(No Model.)

3 Sheets—Sheet 1.

G. J. FOSTER.

CARTRIDGE LOADING MACHINE.

No. 343,706. Patented June 15, 1886.

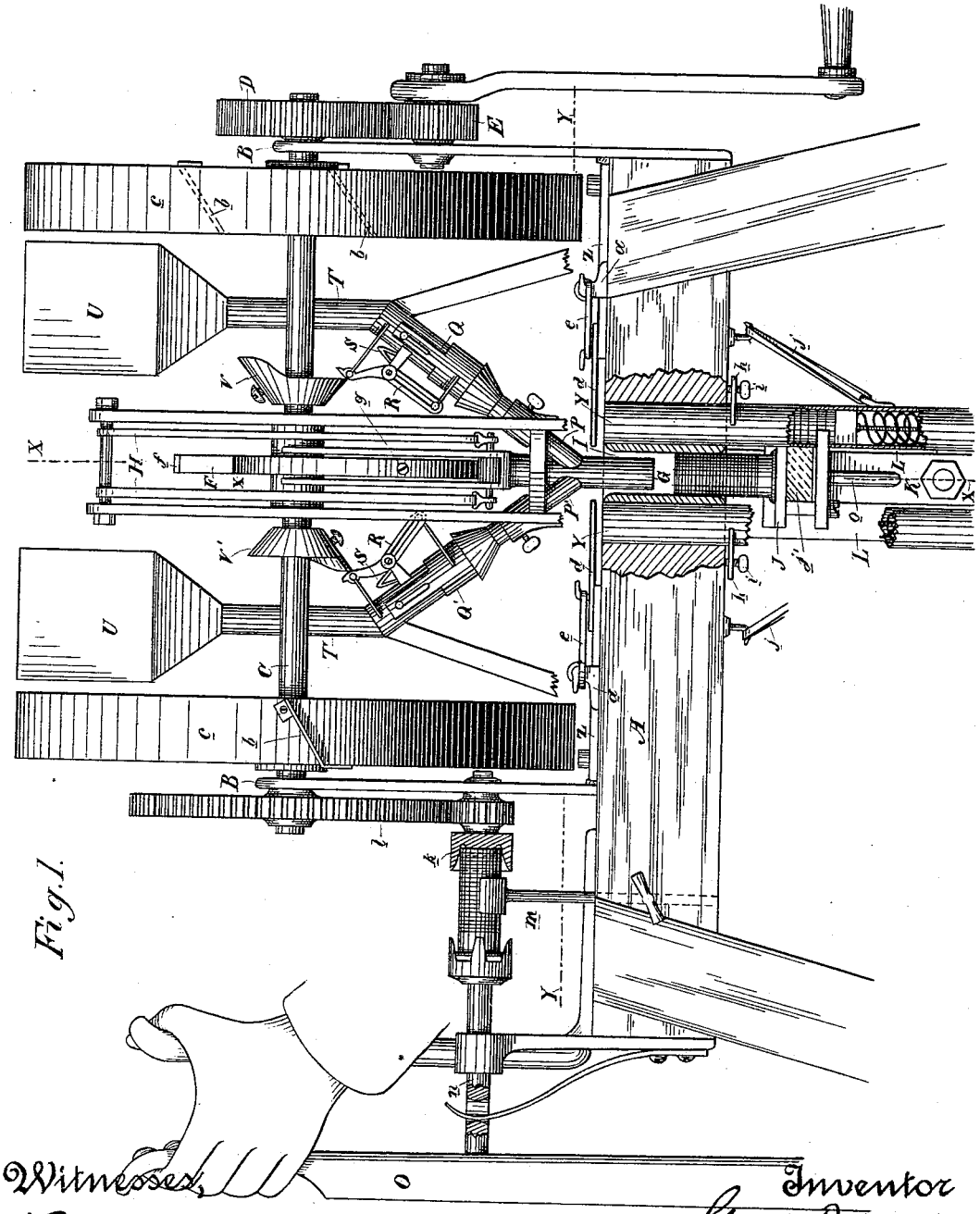

Fig. 1.

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(No Model.) 3 Sheets—Sheet 2.

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CARTRIDGE LOADING MACHINE.

No. 343,706. Patented June 15, 1886.

Fig. 4.

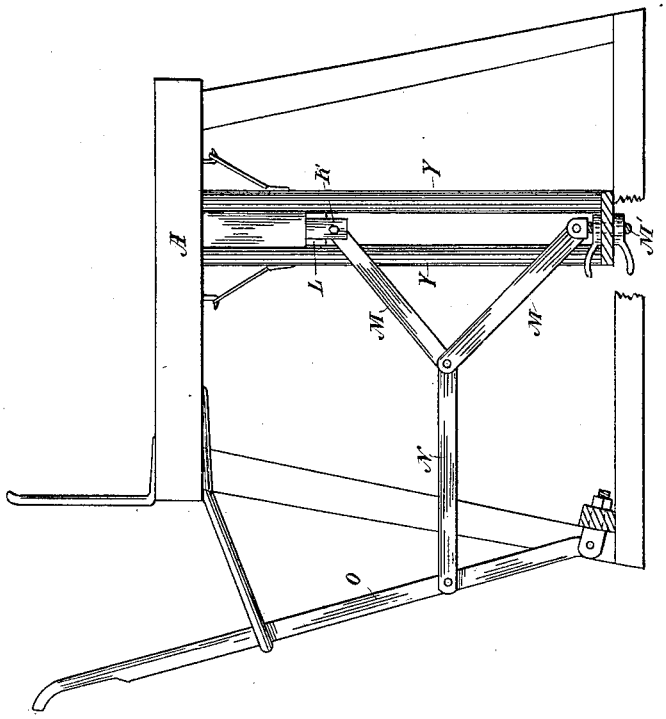
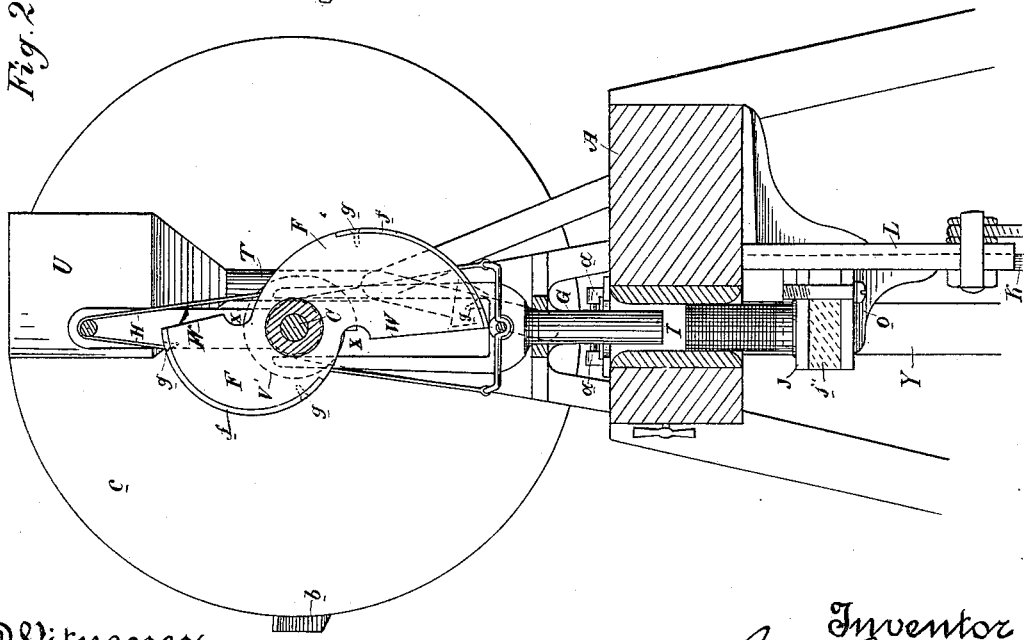


Fig. 2.



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(No Model.)

3 Sheets—Sheet 3.

G. J. FOSTER.

CARTRIDGE LOADING MACHINE.

No. 343,706. Patented June 15, 1886.

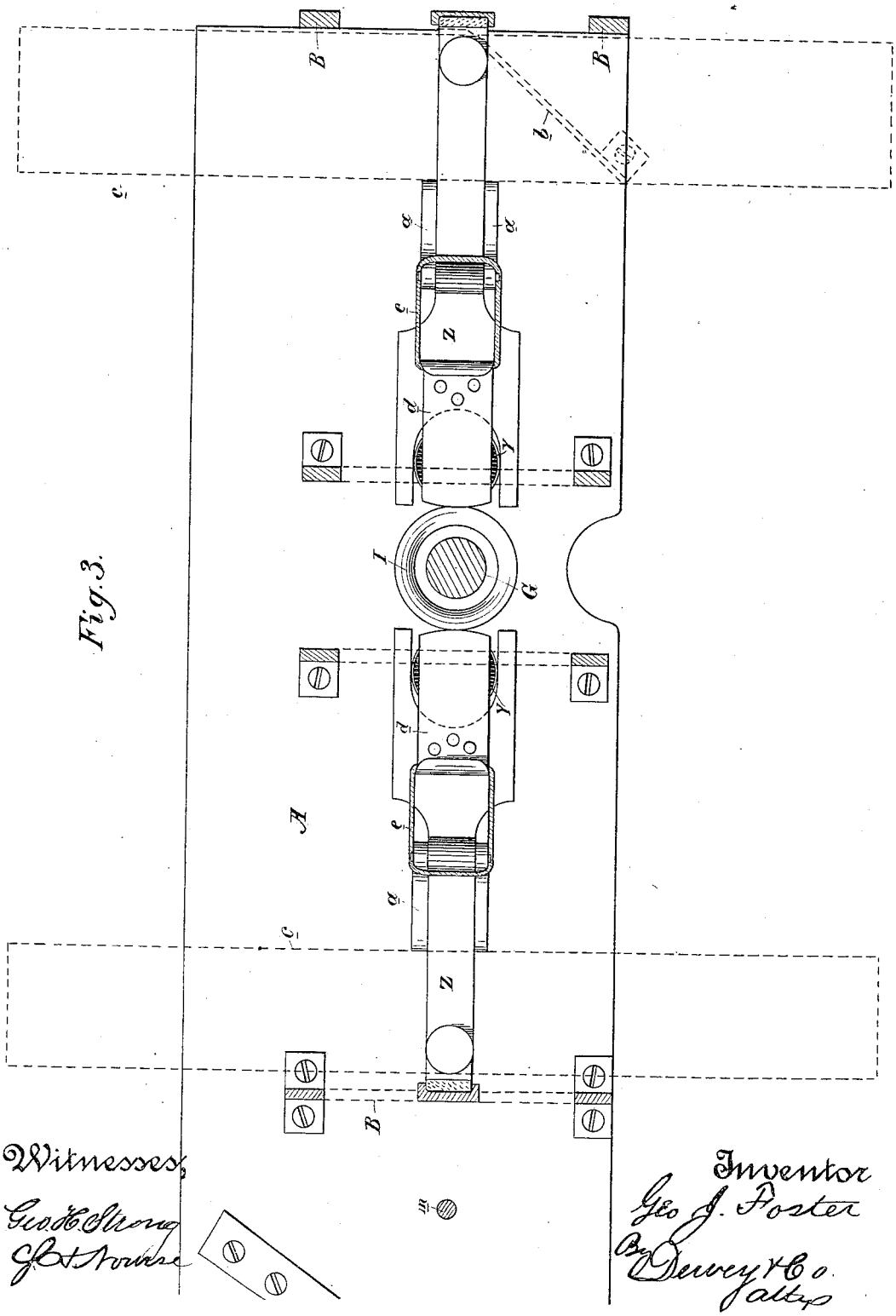

Fig. 3.

Witnesses,
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UNITED STATES PATENT OFFICE.

GEORGE J. FOSTER, OF ALAMEDA, CALIFORNIA.

CARTRIDGE-LOADING MACHINE.

SPECIFICATION forming part of Letters Patent No. 343,706, dated June 15, 1886.

Application filed March 20, 1886. Serial No. 196,029. (No model.)

To all whom it may concern:

Be it known that I, GEORGE J. FOSTER, of Alameda, Alameda county, State of California, have invented an Improvement in Cartridge-Loading Machines; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to a machine for loading cartridges; and it consists of a novel arrangement and mechanism whereby this work is carried out, all of which will be more fully described by reference to the accompanying drawings, in which—

Figure 1 is a side elevation of the machine. Fig. 2 is a transverse section taken through X X, Fig. 1. Fig. 3 is a horizontal section taken through Y Y, Fig. 1. Fig. 4 is a side elevation showing the knee-levers and adjustment.

A is the table or stand by which the mechanism is supported.

B B are journal-boxes, through which a horizontal shaft, C, extends, and within which it turns. One end of this shaft may be provided with a gearing or belt wheel, by which it is rotated. In the present case I have shown a gear-wheel, D, fixed to the end of the shaft, and a pinion, E, is mounted so as to engage with this gear-wheel, the pinion being provided with a crank, by which it is turned, so that the main shaft is driven at a slower rate of speed than the crank-shaft.

Upon the central portion of the shaft C is fixed a double cam, F, and beneath this cam a vertical plunger, G, is placed, working in guides, so that when the cam is turned the plunger will be forced down by it, being drawn back by the action of a spring, H, after the point of the cam has passed. Beneath this plunger, and in line with it, is a chamber or receiver, I, into which the cartridge-shell is carried from below when it is desired to load it.

J is a table having a semicircular grooved channel, into which the flange at the head of the shell may be slipped, so that the shell will be held upright. This table rests upon a rubber or other elastic cushion, *j'*, which is supported by a bracket or shelf, *o*, below, and the table is guided by pins or bolts passing through this bracket or shelf, so that it may have a vertical movement, depending upon the amount of pressure from above, the elastic cushion yielding to allow this movement. The bracket and table are attached to a slide, K, which moves vertically in guides L. A toggle or knee lever, M, has one end attached to the slide and the other end adjustably attached to the frame in line vertically below the slide, as shown. A link or rod, N, extends at right angles from the joint of this knee-lever, to which one end connects, and the opposite end is attached to a lever, O, also fulcrumed upon the frame, which may be moved so as to actuate the toggle or knee lever, and thus force the slide K, with the table carrying the cartridge-shell, upward, so that the mouth of the shell will enter the tubular guide or chamber I, before described. The knee-lever M is adjusted vertically by means of a screw, M', at the bottom, and this raises or lowers the slide K and table J to suit varying charges.

Upon each side of the plunger G are inclined cylindrically-shaped receivers P P', the lower ends of which are beveled and curved in such form that when the plunger passes down between them it will exactly close these ends like a gate, and prevent the escape of their contents. Above these inclined receivers are the powder and shot gages or measurers Q Q', which have a telescopic sleeve or arrangement by which the length may be changed, and the charge within each may be varied, as desired. At the upper and lower ends of these measurers are transversely-sliding gates, connected by means of a lever, R, so that when one is open the other will be closed. A spring, S, is connected with this lever, so that the lower gate will be kept closed when in its normal position, and the upper gate left open. Tubes or pipes T connect with the upper ends of these measuring devices, and extend thence to the hoppers U, into which the powder and shot are placed.

Upon the horizontal shaft C are fixed cams V and V', so placed as to strike the upper ends of the gate-levers R, and by forcing them down close the upper gate, at the same time opening the lower one, thus allowing the charge of powder or shot to escape from the measuring device into the funnel or receiver P or P'. As soon as this cam has passed so as to relieve the upper end of the lever the latter immediately springs back to its place, closing the lower slide, and opening the upper one so that

a new charge may enter the measurer from the hopper. These cams V V′ are arranged to work alternately, so that one will be opened and discharge powder, and after a wad has been placed in the shell above that the other one discharges the shot. As long as the plunger G remains down between the lower ends of the tubes P P′ they will both be closed; but when it is raised above them they will be open so that the contents of either will be discharged. When in its normal position, the lower end of the plunger stands slightly below the mouths of these pipes, and they are consequently closed until it is raised.

The cam F is formed so that when either point has passed the upper end of the plunger so as to release it the plunger is carried upward by the spring H until its upper end strikes the rear portion of the cam, which is formed, as shown at W, so as to check the plunger before its lower end has risen above the mouths of the tubes P. By turning the shaft C a slight distance farther the cam is carried so far that a depression, X, arrives in such position that the upper end of the plunger falls into it, thus raising the lower end above the mouths of the tubes P, and allowing the one which is at that moment filled to discharge into the shell guide or receiver I. The shell having been raised into the proper position, by moving its table J upward by the knee-lever, as before described, it will receive the contents of the tube I.

In order to introduce a wad or wads into the shell, I employ two wad-magazines, Y, which extend from below up through the table, their mouths opening upward upon each side of the shell receiver or chamber I, and springs in the lower ends of these tubes act to force the wads upward. Above the mouths of the tubes are horizontally-moving shuttles or slides Z. These slides move in guides *a*, and are actuated by cams *b* upon the rims of the wheels *c*, fixed upon the main shaft C. The slides are provided with a thin plate or stop, *d*, projecting far enough forward from the upper front edge so that the upper ends of the wad-tubes are never entirely uncovered, and the pressure of the spring in the tube will force a wad up until it strikes this plate or stop, and when the slide is moved forward it carries the wad to a point above the shell-receiver I, into which it drops by gravitation, the upper ends of the receiver being chamfered or beveled to allow this, and the wad will fall down upon the mouth of the shell. At this instant the cam B, by which the slide Z was moved forward, will have passed, so as to allow the slide to be instantly retracted by a spring, *e*, by which it is operated. If the same kind of wads were to be used over both powder and shot, it would be manifest that a single cam-wheel might be employed, and a single wad-magazine, and carrying-slide; but it is customary to use soft wads over the powder, and harder ones over the shot, consequently I employ the two magazines and the two cam-wheels.

As it is usually desirable to place two wads above the powder, I fix two cams upon the cam-wheel which operates the slide, carrying the wads to be placed over the powder. These cams are so close together that the slide is moved forward and retracted by its spring twice in quick succession. The operation will than be as follows: While the plunger G is down the cam V strikes the lever R of the powder-receiver, and moves it so as to discharge the powder contained within it into the tube P, the powder then lying against the side of the plunger G at the lower end of the tube. As the shaft C is rotated the cam F passes beyond the end of the plunger and releases it, allowing it to rise and strike the rear face, W, of the cam F. The powder, still resting against the plunger, is prevented from escaping from its tube until the cam has been rotated, so that the upper end of the plunger drops into the depression X, which allows the plunger to rise with a sudden movement, so as to allow the powder to run out of the inclined tube P, and fall into the shell-receiver and guide I, passing directly into the shell, which has been raised up by the movement of the lever N. A further rotation of the shaft C brings the cam *b* successively into contact with the lug upon the slide Z, thus forcing two wads forward one after the other, both of which fall into the upper end of the shell guide and receiver I. As the rotation of the shaft is continued the longer end of the cam F acts upon the upper end of the plunger G and forces it down, pressing the wads into the shell and down into contact with the powder. After the point of this end of the cam has passed the upper end of the plunger the latter again rises in the same manner as before described, and allows the charge of shot which has been delivered into the tube P′ by the action of the cam V to pass into the receiver I, and thence into the shell. The other cam, *b*′, then acts upon its slide Z′ and forces a single wad forward, which drops into the receiver above the mouth of the shell, and is pressed down by the opposite and shorter arm of the cam F, this arm being made enough shorter than the one which forces the wads upon the powder to allow for the difference in depth between the bottom and the top of the shot. By this construction and the use of this receiver, which is somewhat larger in diameter than the interior of the shell, the wads may be made to fit tightly within the shell, which is the proper way.

In order to allow for adjustments, so that more or less powder or more or less shot may be loaded into the shell, the exterior faces of the cam F are shod with curved spring-plates *f*, the outer ends of which are adjustable by means of screws *g*, so that they may stand farther from or nearer to the center, as desired. When the shoe of the longer cam is adjusted

to stand farther from the central shaft, it will load the wads upon a small charge of powder, and when drawn in close to the end of the cam it will serve to load with a larger charge of powder. The same adjustment of the shoe upon the opposite or shorter cam will regulate it for larger or smaller charges of shot.

As the wads are sometimes of greater or less thickness, in order to accommodate these wads and prevent their binding or sticking at the mouth of the wad-magazine the latter is attached to the table by means of a plate, *h*, having a screw, *i*, by which it may be raised or lowered with reference to the table, and the slides Z, which carry the wads. The magazine is easily attached and held in place by means of a spring, as shown at *j*. The cushion or spring beneath the table J, upon which the shell is placed, is sufficiently elastic to allow the shell to adjust itself for all slight variations in the amount of powder and shot or the thickness of wads, and the consequent difference in pressure caused by the movement of the plunger into the shell. After the shell has been charged it is necessary to crimp or turn over the outer end, so as to hold the load securely in the shell. This is done by means of a rotary cylinder, into which the end of the shell is placed and pressed against the bottom of the chamber in the cylinder, which has a return-curve, so as to turn the end of the shell over. This cylinder *k* is mounted upon a horizontal shaft, and has a pinion driven by a gear-wheel, *l*, upon the horizontal shaft C, so as to be rotated rapidly. The shell is laid upon a stand or support, *m*, in line with this crimper, and when the lever O is drawn up, so as to raise a cartridge into the guide I for loading, it also forces the rod *n* forward, and by means of a cap upon its inner end presses another shell into the crimper, the work being thus completed by crimping each shell as fast as it is removed from the loader.

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

1. In a cartridge-loading machine, the combination, with a supporting-table, of a guiding-tube mounted in said table, a cam mounted upon a horizontally-rotating shaft, and having one end made longer than the other, and a vertically-arranged plunger operated and depressed alternately by said ends of the cam, whereby the extent of the thrust of the plunger is regulated, substantially as herein described.

2. A cam mounted upon a horizontally-rotating shaft and having one end made longer than the other, in combination with a vertically-moving plunger traveling in guides beneath the cam, a shell guide and receiver beneath the plunger, and a support or table upon which the shell may be placed to be moved in or out of the guide, substantially as herein described.

3. A cam mounted upon a horizontally-rotating shaft and having one end made longer than the other and having adjustable faces, in combination with a vertically-moving plunger operated by said cam, a shell guide and receiver in line beneath the plunger, and a vertically-moving table upon which the shell is supported and raised and depressed, substantially as herein described.

4. A vertically-moving shell-supporting table, and the tube or guide into which the mouth of the shell is introduced, the plunger moving in vertical guides in line with the shell, in combination with a cam fixed to a horizontally-rotating shaft above the plunger, said cam having its curved faces made expansible or adjustable, so as to move the plunger over a greater or less distance, substantially as herein described.

5. The combination, with the shell-supporting table and cylindrical guide, of a vertically-moving plunger with retracting-springs, as shown, the cam having the curved faces by which the plunger is depressed, and having its rear faces formed with successive steps against which the head of the plunger strikes after passing the point of the cam, so as to be retracted in two motions, substantially as herein described.

6. The vertically-moving shell-supporting table, the cylindrical guide into which the mouth of the shell is introduced, a vertically-moving plunger, and operating-cam, as shown, in combination with the inclined powder and shot tubes, the lower ends of which fit the sides of the plunger, which forms a gate or valve, and the upper ends of the tubes connected with the powder and shot measuring and charging devices, substantially as herein described.

7. The oppositely-disposed powder and shot measuring devices, and the levers R, mounted thereon and having the double gates, in combination with a horizontally-rotating shaft, and the cams V V′, mounted on said shaft and adapted to engage the levers and operate the gates, substantially as and for the purpose described.

8. The inclined powder and shot measurers with the double gates, connecting-levers, and actuating-cams mounted upon the horizontal rotating shaft by which the loading-plunger is actuated, in combination with the supplemental inclined receiving-tubes into which the mouths of the measurers discharge, the lower ends of said tubes fitted against the sides of the plunger, so that it acts as a gate for them, substantially as herein described.

9. The inclined adjustable powder and shot measurers with double valves, connecting-lever, and receiving-tubes into which they discharge, cams by which the valves are alternately actuated so that the charges of powder or shot are successively delivered into their respective receivers, a loading-plunger moving in guides in line with the shell guide and receiver, and a double cam whereby the plun-

ger is actuated with a long and a short stroke at each revolution of the shaft, in combination with wad-magazines and horizontally-moving slides or shuttles, whereby the wads are carried forward and dropped into the shell-guide below the plunger after each stroke of the plunger, substantially as herein described.

10. The vertical wad-magazine extending upwardly at the side of the shell-guide, and having the shuttle or slide moving in guides transversely above the end of the magazine, a spring by which the shuttle is retracted, in combination with one or more cams upon a wheel upon the main shaft, whereby the shuttle is made to deliver one or more wads into the shell-guiding cylinder and beneath the loading-plunger, substantially as herein described.

11. The vertical wad-carrying magazine having a spring in the lower part to advance the wads, the transversely-moving slide or shuttle traveling in guides across the upper end of the magazine, so as to carry wads into the cylindrical shell-guide beneath the loading-plunger, and the cam by which the wad-carrying shuttle is operated, in combination with an adjusting-screw whereby the magazine may be raised and depressed and adjusted for different thicknesses of wads, substantially as herein described.

12. The inclined powder and shot measurers, receiving-tubes, cam-actuated plunger moving between said tubes and forming a gate or valve for them, a cylindrical guide fixed in line beneath the plunger and into which the powder and shot chargers are emptied, in combination with a shell-holding table or bracket moving in vertical guides beneath the table, and a lever by which said table is actuated, so as to carry the mouth of the shell into the cylindrical receiver, for the purpose of receiving the load, substantially as herein described.

13. In combination with the co-operating loading mechanism of a cartridge-loading machine, the vertically-moving table having the semicircular channeled plate for holding the flange of the shell, a vertically-moving bracket and a cushion supported thereon and forming a rest for the table, substantially as herein described.

14. The powder and shot loading mechanism and the vertically-moving plunger, the cylindrical shell guide and receiver into which the powder and shot are discharged and by which they are delivered into the shell, a bracket moving in vertical guides beneath the receiver, and the operating-levers by which it is raised and depressed, as shown, in combination with a supplemental shell-holding table supported upon an elastic cushion or spring upon the bracket, whereby the pressure upon the load may be regulated, substantially as herein described.

15. The combination, with a table having a loading apparatus mounted thereon, of a lever fulcrumed beneath said table, a link connected with the lever, and the toggle-levers M and slide J, whereby the cartridge is raised or depressed, substantially as herein described.

16. The combination, with a table having a horizontal shaft mounted above the same, and a gear-wheel, *l*, on one end of said shaft, of a lever, O, fulcrumed to the table, a rod, *n*, carried by said lever and having a cap for receiving one end of the cartridge, the standard *m*, and a cylinder, K, having a pinion driven by the gear-wheel *l* and engaging the opposite end of the cartridge, substantially as herein described.

17. The combination of the table, the powder and shot loading mechanism above said table, an operating-shaft, a vertically-moving plunger operated by a cam on said shaft, the shell guide and receiver in said table, a bracket or shell-supporting table moving in guides beneath the shell-guides, and a knee or operating-lever having a regulating screw or mechanism at the fulcrum, substantially as herein described.

In witness whereof I have hereunto set my hand.

GEORGE J. FOSTER.

Witnesses:
S. H. NOURSE,
H. C. LEE.