoted to said post, an ink-pad on the outer end of said arm, an eye on the end of the said vertically-movable arm, a rod secured at one end to the pad-arm and engaging said eye at the opposite end, and a collar adjustably secured to said rod above the said eye.

5. In combination with a cartridge-loading machine, having a rotary shell-carrier and a ring-track beneath said carrier having a feed-opening, an inclined trough having an upper open end adapted to receive shells in a horizontal position, said trough being twisted at its lower end to bring the shells to a vertical position beneath the feed-opening in the track, a ram adapted to engage the lower end of the shell beneath the feed-opening and lift the same above the track, a vertically-movable shaft, an arm secured to said shaft and provided with an opening at its outer end to receive the same, and collars adjustably secured to said ram above and below said arm.

6. In combination with a cartridge-loading machine, having a stationary table, a rotary shell-carrier provided with openings to receive shells, a track to support the shells and provided with a feed-opening, a series of powder, shot and wad feeding devices secured to the table, and a vertically-movable shaft in the axis of the shell-carrier and a rocker-bar at the side of the table to operate said feeding devices, an inclined trough having an upper open end to receive shells in a horizontal position and having its lower end twisted to bring the shells to a vertical position, a casting secured to the lower side of the track over the feed-opening and provided with a pocket to receive the shells from the trough, a ram having a head to engage the shells, an arm secured to the said vertically-movable shaft and having an opening to receive the lower end of the ram, collars adjustably secured to said ram above and below the arm, a slide adapted to project into the pocket of said casting and prevent the shells from moving into the inner end thereof, a post on said rocker-bar, and a rod connecting said post and slide.

In testimony whereof we affix our signatures in presence of two witnesses.

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WILLIAM HENRY NICHOL.

Witnesses:
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