(No Model.) 4 Sheets—Sheet 1.

C. S. HISEY.

CARTRIDGE LOADING MACHINE.

No. 505,423. Patented Sept. 19, 1893.

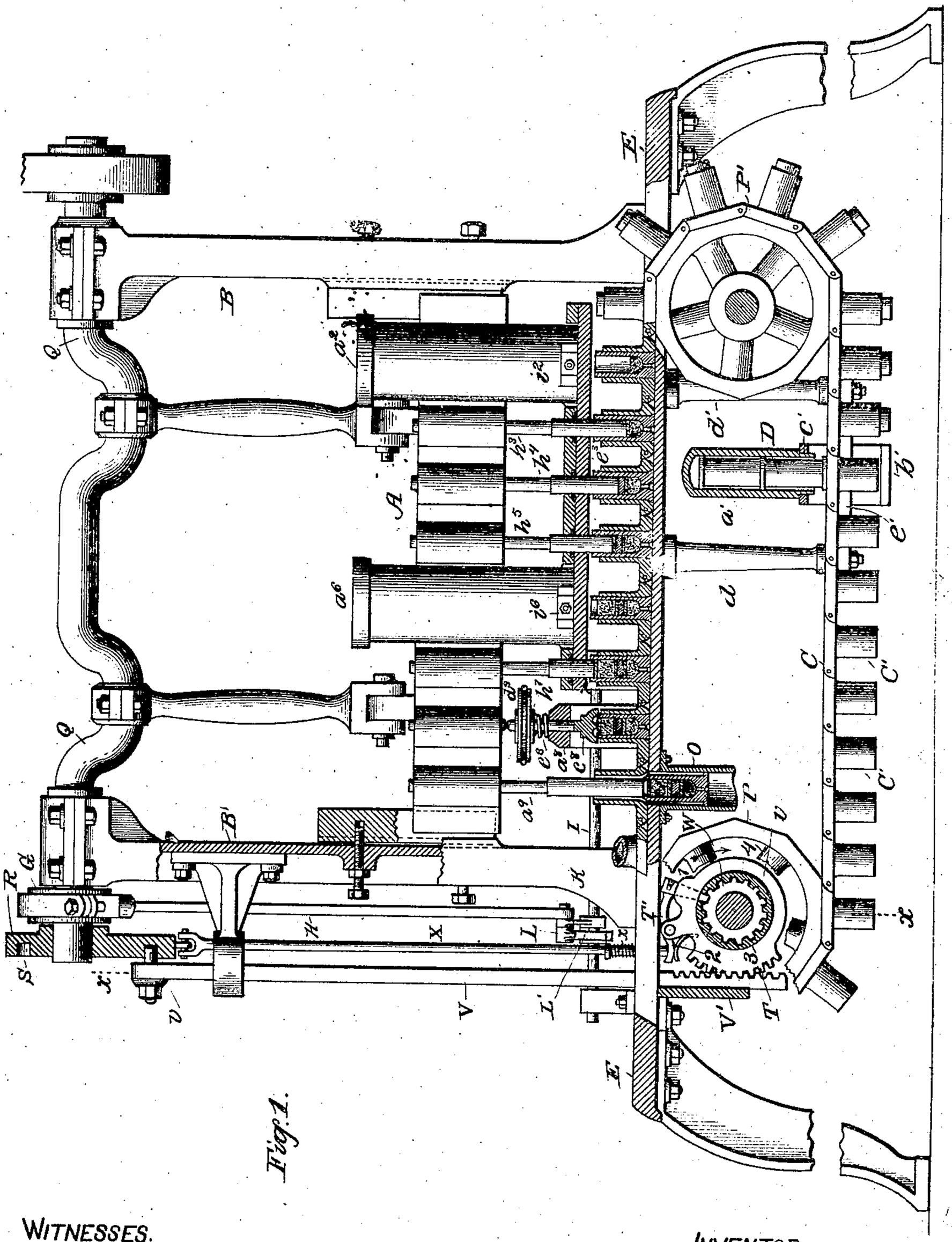


Fig. 1.

WITNESSES.
Victor J. Evans.
L. M. Marble

INVENTOR.
C. S. Hisey.
By E. M. Marble
Attorney

(No Model.) 4 Sheets—Sheet 2.

C. S. HISEY.

CARTRIDGE LOADING MACHINE.

No. 505,423. Patented Sept. 19, 1893.

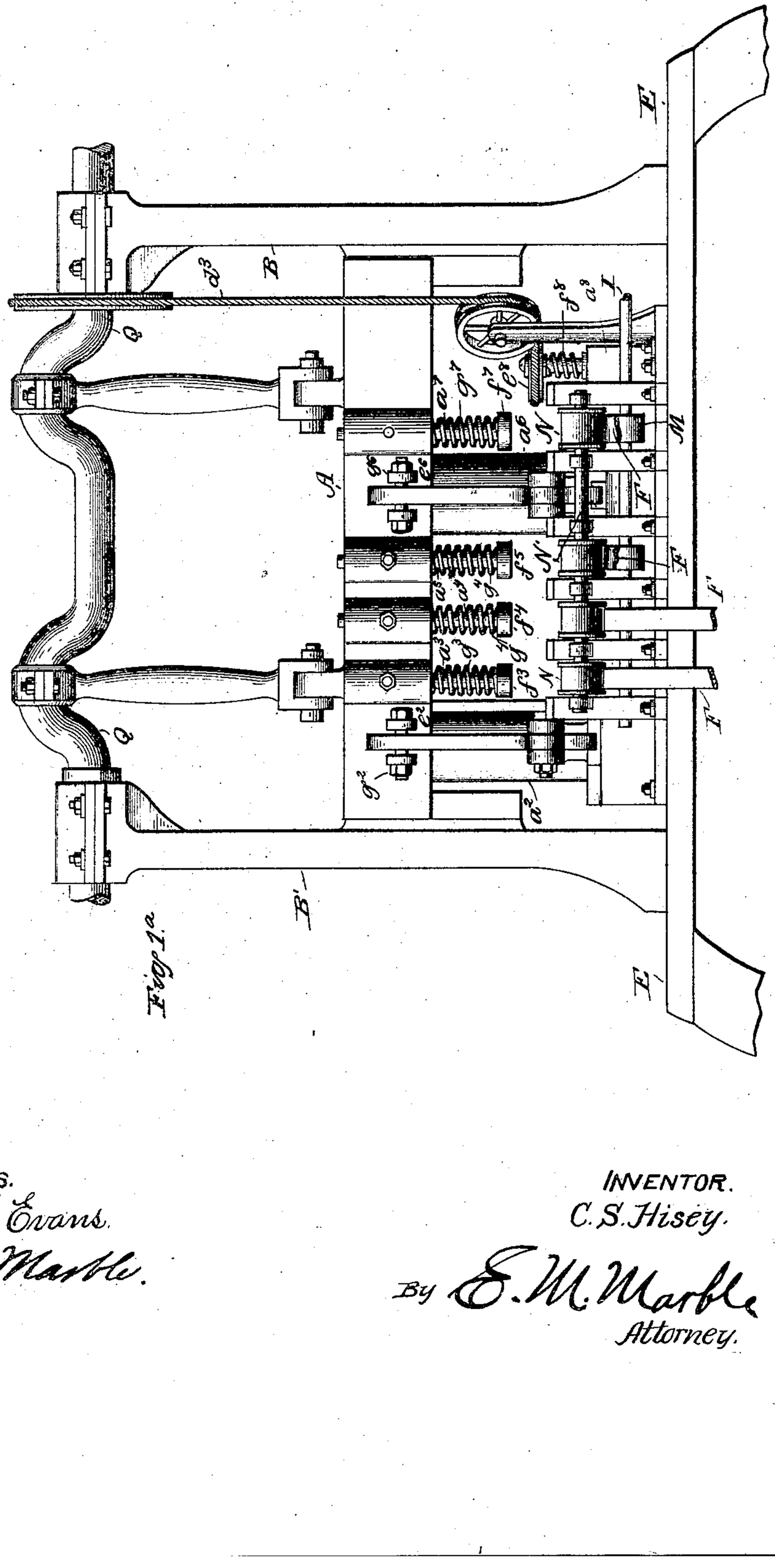


Fig. 1.

WITNESSES.
Victor J. Evans.
L. M. Marble.

INVENTOR.
C. S. Hisey.
By E. M. Marble
Attorney.

(No Model.) 4 Sheets—Sheet 3.

C. S. HISEY.

CARTRIDGE LOADING MACHINE.

No. 505,423. Patented Sept. 19, 1893.

Fig. 2.

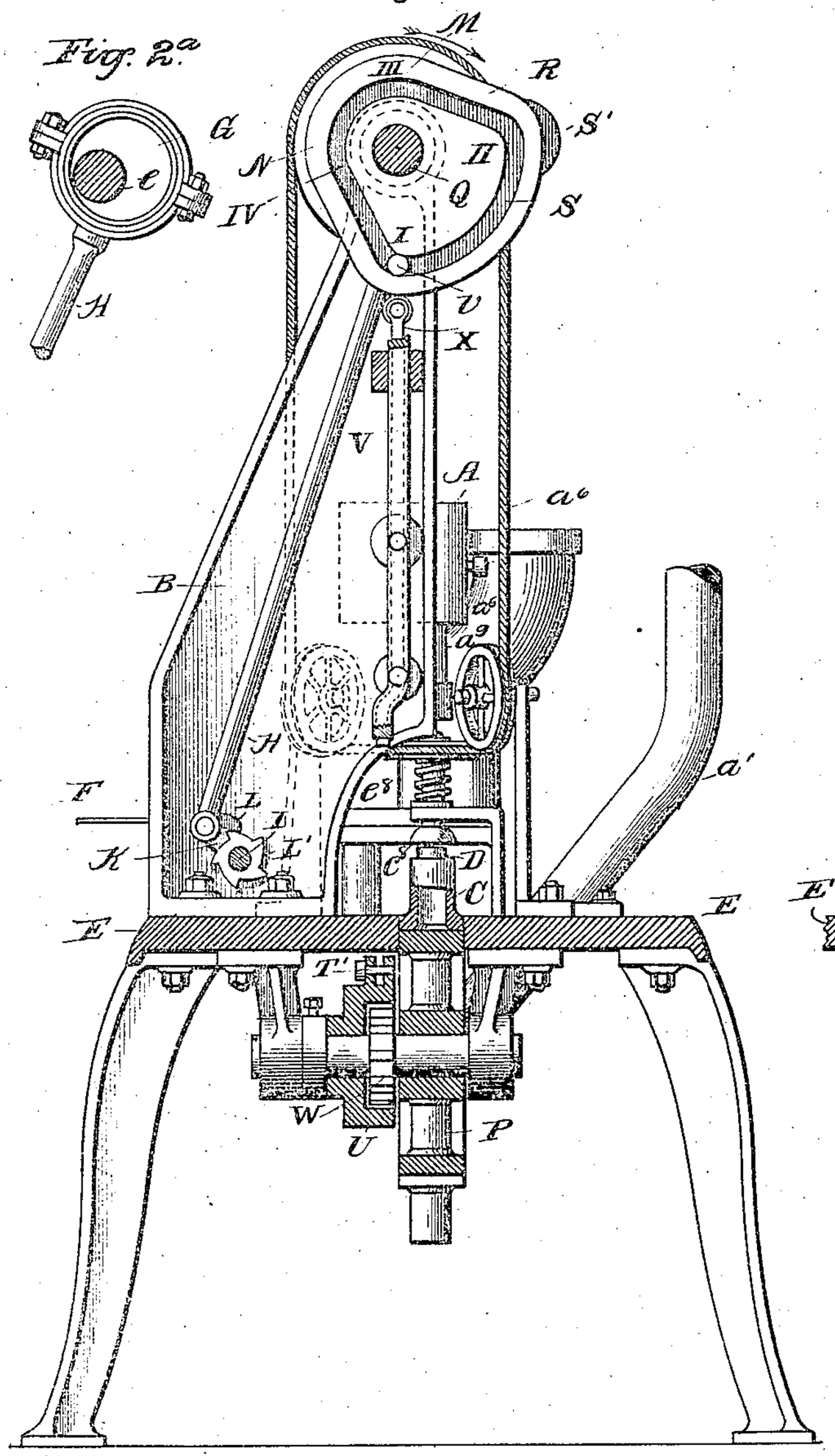


Fig. 3.

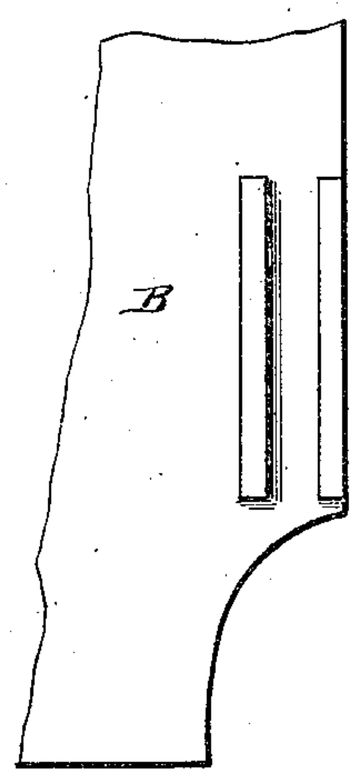
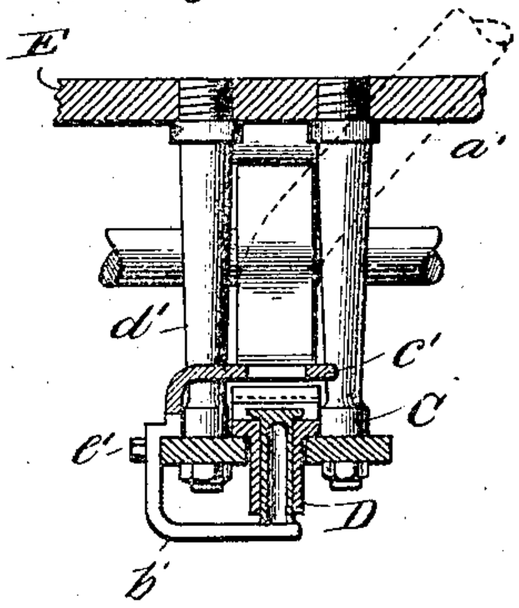


Fig. 4.



WITNESSES.
Victor J. Evans.
E. M. Marble.

INVENTOR.
C. S. Hisey.
By E. M. Marble
Attorney.

(No Model.) 4 Sheets—Sheet 4.

C. S. HISEY.

CARTRIDGE LOADING MACHINE.

No. 505,423. Patented Sept. 19, 1893.

Fig. 5.

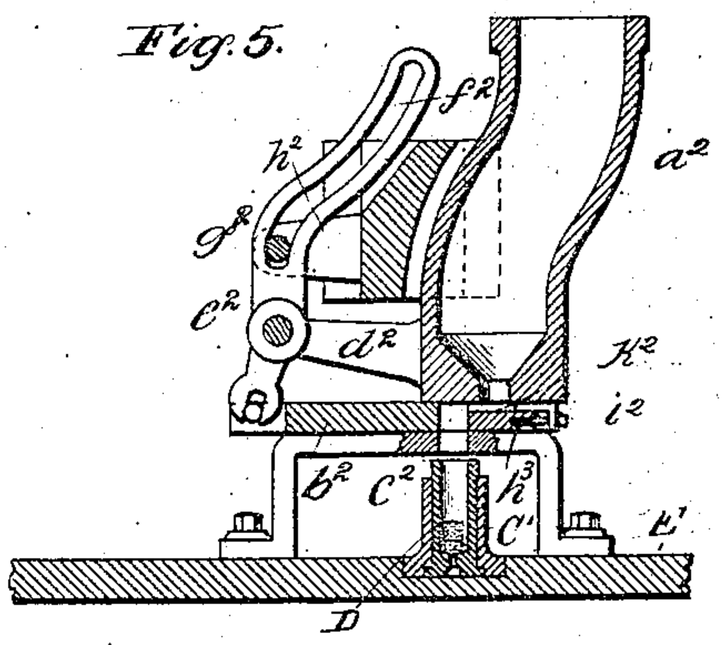


Fig. 6.

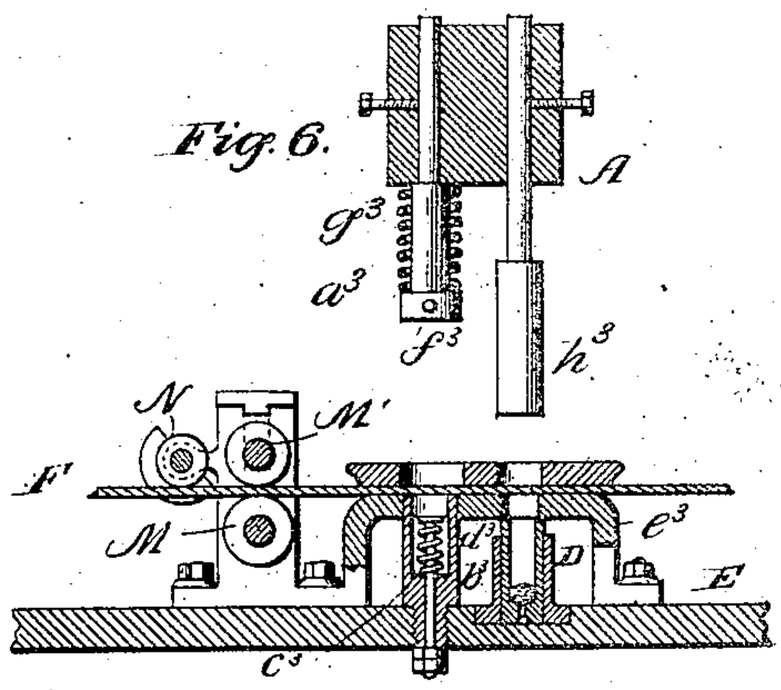


Fig. 10.

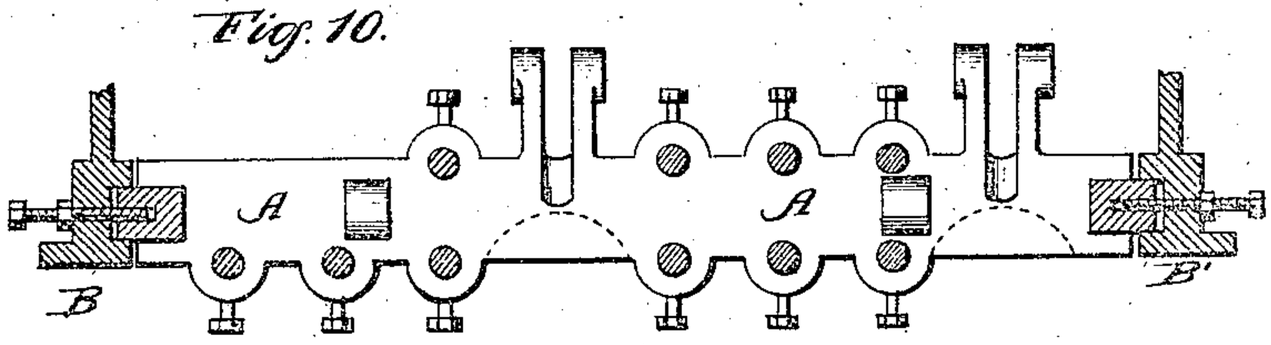


Fig. 9a

Fig. 9.

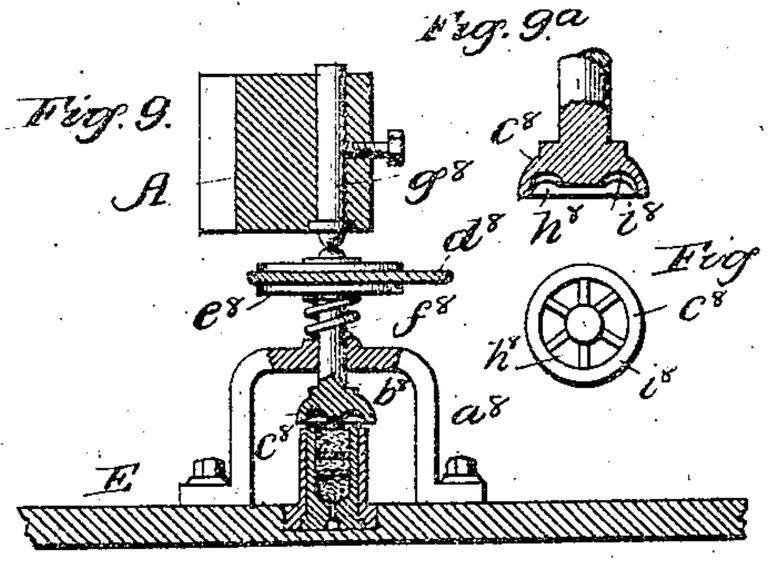


Fig 9b

Fig 7a

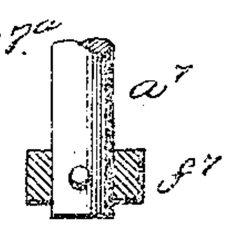


Fig. 7.

Fig. 8.

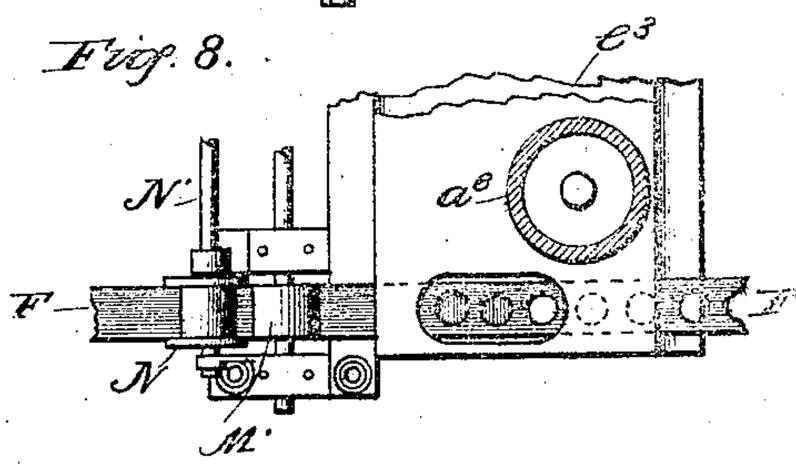
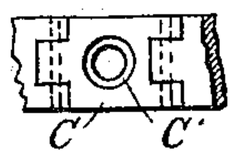


Fig. 11.

Fig. 12.



WITNESSES.
Victor J. Evans.
L. M. Marble.

INVENTOR.
C. S. Hisey.
By E. M. Marble
Attorney.

UNITED STATES PATENT OFFICE.

CHARLES S. HISEY, OF AURORA, INDIANA, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE STANDARD CARTRIDGE COMPANY, OF NEW JERSEY.

CARTRIDGE-LOADING MACHINE.

SPECIFICATION forming part of Letters Patent No. 505,423, dated September 19, 1893.

Original application filed June 24, 1889, Serial No. 315,308. Divided and this application filed September 26, 1892. Serial No. 446,960. (No model.)

To all whom it may concern:

Be it known that I, CHARLES S. HISEY, a citizen of the United States, residing at Aurora, in the county of Dearborn and State of Indiana, have invented certain new and useful Improvements in Cartridge-Loading Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This application is an improvement on the construction shown in my application for Letters Patent filed September 8, 1888, Serial No. 284,961, and is a division of my application filed June 24, 1889, Serial No. 315,308, and relates to the construction of a machine for loading cartridge shells with powder and shot. The loading is effected by first filling an adjustable charge of powder into the cartridge, then inserting the customary wads, preferably three, *id est*, first a cardboard, then a felt, and lastly a second cardboard wad, above which the shot charge is introduced, and above the charge of shot a card or paste board wad is inserted, onto or into which said wad the quantity of powder and shot in the charge is printed or impressed, whereupon the protruding edge of the shell is folded over or crimped, and the finished cartridge ejected from the machine.

The tools required for carrying the several operations of loading said cartridges into effect are attached to a common tool carrier, which is moved up and down in suitable guides in the standards of the framework of the machine. Nine tools are required for feeding in the shells, charging the same with powder and shot, inserting the wads, folding over the upper edge of the shell, impressing or printing the upper wad, and ejecting the finished cartridge from the machine. The cartridge bearings are connected in suitable manner so as to form an endless, articulated band, to which an intermittent movement is communicated by means of suitable prismatic drums or wheels, so that at each part rotation of the said drums, the cartridge shells are successively brought beneath the various tools for effecting the charging and ejecting of the finished cartridge from the machine. The empty shells are fed into the bearings in the articulated endless band at the lower side of the same, as represented in the accompanying drawings, and are then fed successively under the various tools, so that when the first cartridge has been finished, a finished loaded cartridge will be ejected from the machine at each and every part revolution of the prismatic drums. The machine is driven from the strap drum on the crank shaft, which has its bearings in the standards, the cranks of the said shaft being so connected by means of connecting rods to the tool carrier, that the latter is caused to make a reciprocating movement at each revolution of the shaft, the prismatic drums are intermittently rotated through the mechanism driven by a suitable cam on the crank shaft, and the felt and card or pasteboard strips are caused to be fed beneath the cutters for cutting out the wads.

Figure 1 represents my improved machine partly in elevation and partly in section. Fig. 1ª is a back view of a portion of my improved machine, showing the wad suppliers, feeders and cutters. Fig. 2 is an end view partly in section on the line *x*—*x* in Fig. 1. Fig. 2ª is an elevation of the eccentric and rod for driving the spindle to the feeding device for the board and felt wad strips. Fig. 3 represents the guide slots in the standards for guiding the tool carrier. Fig. 4 represents the mechanism for feeding the empty shells into the bearings in the endless band, a portion of the parts being broken away and partly in section, in order to better illustrate the operation of the same. Fig. 5 is a sectional view of the mechanism for charging the shell with powder or shot. Fig. 6 is a vertical section of the mechanism for cutting out the wads placed between the powder and shot. Fig. 7 is a vertical section of the mechanism for cutting out the upper wad, printing or impressing the number, &c., into said wad, and driving the wad into the cartridge. Fig. 7ª is a like section of a portion of the same on an enlarged scale. Fig. 8 is a horizontal section of Fig. 7 with most of the parts in top view.

Fig. 9 is a vertical section of the mechanism for folding over the upper edge of the cartridge. Figs. 9^a and 9^b represent the folding or crimping tool in vertical section and bottom view. Fig. 10 is a top view of the tool carrier. Fig. 11 is a vertical section and Fig. 12 the top view of one of the link like members of the endless chain with its cartridge bearing.

I will now proceed to successively describe the mechanisms or tools used in my improved machine for effecting the various operations for loading the cartridges, while the mechanisms for producing the intermittent movement of the endless band which carries the cartridge bearings and runs beneath the charging tools and the mechanisms for producing the reciprocating movement of the tool carrier will be described in specifying the operation of the entire machine.

For clearness sake, the constructive parts of the mechanism or tools are provided with numbers corresponding to the numbers of the operation to which the cartridge is subjected, *i. e.* the parts of the feed mechanism for the empty cartridges the number 1, the device for filling in the powder charge the number 2, and so on. The common tool carrier A of the machine is guided in the vertical plane by lateral guides on the two standards B B', while the single links or members C of the endless belt with the cartridge bearings C' are guided beneath the said tool carrier and in a direction rectangular to the same. The mechanism for feeding the empty cartridge shells D, Fig. 4, into the cartridge bearings of the endless band is so arranged between the two halves of the endless band that the guide tube a' runs through the plate E of the frame, Fig. 2. The shells D fall from the feed tube according to the intermittently advancing movement of the endless band into the cartridge bearings in the latter, and are held somewhat above the surface of the band by means of the arm b' of a small bow or strap, so that should the cartridge shell be shorter or of smaller diameter than the bearing, the shell is still held up, so as to prevent the next following cartridge shell from entering the bearing in the band, which would eventually damage the parts. The upper horizontal arm c' of the bow or strap serves as a guide for the tube a'. The bow or strap b' c' is attached to one of the rails e', attached to the lower ends of the arms or posts d', screwed into the lower surface of the table, the rails e' serving at the same time to support the endless band. The cartridge shells fed into the bearings in the links or members of the endless band are brought by the successive forward movement of the band beneath the mechanism, Fig. 5, for charging the same with an adjustable quantity of powder, which passes from a funnel shaped powder chamber a^2, the outlet of which is closed by a slide b^2, when the tool carrier A has reached its lowest position. When the slide b^2 is moved forward, the cavity or boring c^2 in the same is filled with powder, which falls through an opening in the slide seat, into the cartridge D, when the slide is moved again in the opposite direction. The movement of the slide is effected by means of a lever e^2 with curved slot f^2, in which an antifriction roller or pivot g^2 of the holder h^2 fixed in the tool carrier glides, the said lever e^2 having its fulcrum in the arm d^2. The quantity of powder with which the cartridges are to be charged can be regulated by the adjusting screw i^2, and plate k^2, by means of which the opening in the slide can be enlarged or decreased. It must be remarked that the mechanism for charging the cartridge with shot is precisely of the same construction as above described for the powder charging mechanism, and needs, therefore, no special description. The cartridge, which has now been charged with powder, passes through the forward movement of the endless belt beneath the mechanism for cutting out and inserting the card or pasteboard and the felt wads, which is constructed as follows: The strips of board or felt F are intermittently fed forward at a speed corresponding to the speed communicated to the endless band. The cutting or punching device consists of an upper part a^3 and lower part b^3, the latter being arranged in a cylindrical guide piece c^3 screwed to the table and held level with the surface of the guide by a helical spring d^3. The upper part a^3 consists of a mandrel with head f^3 and helical spring g^3, said head f^3 being movable so that when the upper part a^3 is forced onto the board or felt strip by the downward movement of the tool carrier A, the head will glide upward on the mandrel and the hollow mandrel or punch cuts out the wad, the lower part b^3 being depressed so that the wad is entirely separated from the strip. As soon as the tool carrier rises, the lower part b^3 and with it the wad is raised by the helical spring d^3 and the head f^3 simultaneously and in correspondence with the rising out of the guide piece c^3, depressed by the spring, so that the wad is held from both sides in the hole in the strip F, and remains in the same when the said strip is moved forward. By the second intermittent movement of the strip the wad comes over the partly charged cartridge, and is driven into the cartridge above the powder charge or the other wads by the mandrel h^3.

The mechanism for feeding the wad strips is set in motion from the driving shaft of the machine, (Fig. 2.) For this purpose an eccentric G is arranged on this shaft, which is connected by the rod H to the arm K, working loosely on the shaft I as on a pivot. The shaft I is provided with a ratchet wheel L', and a pawl L is connected with the arm K, and engages the ratchet wheel L', which is thereby caused to intermittently rotate, so that the feed rollers M are intermittently rotated, and in this manner, and through the rollers M', pressed onto the wad strips by means of suitable

springs, the wad strip is moved a certain distance. This motion can be so regulated that the consumption of board or felt is reduced to a minimum. N is a guide roller attached to the shaft N′, which is carried by an arm fixed to the standard carrying the pressure rollers. The cartridge is provided above the powder with three wads, two pasteboard or cardboard wads, and between them a felt wad, which are all cut out by the same mechanism and successively driven into the cartridge. An adjustable quantity of shot is now fed into the cartridge by a mechanism corresponding with that for feeding in the powder. The shot having been fed into the cartridge, a paste or cardboard wad is inserted in the same, said wad being previously provided with the number of the shot loaded into the cartridge, by printing the same onto or impressing it into the said wad. This printing or impressing of the wad is effected by means of a stamp of the mechanism represented in Figs. 7 and 8 for impressing and driving in the wad. This stamp i^7 is arranged between the circular wad cutter and the mandrel for driving the wad into the cartridge, so that when the tool holder descends, the stamp will impress the number, &c., into the wad which has been cut out of, but is still held in the strip until it is driven into the cartridge. When this last wad has been driven into the cartridge, the upper edge of the shell is folded over or crimped, so as to securely hold the charge in position, as represented in Figs. 9, 9^a, 9^b. A rod b^8 arranged to slide in a boring of the bow a^8 carries at its lower end a folding or crimping head c^8, and at its upper end a cord drum or pulley e^8, which is kept in continuous rotation by the cord d^8, and is supported in an elevated position by the helical spring f^8, so that the head c^8 is kept out of contact with the cartridge when the tool carrier rises. As soon as the cartridge, which has been provided with the last wad, comes beneath this folding or crimping mechanism, the tool carrier descends and presses, by means of the mandrel g^8, the mandrel b^8 and head c^8 firmly into the projecting end of the cartridge. As represented in Figs. 9^a and 9^b, the annular groove h^8 is provided with ribs i^8. As soon as the upper edge has been folded or crimped by the rapidly rotating head c^8, the ribs i^8 will render the upper edge perfectly smooth and firm. When the tool carrier rises, the mandrel b^8 is pressed upward by the spring f^8, and the head c^8 brought out of contact with the cartridge, which is now finished and is ejected at the next movement of the endless band from the machine by an ejecting rod a^9 Fig. 1, which forces the finished cartridge through an opening in the table into the tube O, from whence the same falls into suitable receptacles. The step by step movement of the articulated endless band with its cartridge bearings is attained by means of the prismatic drums or wheels P P′, so that the cartridge bearings are intermittently fed beneath the tools for loading the said cartridges.

The mechanism for intermittently rotating the prismatic wheels or drums is arranged on one side of the machine, and is operated by means of a cam R on the shaft Q, said cam or eccentric being provided with the cam groove S and tappet S′. On the nave of the prismatic disk P I place a rotary ring U, provided with toothed segment T and pawl T′, said toothed segment being in gear with the toothed rod or rack V, guided in the guide V′, so that the same is alternately moved in the one and the other direction. The pawl T′, which at its bifurcated end embraces a pin or stud of the peg or stop cone 1, is provided at the rear end with a spring 2, so as press the tip of the cone or peg 1 into the grooves or recesses 3, arranged at equal distances in the ring W fixed to the shaft on one side of the prismatic drum or wheel P. When the cam R is turned in the direction of the arrow Fig. 2, the pivot v of the rod V will run in the part I to II of the cam groove S of the cam R without operating the said rod V, but as soon as the pivot v has passed the point II, the rod V commences to rise, while the rod X is operated on by the tappet S′, the spring x compressing so that the lower end of the said rod X will press down the rear arm of the pawl and withdraw the peg 1 from its gear with the groove or recess 3 of the ring W. Through the upward movement of the toothed rod V, the released ring U will be moved in the direction of the arrow Fig. 1, until the pawl causes the peg 1 to gear into the next groove or recess 3 of the ring W whereas the rod X is returned to its highest position by the helical spring x as soon as the tappet S′ has passed the end of the same. When the pivot v has arrived at the point III of the cam groove, the rod V has reached its highest position and remains in this position until the said pivot v has arrived at the point IV of the cam groove S. By the further rotation of the cam R the pivot v, and with it the toothed rod V, is moved downward, and as the rod V is in gear with the toothed segment T and the peg 1 in gear with one of the grooves 3 of the ring W, thus coupling the cam to the disk U, the prismatic drum or wheel P is caused to make a partial revolution corresponding with one of the surfaces of the said prismatic drum or wheel P. In mounting the machine, the cam must be so arranged in reference to the cranks of the main driving shaft, that the movement of the prismatic drums or wheels and consequently also the endless belt with the cartridge bearings is effected at a time when the tools are out of contact with the cartridge shells. It will be evident that when the rack is moved upward, the ring U with its toothed segment will move idle. When the rack is moved downward, the segment ring is coupled to the ring W, and in this manner the prismatic drum

or wheel moved a distance corresponding to the length of one link or member of the endless chain, or the distance from the center of one to the center of the next cartridge bearing. This intermittent movement of the prismatic drums or wheels is repeated at each revolution of the cam R, so that each cartridge bearing C′ is moved forward a distance equal to the length of a link or member C of the endless band at each revolution of the driving shaft. Guides which can be adjusted by means of appropriate screws, Figs. 1 and 10, are applied to the standards B B′, so as to regulate the movement of the tool holder and the connecting rods.

Having fully described my invention, its construction, and mode of operation, what I claim as new, and desire to secure by Letters Patent, is—

1. In a machine for loading cartridges, the combination with a wad feeder, of a wad cutter, and a wad inserter, all arranged in a right line, the said wad cutter and the inserter located and operating at different points along the line of feed, substantially as described.

2. In a machine for loading cartridges, the combination with a shell carrier, of a wad feeder having its line of feed at an angle to the path of the carrier, a wad cutter and a wad inserter, said devices being arranged in a right line, and the said cutter and inserter located and operating at different points along the line of feed, substantially as described.

3. In a machine for loading cartridges, the combination with a wad feeder, of a wad cutter, a wad stamp, and a wad inserter, said devices being arranged in a right line, and said cutter stamp and inserter located and operating at different points along the line of feed, substantially as described.

4. The combination in a machine for loading cartridges of a wad feeding device, a device for cutting out the wads, a device for inserting the wads into the shells, located at different points along the line of feed, and a stamp for impressing or printing the number of the charge on the wad situated between the cutter and inserter, whereby the wad is first cut out of the strip, then impressed with the number of the charge, and then inserted in the shell, substantially as described.

5. The combination in a machine for loading cartridges with powder and shot, of a shell carrier, powder and shot supply, and wad feeders consisting of the shaft I, the rollers M and M′, and the guide rollers N, in connection with the operating mechanism, substantially as described.

6. In a cartridge loading machine, the combination with a shell carrier having a right line movement, of wad feeding devices including feeding rolls in line with the path of the shell carrier, and a common operating shaft, substantially as described.

7. In a cartridge loading machine, the combination with a shell carrier consisting of an endless belt provided with shell holders, of a series of wad feeders including feed rollers located parallel with said belt and having a feed movement at right angles to the belt and a common operating shaft, substantially as described.

8. In a machine for loading cartridges with powder and shot, a wad supply, cutter and inserter, consisting of the shafts I and N′ provided with rollers M and M′, and the roller N mounted on a shaft N′, the tool carrier A with the punch a^3 attached thereto, the mandrel b^3 with a head c^3, said mandrel and head being held up by the spring d^3 and the piston h^3 attached to the tool carrier A, whereby the wad is inserted into the cartridge, substantially as described.

9. In a machine for loading cartridges, the combination with a shell carrier and powder and shot supply, of means for feeding wad strips consisting of the eccentric G geared to the driving shaft, the rod H connected with said eccentric, the shaft I provided with the rollers M M′, and the rollers N, the shaft I and the rod H being connected, substantially as described.

10. The combination, with the shell carrier provided with shell holders, of means for feeding the shells into the holders, consisting of the supports d' of the plates e' attached thereto, the bands or strips b' and c', and the tube a', substantially as described.

11. In a machine for loading cartridges, a wad cutter consisting of the guide c^3 and the headed bolt b^3 provided with the spring d^3, supported by the frames E and e^3 and the hollow mandrel provided with a spring g^3 and head f^3, constructed and combined substantially as described.

12. In a machine for loading cartridges, a wad cutter, and means for forcing the same into the cartridge consisting of the casting c^3, containing the headed bolt b^3, provided with the spring d^3, said parts being supported by the band e^3 and a hollow mandrel provided with a spring g^3 and movable head f^3, and the piston or mandrel h^3 attached to the tool carrier A, substantially as described.

13. In a cartridge loading machine, a wad punching device consisting of a punch, a movable sleeve surrounding said punch, a support for the wad strip or material provided with a yielding part beneath the punch, of the same size as the punch, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

CHARLES S. HISEY.

Witnesses:
M. G. STERRETT
H. F. RICE.