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G. B. JACOBS.

CARTRIDGE LOADER.

No. 454,578. Patented June 23, 1891.

Fig. 1.

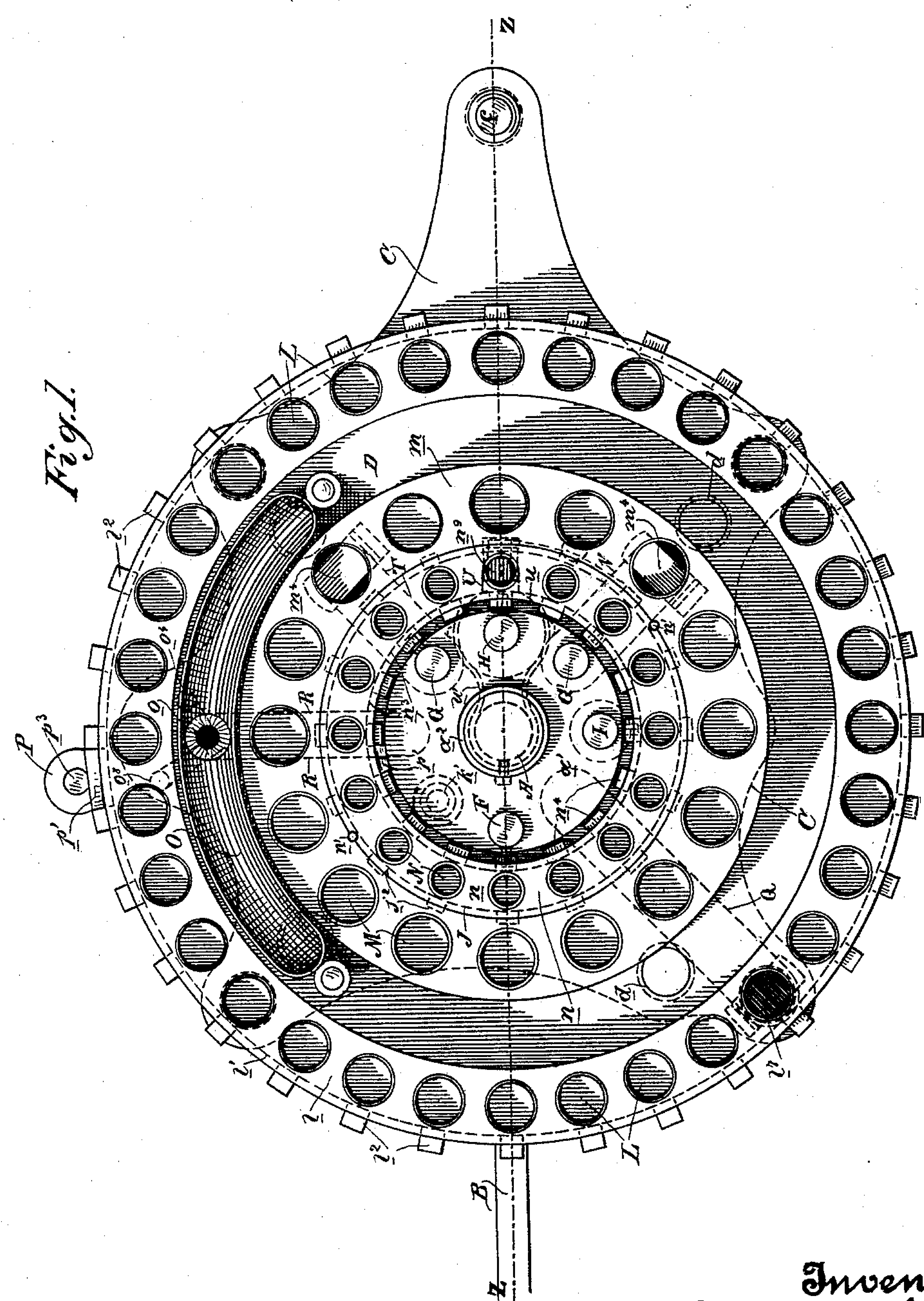

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Fig. 2.

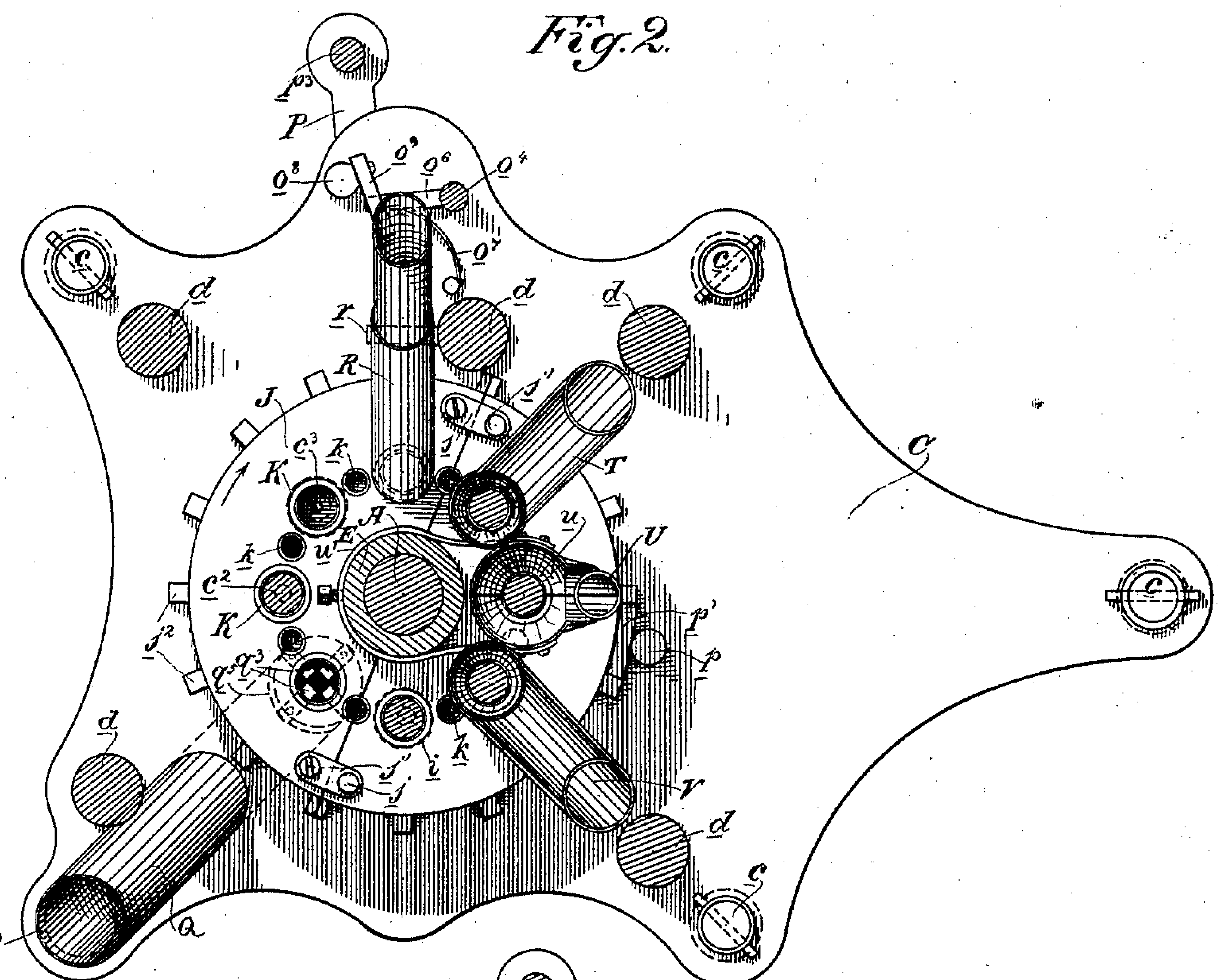
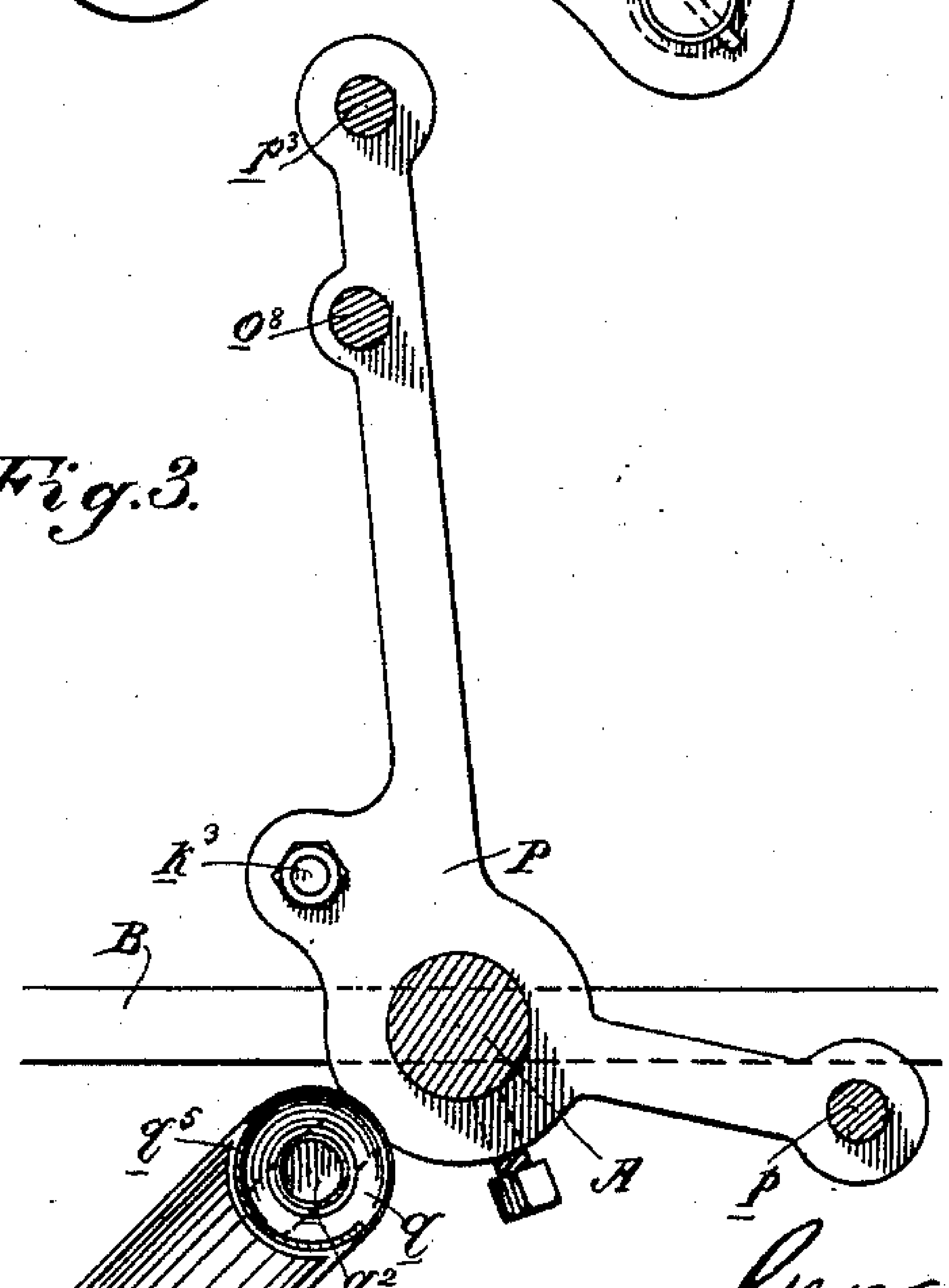


Fig. 3.



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CARTRIDGE LOADER.

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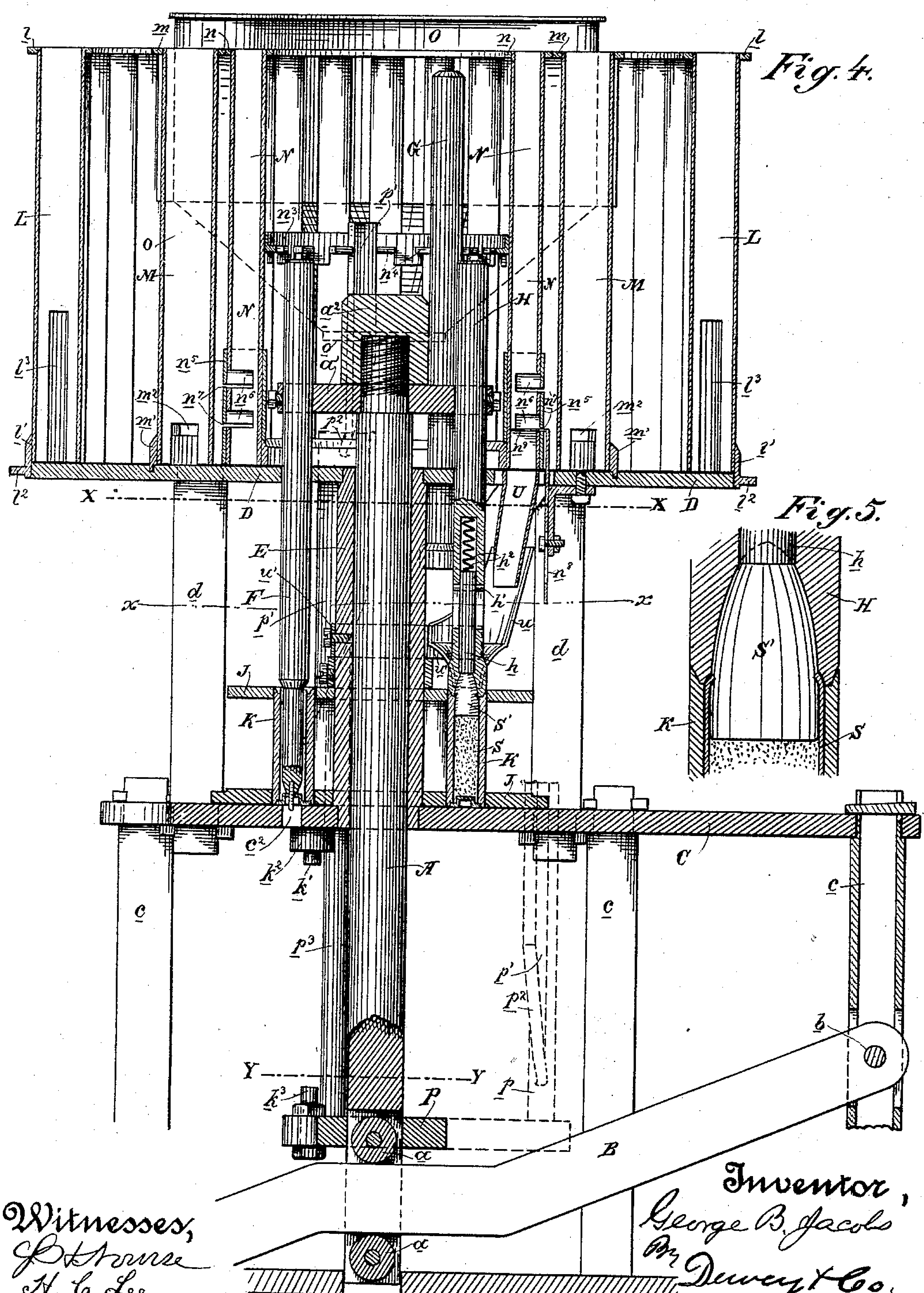

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No. 454,578. Patented June 23, 1891.

Fig. 6.

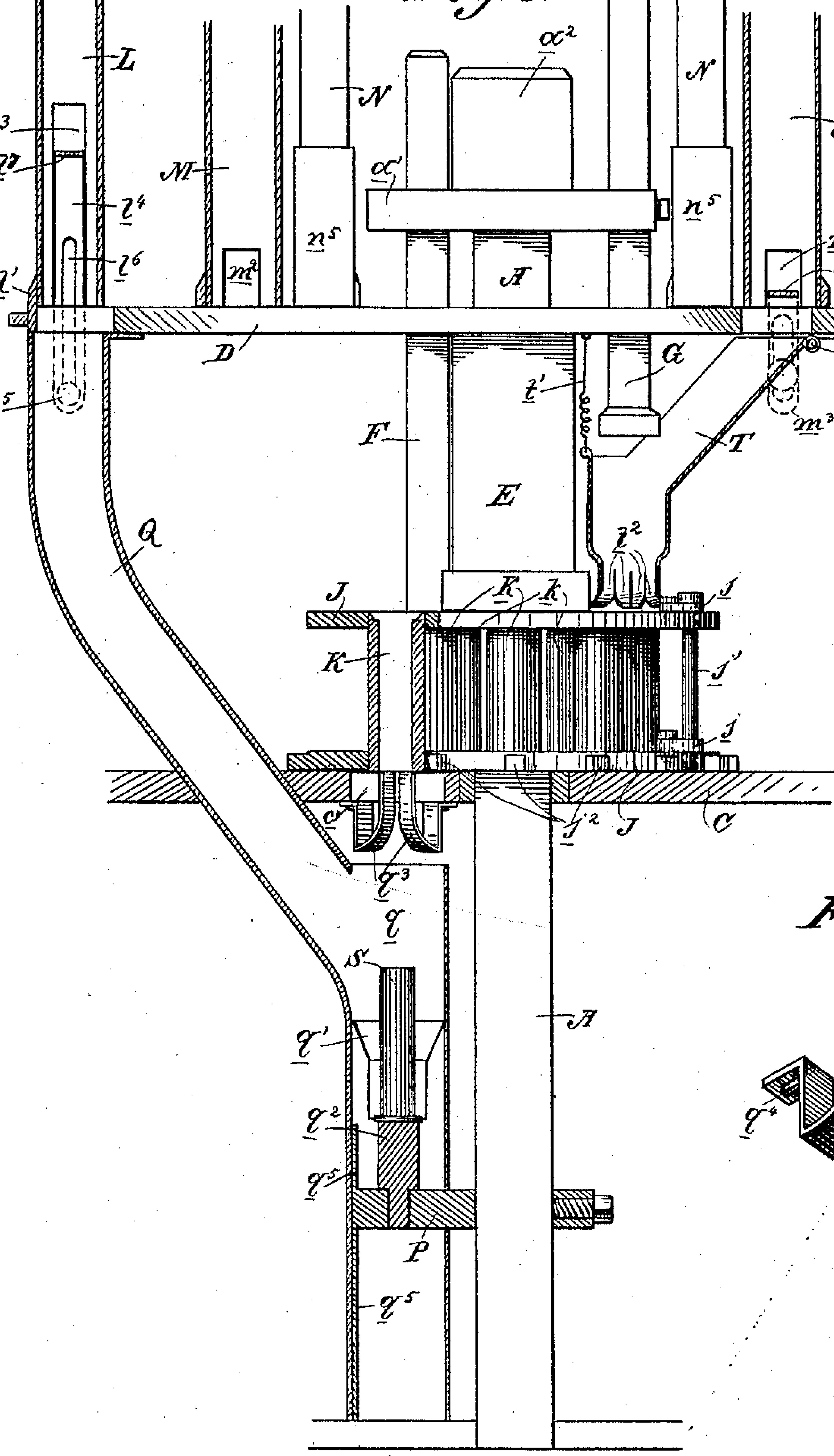


Fig. 7.

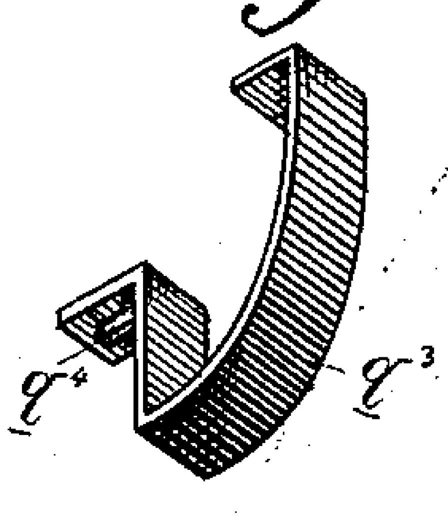
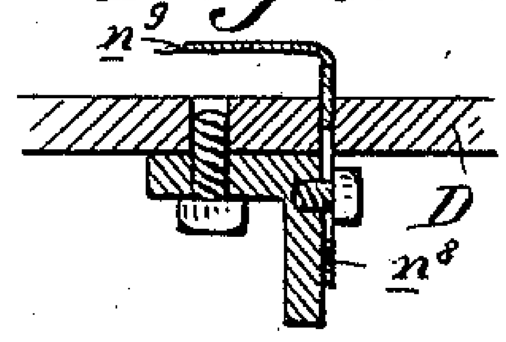


Fig. 8.



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CARTRIDGE LOADER.

No. 454,578.

Patented June 23, 1891.

Fig. 9.

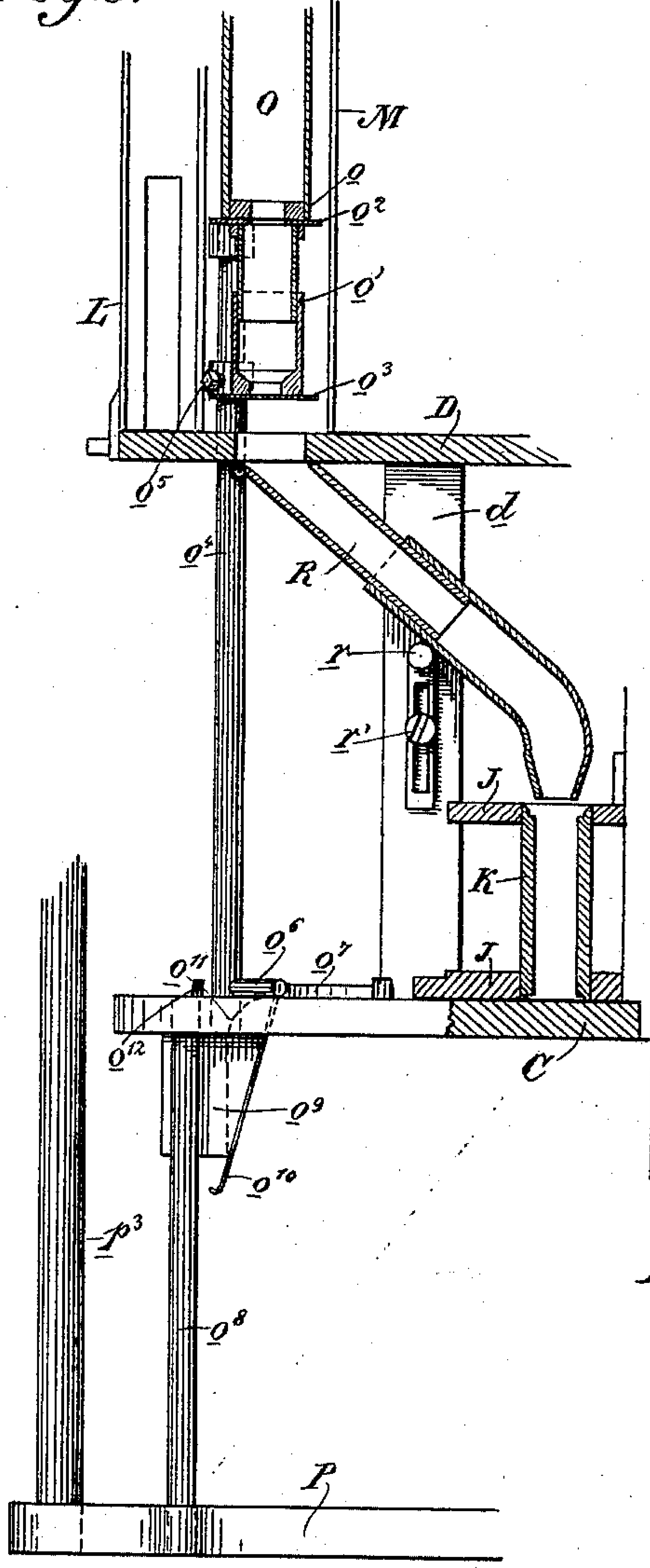
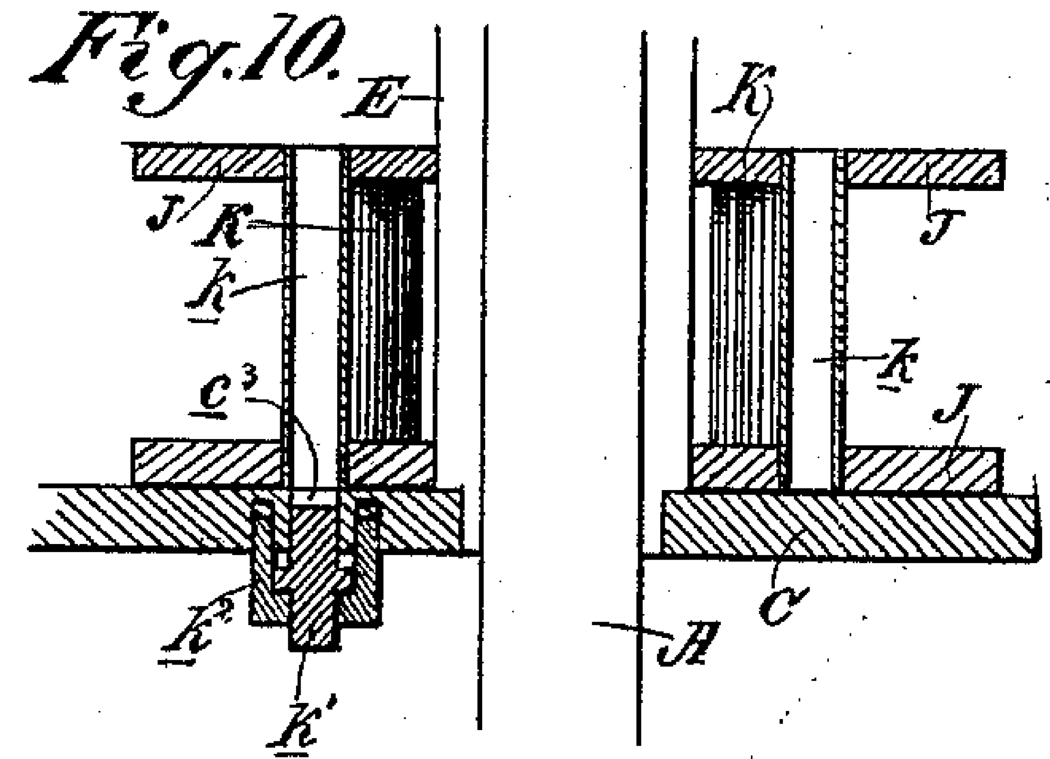


Fig. 10.



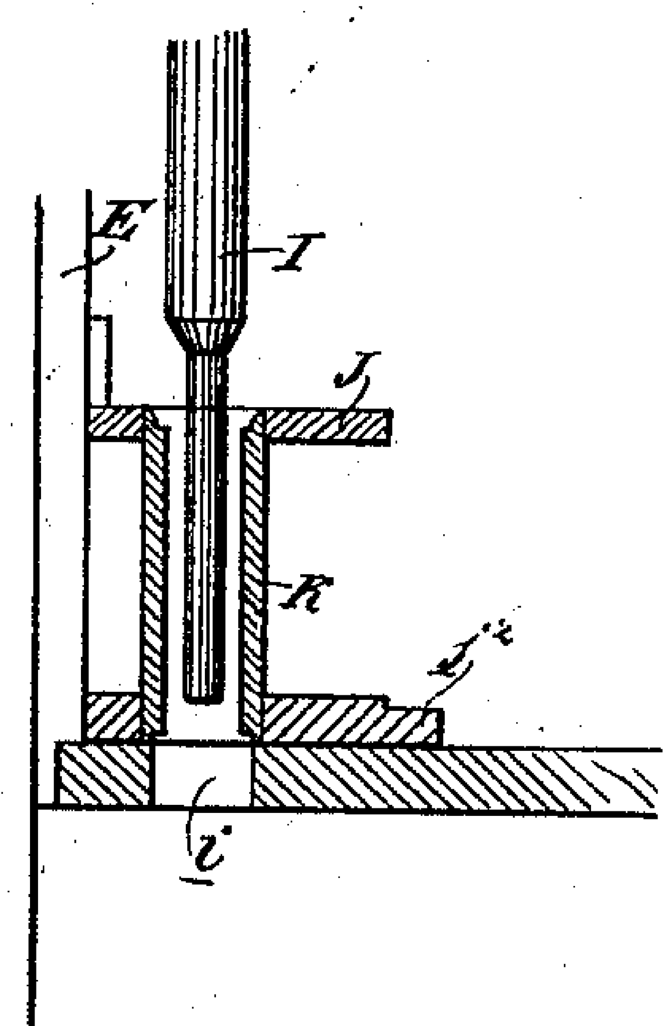


Fig. 11.

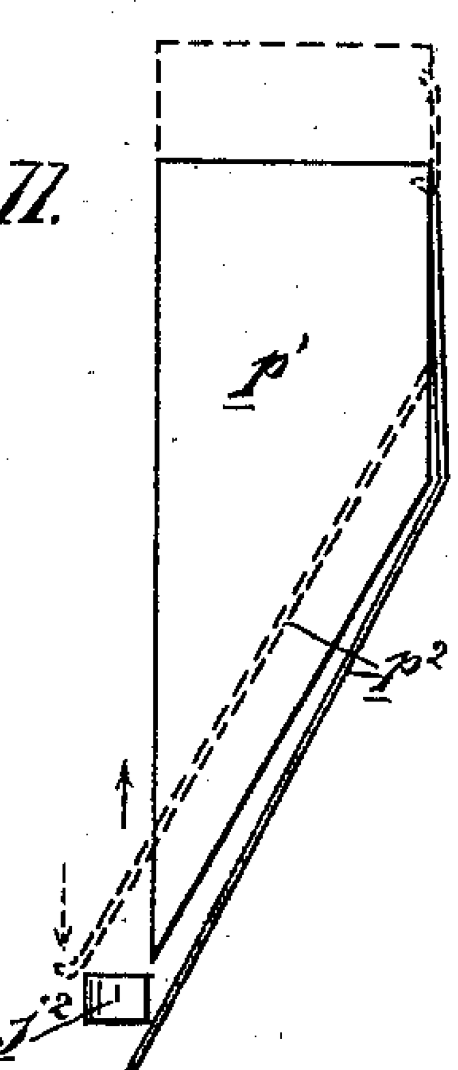


Fig. 12.

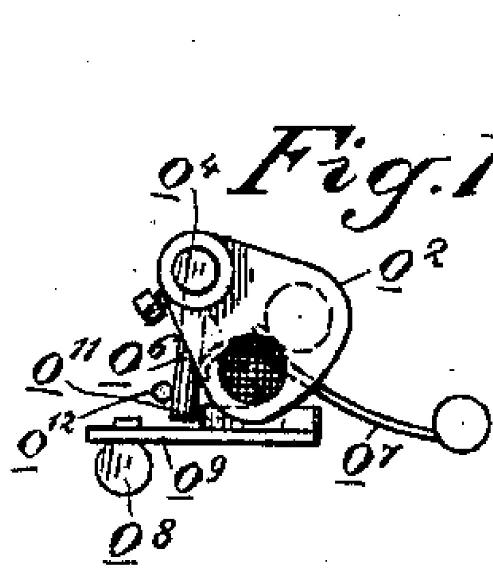
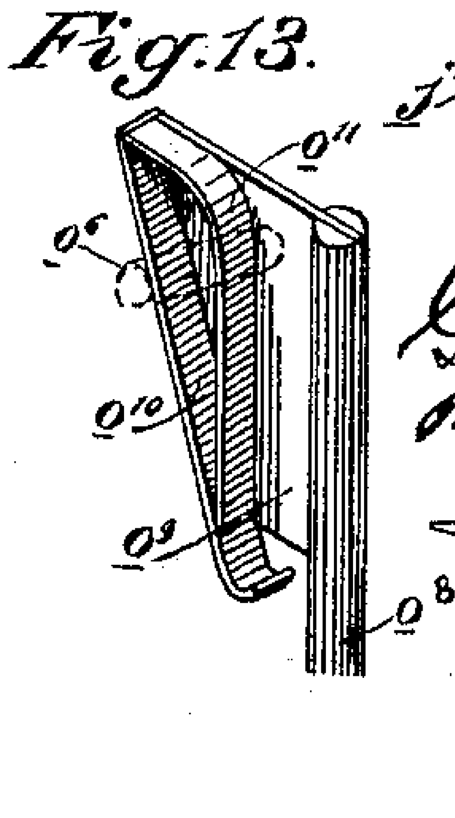


Fig. 13.



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UNITED STATES PATENT OFFICE.

GEORGE BENJAMIN JACOBS, OF PARRAL, MEXICO.

CARTRIDGE-LOADER.

SPECIFICATION forming part of Letters Patent No. 454,578, dated June 23, 1891.

Application filed October 20, 1890. Serial No. 368,718. (No model.)

To all whom it may concern:

Be it known that I, GEORGE BENJAMIN JACOBS, a citizen of the United States, residing at Parral, Chihuahua, Mexico, have invented an Improvement in Cartridge-Loaders; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to the class of machines for loading cartridges; and it consists in the novel constructions and combinations of parts hereinafter fully described, and specifically pointed out in the claims.

The object of my invention is to provide an efficient machine for loading cartridges of all kinds and sizes.

Referring to the accompanying drawings for a more complete explanation of my invention, Figure 1 is a plan of my machine, showing the relative location of the several parts. Fig. 2 is a horizontal section taken on the line x x of Fig. 4. Fig. 3 is a horizontal section on the line Y Y of Fig. 4. Fig. 4 is a vertical central section of the machine on line Z Z of Fig. 1. Fig. 5 is a sectional detail of the bullet-rammer. Fig. 6 is a detail section showing the wad and shell chutes. Fig. 7 is a perspective view of one of the spring-supports of the shell. Fig. 8 is a detail of one of the cut-off plates. Fig. 9 is a sectional detail showing the powder-feed and the discharger-plunger. Fig. 10 is a section of the capping device. Fig. 11 is a detail view of one of the actuating cams or wedges. Fig. 12 is a detail plan of the powder-feed. Fig. 13 is a perspective view of cam o^9.

Referring to Fig. 4, A is a vertical shaft, which is adapted to be moved up and down by a lever B, pivoted at b and engaging the shaft by means of anti-friction rollers a, between which it passes, as shown. C is a fixed plate supported by posts c from a foundation below. D is an upper fixed plate supported by posts d from the plate C. Between these two plates is a sleeve E, through which the shaft A passes and which forms a seat for said shaft. Carried by the top of shaft A is a head-plate a', firmly secured thereto by a nut a^2. Passing through and firmly secured to this head-plate by means of set-screws are the several rammers or plungers of the machine, which therefore have a vertical movement with shaft A.

In Fig. 4 the decapping-plunger F is shown, the first wad-rammer G, (shown elevated,) and the bullet-rammer H. In Fig. 1 these are also shown, as well as the second wad-rammer G' and the discharging-plunger I. One or more of these rammers or plungers may be lifted up out of the way when not needed by loosening the set-screw which binds them to head-plate a', raising them, and setting the screw again. The decapping-plunger F is of the usual type, having a pin on its end to force the old cap out of the shell. The two wad-plungers, one of which is shown in Fig. 4, have enlarged presser-heads. The bullet-rammer is of novel construction and is shown in Figs. 4 and 5. Its lower end is hollow, and in this is fitted a yielding presser-pin h, guided by a cross-pin h', playing in slots in the rammer. The presser-pin is normally held projected by a spring h^2. The lower end of the rammer is enlarged and is tapered and shouldered, as shown in Fig. 5, to effect the crimping of the shell S upon the bullet S'. The object of the presser-pin will be hereinafter described.

The discharging-plunger is shown in Fig. 9, and is of the ordinary type.

The loading-cylinder or holder in which the shells are carried while being loaded consists of two plates J J, each plate being in two parts, as is seen in the upper plate in Fig. 2, these parts being connected by cross-clips j, through one end of which a bolt j' (seen in Fig. 6) passes so as to firmly connect the two plates and yet permit the ready removal of the cylinder for the substitution of another. These two plates, which form the frame of the loading-cylinder or shell-holder, have extending between them an annular series of tubes (represented by K,) both ends of which are open. These are the shell-seating tubes, and they are in the vertical planes of the several plungers or rammers above, which are adapted to come down into them, as is shown in Fig. 4. Smaller tubes k extend between the two plates and lie between the larger or shell tubes, alternating with them, as is seen in Fig. 2. These are the cap-magazines, and said tubes have open ends also. This loading-cylinder or shell-holder rests upon the fixed plate C and is adapted to be rotated thereon, its plates J J fitting around and having the sleeve E for a center, and it is held down to place by a collar on said sleeve bearing on its top. By this rotation of the loading-cylinder or shell-holder the shell-tubes are brought successively under the several rammers or plungers and also under the several directing-chutes by which they are supplied with the materials with which they are to be loaded.

The magazine-cylinder consists of three concentric annular series of open-ended tubes. The outer series of tubes are represented by L, said tubes being connected by fitting their upper ends into a ring l and having their lower ends connected by means of a band l' encircling their outer sides, as is shown in Fig. 4. The lower ends of these tubes rest upon the upper fixed plate D, and their lower connecting-band l' serves as a guide for them about the periphery of said plate. These tubes L are the shell-magazines. The next series of tubes are represented by M, and they are connected in series by fitting their upper ends into a ring m, and their lower ends are connected by an encircling band m', which serves also to guide them upon the plate D, as is shown in Fig. 4. The tubes M are the wad-magazines, and they are removed from the outer series of tubes L, leaving a space between them. The next series of tubes is represented by N. They likewise fit their upper ends into a ring n and have their lower ends connected by a suitable band, and said tubes travel and rest on the plate D and form the magazines for the bullets or shot, as the case may be. The tube series M and the tube series N have their top rings m and n fitted closely together, and they are connected by means of pins n', which are shown in Fig. 1, and fit in semicircular holes in each ring, so that the two series M and N may be rotated together. All of these tubes forming the several magazines are open at both ends; but their lower ends are closed by the fixed plate D, on which they rest, and are only opened when they arrive at the openings in said plate with which the chutes or guiding devices by which their contents are delivered are reached.

In the space between the outermost series of tubes L and the adjacent tubes M is located the powder-magazine O, Figs. 1 and 4, said magazine being suitably supported in a stationary position.

The loading-cylinder or shell-holder which rests upon the lower plate C and the several magazines which rest upon the upper plate D are given a rotary motion by means of power imparted by the vertical movement of the central shaft A. This movement, though it may be effected by different power-transmitting connections, I have here shown is effected as follows: Referring first to the loading-cylinder or shell-holder, there is projecting from the periphery of its lower plate J a series of separated tappet-lugs j^2, Figs. 2 and 6. Secured to the shaft A below the plate C is a plate P, the particular shape of which is shown in Fig. 3, but which is also shown in Figs. 4 and 6. This plate has extending upwardly from it an arm p, which carries a wedge or cam p'. (Shown particularly in Fig. 11.) This cam has an inclined lower face, upon which rests a spring p^2, the upper end of which is connected with the edge of the cam, while its lower end is free and projects beyond the point of the cam. In Fig. 11 is represented one of the tappet-lugs j^2, heretofore mentioned. It will be seen that the cam in ascending passes its straight edge by the lug j^2 until the point of its spring meeting said lug is forced outwardly away from it, whereby it is enabled to pass it as the cam continues to move upwardly; but, having reached the position shown in the dotted lines in Fig. 11, it will be seen that the spring returns to the face of the cam, so that its point projects over and beyond the lug and on the other side of it. Now when the cam descends the spring in its inclined position, pressing on the other side of the tappet-lug, will force said lug over, causing it to move in front of the inclined face of the cam as it descends, thereby moving said lug over to the other side of the cam and bringing the succeeding lug into the position occupied by the previous one for the repetition of the operation. Therefore by reference to Fig. 4, the effect of the cam p' (shown in said figure in dotted lines) will be seen—to wit, that it will move the loading-cylinder or shell-holder around one lug for each complete stroke of the shaft A, this movement taking place on the downward stroke of the shaft.

Now referring to the outer series of magazine-tubes L their rotary movement is effected as follows: From the base-band l' of said series project tappet-lugs l^2, Figs. 1, 4, and 6. From the plate P, heretofore mentioned, extends upwardly a rod p^3, Figs. 1, 4, and 9, which carries on its upper end a cam or wedge, which is shown in Figs. 1 and 4, and is lettered p', it being identical with the cam p' (shown in Fig. 11) and having a spring similar to p^2, whereby it is enabled through its engagement with the lugs l^2 to turn the series of tubes L.

The connected or double series of tubes M and N are turned as follows: Referring to Fig. 4, it will be seen that on the inner side of the series of tubes N is connected a band n^3, portions of which are turned horizontally at intervals, forming the series of separated tappet-lugs n^4. A cam similar to p' of Fig. 11 and lettered similarly in Fig. 1 is secured to the head-plate a' of the shaft A and is adapted to operate between the lugs n^4, whereby the ring or band n^3 is turned and the connected series of tubes M N are given a rotary motion.

The directing-chutes by which the contents of the several magazines are delivered to the shells in the loading-cylinder or shell-holder are as follows: Q is the chute of the shell-magazine. This is shown in dotted lines in Fig. 1, in section in Fig. 6, and in Fig. 2. R is the feed-chute of the powder-magazine. This is shown in Fig. 1 in dotted lines, in Fig. 2, and in Fig. 9. T is the first wad-chute, and is shown in dotted lines in Fig. 1, in Fig. 2, and in Fig. 6. U is the bullet-chute, shown in dotted lines in Fig. 1, in Fig. 2, and in Fig. 4. V is the second wad-chute, shown in dotted lines in Fig. 1 and in Fig. 2. Each of these chutes communicates at its upper end with a hole or aperture in the plate D, as is shown in the several figures.

To avoid confusion I will describe at this point the general objects of these parts of the machine, whereby its operation will be better understood. The rotation of the loading-cylinder or shell-holder J J is for the purpose of bringing its contained shells successively under or in position to receive the several contents of the magazines as delivered through their several chutes and also to carry the shells under the several rammers or plungers. The object of the rotation of the magazines L, M, and N is to bring the several tubes of said magazines successively over the apertures in the plate D, which communicate with the several delivery chutes. The objects of the vertical movement of the shaft A are, first, to reciprocate the several rammers or plungers, and, second, to effect the rotation of the loading-cylinder or shell-holder and the series of magazine-tubes. In this way the shells are delivered to the loading-cylinder or shell-holder decapped, (if old shells are being used recapped,) supplied with powder, fitted with a wad, supplied with a bullet or shot, fitted with a second wad, and discharged as loaded cartridges, the discharge taking place by means of the discharge-plunger I, Fig. 9, through an aperture i in the lower plate C.

I will now describe the details relating to each of the feeds. Beginning first with the shell-feed and referring to Fig. 6, it will be seen that each of the tubes L is provided at its lower end with a vertical elongated aperture l^3, extending completely through it. These apertures are also shown in Fig. 4. In Fig. 6, l^4 is an upwardly-extending arm, which is adapted to be vertically adjusted by means of a set-screw l^5, passing through an elongated slot l^6 in said arm. The upper end of said arm is turned at right angles and is represented at l^7, Fig. 6, forming a cut-off plate, and this plate lies in the path of the openings l^3 in the tubes L, so that said plate passes through the openings. This plate is in the vertical plane of the opening in plate D, communicating with the feed-chute Q. This cut-off plate l^7 is shown clearly in Fig. 1, and its position and object are such that it will pass just above the top of the lowermost shell in the tube L and below the bottom of the shell just above, whereby as the tube L arrives in open communication with the chute Q only the lowermost shell will fall down into said chute, while the column of shells above will be supported by the cut-off plate until by the travel of the tube the plate is left behind, whereupon the column of shells will drop on and will be supported by the plate D. The chute Q, as is shown in Fig. 6, extends down through the plate C, where it opens into a vertical portion q, in the lower portion of which is fitted or formed a hopper-shaped receiver q', which is to be made in two separate halves, so as to receive different sizes of shells. Rising from the plate P of Fig. 3 is a supporting-arm q^2, on which the shell S (shown in Fig. 6) is delivered from the chute Q. In the plate C is made an opening c', about which are fitted four springs q^3, one of which is shown in perspective in Fig. 7. The lower ends of these springs are bolted up under the plate C, while their upper ends project into the plane of the opening of the shell-tube in the loading-cylinder or holder and are free, whereby said springs may separate as the shell passes through between them and close together again after the shell has passed. The lower ends of the springs are slotted to provide for adjustment. Now it will be seen that when a shell is dropped through the chute Q and falls upon the arm q^2, as is shown in Fig. 6, the upward movement of the shaft A will carry the shell upwardly and pass it through between the springs q^3, their upper ends separating, so as to receive the entire shell, and closing again under the head of the shell when the arm q^2 moves downwardly, thereby supporting said shell in the loading-cylinder or holder until by the movement of said cylinder it is carried beyond the hole c'. Now, in order to avoid any possibility of a succeeding shell being delivered into the lower portion q of the chute Q before the arm q^2 has fully returned and is ready to receive it, I have on the edge of the plate P a flange q^5, which forms a gate and is adapted as the plate P rises with the shaft to close the outlet of the chute Q, so as to prevent the shell from falling into the portion q until both the gate and the arm have fully descended and the latter is ready to receive a fresh shell. The next operation is to decap the shell, (if it be an old one,) and this is done on the downstroke of the shaft A by the pin of the plunger F, Fig. 4, which drives the cap out from the shell through a hole c^2 in the plate C. The next operation is to supply the shell with a fresh cap. The caps are contained, as heretofore stated, within the tubes k of the loading-cylinder.

Referring now to Fig. 10, it will be seen that in the plate C is made a hole or opening c^3, and in this is fitted a vertically-movable plunger k', which is fitted in its supporting-bracket k^2 in such a manner that it can be adjusted up or down, so as to carry its upper edge flush with the top of the plate C or to lower it sufficiently to provide a socket just the height of and adapted to receive a cap, said socket being in the path of the cap magazines or tubes k. This plunger and its bracket are also seen in Fig. 4, and by referring to that figure it will be seen that the plate P carries an adjustable contact-screw k^3, which is in the vertical plane of the plunger k' above. Now as the loading-cylinder revolves and one of its cap-tubes k comes over the socket formed in the hole c^3 by the plunger k' the lowermost cap will drop down into said socket and remain there, while the column of caps in the tube will be supported by the plate C as the tube continues on its travel. A shell will now be brought by the movement of the loading-cylinder or holder directly over the cap which is resting on the plunger k'. Now upon the upstroke of the shaft A the contact-screw k^3 will come in contact with the plunger k' and will drive it upwardly, so that the cap resting upon it will be pressed into the shell. When it is not desired to use the capping apparatus, as when shells are being loaded which are already capped, the plunger k' is set up flush with the surface of the plate C and the set-screw k^3 is turned downwardly, so that it will not come in contact with the plunger.

The next operation is the powder-feed. The regulation of this will be best seen by referring to Fig. 9. The chute R is preferably made telescopic, as is shown, and is supported adjustably upon a vertically-adjustable pin r on the upper end of the sliding plate, set by a screw r'. This adjustment of the chute provides for its use with different-sized shells, and to permit of its adjustment the upper end of said chute is hinged to the plate D. The discharge-pipe o of the powder-magazine has fitted to its lower end a telescopic measuring-cup o'. This is traversed by the cut-off plates, the upper one of which is o^2 and the lower one is o^3. Thes plates are both carried by a vertical turn-rod o^4, the upper plate being fast upon said rod and the lower one being vertically adjustable thereon by means of a set-screw o^5, whereby it can accommodate itself to the adjustment of the lower telescopic section of the measuring-cup. These plates are set upon the rod at different radial planes, so that when one extends across the measuring-cup the other is moved therefrom, and vice versa, in the manner of the regulating-gates of powder-flasks, whereby a charge of powder is measured off between them, and this charge may be varied by the telescoping of the cup. The plates are operated as follows: Upon the lower end of the turn-rod o^4 is an arm o^6, acted upon by a spring o^7, which throws the rod over to its normal position, said arm being limited by a pin o^{12} in plate C. Rising from the plate P on the shaft A is a rod o^8, which carries at its upper end a cam o^9. This cam has an inclined face, upon which is a spring o^{10}, the lower end of which projects, as shown. The cam has also on its face or side a guide-flange o^{11}. Now when the shaft A rises and the plate P moves up, carrying the rod o^8 with it, the cam o^9 also rises, and the arm o^6 of the turn-rod o^4 is held and guided between the flange o^{11} of the cam and the pin o^{12}, so that as the cam rises the rod o^4 is held and the powder-feed remains closed. When the end of the movement is reached, the projecting end of the spring o^{10} yields before the arm o^6, and when it has passed it springs back to a plane on the other side of it, whereby as the cam descends the point of the spring o^{10} will pass to the other side of the arm o^6, whereby the arm is forced to travel along the inclined face of the cam, thus turning rod o^4 to open the powder-feed. As long as the inclined face of the cam travels down against arm o^6 the feed remains open; but when the top of the cam is reached the spring o^7 throws the arm back to its first position against pin o^{12} and the feed is closed. The pin o^{12} is a removable one, and by its removal the whole powder-feed is thrown out of action, for the spring o^7 will then throw the arm o^6 over so far that it will not be affected by the cam.

The next operation is the delivery of a wad to the shell. By referring to Figs. 6 and 4 it will be seen that the wad-tubes M are provided at their lower ends with openings m^2, passing completely through them. In Fig. 6, m^3 is a vertically-adjustable arm carrying at its upper end a cut-off plate m^4, which lies in the path of the openings m^2, so that it passes through said openings as the tubes M revolve. This cut-off plate is so located that it passes above the lowermost wad and under the wad just above, whereby it allows only the lowermost to drop through the opening into the chute T, while it supports the column of wads until they are removed by the rotation of the tubes and are supported upon the plate D. This cut-off plate is shown in Fig. 1 also, and the object of its adjustment vertically is to suit it to different thicknesses of wads. The chute T, which receives the wad, is hinged at its upper end at t and is supported at its lower end by a spring t'. The lower or delivery end of the chute is formed in two halves adapted to expand to provide for different diameters of wads, and each half is formed with four spring-fingers t^2, two of which are bent inwardly and two are bent outwardly. Now when the wad falls into and through the chute T and drops into its lower end the wad-plunger G descends at the same time, and on account of the wad binding in the end of the chute the latter is forced downwardly, turning about its hinged upper end, whereby its inwardly-turned fingers enter the inside of the top of the shell and serve as guides for the wad, preventing it from catching on the top of the shell, while its outwardly-turned fingers fit over the outer surface of the top of the shell. The wad is thus guided truly and tightly into the shell below. When the plunger G rises again, the spring t' raises the chute T to its normal position.

The next operation is to supply the bullet. In Fig. 4, n^5 is a vertically-adjustable sleeve fitted around the lower end of each bullet-tube N. This sleeve covers wide apertures n^6, made in the side of the tube N, and said sleeve itself is provided with narrow slits n^7, which communicate with the openings n^6 in the tube. n^8 is a vertically-adjustable arm provided at its top with a cut-off plate n^9, which is shown in Fig. 8, said plate extending through the slit n^7 and into the aperture n^6. This cut-off plate feeds the bullets in the same manner as is described for the feeding of the shells and the wads, the only difference being that the cut-off plate n^9 passes into the side of the tube instead of through it. The object of the sleeve n^5 is to cover the wide apertures n^6 and prevent the spilling of shot when shot-cartridges are being loaded. The object of the wide apertures is to permit of the vertical adjustment of the cut-off plate to different lengths of bullets, and the object of the two sets of apertures and slits is to vary the cut-off considerably when required. The lower end of the chute U extends into a two-part hopper u, which embraces the rammer H, and its lower end is held together by a U-shaped spring u' (shown also in Fig. 2) and secured by a set-screw to the sleeve E. The ends of this spring embrace the two parts of the hopper u and hold them together, so that they receive and hold upright the bullet which is delivered into the hopper from the chute U. The object of the presser-pin h, heretofore described, in the lower end of the rammer H is to come down first upon the point of the bullet and hold it upright, preventing it from toppling over, as it would have a tendency to do when the rammer spreads the hopper. As the bullet offers resistance, the presser-pin h is pressed upwardly, while the rest of the rammer coming down presses the bullet home, its shouldered lower end pressing upon the top of the shell and crimping said shell around the bullet, as shown in Fig. 5, at which time the pressing is complete.

The next operation is the feeding of the second wad, which is accomplished by devices precisely similar to those by which the first wad is fed.

The final operation is the discharge of the loaded cartridge by means of the discharge-plunger I. (Shown clearly in Fig. 9.)

All the parts of the machine are so put together that they can be readily separated and others of different sizes substituted, or the whole easily packed for transportation.

The general operation of the machine may be thus briefly described: Supposing the operation to have started, the course of a single shell is as follows: On the downstroke of shaft A the shell-magazine series has been turned one place by the cam acting against its tappet-lugs. The shell drops through chute Q into the hopper-receiver q' and stands upright on arm q^2. Then on the upstroke of the shaft the shell is raised into that tube of the shell-holder which has been brought directly above it by the turning of said holder on the previous downstroke of the shaft. Then on the next downstroke the holder is turned once more, so as to carry said shell directly under the descending decapping-plunger, by which its old cap (if it have any) is driven out. On the next upstroke it remains stationary, but on the next downstroke it is moved over the capping-plunger, and on the succeeding upstroke is furnished with a cap. Then on the downstroke it is turned one step and receives its charge of powder through chute R. On the upstroke it remains stationary, but on the downstroke it is moved one step to a position to receive a wad from chute T, and said wad is on this same downstroke pressed into the shell by the descending rammer G. On the next upstroke it is stationary, but on the downstroke is moved to position to receive the bullet or shot from chute U, which, if a bullet, is pressed home by the descending rammer H on this same downstroke, but which, if shot, need not be rammed, the rammer H being then hung up. On the next upstroke it remains stationary, but on the downstroke it is moved under the second wad-chute V, and if shot is being loaded it will receive a second wad, which is on this same stroke pressed home by rammer G'. On the next upstroke it is stationary, but on the next downstroke it is moved over opening i and is forced down and out by the plunger I. This course can be readily understood by referring to Fig. 1. The course of succeeding shells is the same, so that the operation is continuous.

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 of rotating magazines containing the materials with which the shells are to be loaded, directing-chutes below for conveying said materials, and a rotating holder for the shells adapted to bring each shell into communication with the several chutes to receive the materials, substantially as herein described.

2. In a cartridge-loading machine, the combination of a rotating holder for carrying the shells, rotating magazines above for carrying the materials with which the shells are to be loaded, and intervening fixed directing-chutes for conveying the contents of said magazines to the shells, substantially as herein described.

3. In a cartridge-loading machine, the combination of rotating magazines containing the materials with which the shells are to be loaded, directing-chutes for delivering said materials, reciprocating plungers or rammers, and a rotary shell-holder adapted by its movement to bring each shell successively into communication with the directing-chutes and under the rammers or plungers, substantially as herein described.

4. In a cartridge-loading machine, the com-

bination of rotating magazines containing the materials with which the shells are to be loaded, fixed directing-chutes with which said magazines communicate as they rotate, reciprocating plungers, and a rotary holder for the shells, adapted to carry the shells successively into communication with the fixed chutes and under the rammers or plungers, substantially as herein described.

5. In a cartridge-loading machine, the combination of a reciprocating shaft, rammers or plungers carried thereby, rotating magazines containing the materials with which the shells are to be loaded, directing-chutes communicating with said magazines, and a rotary shell-holder adapted to carry its shells successively into communication with the directing-chutes and under the rammers or plungers, substantially as herein described.

6. In a cartridge-loading machine, the combination of a reciprocating shaft, rammers or plungers carried thereby, rotating magazines containing the materials with which the shells are to be loaded, fixed chutes communicating with said magazines, and a rotary shell-holder adapted to carry its shells successively into communication with the directing-chutes and under the rammers or plungers, substantially as herein described.

7. In a cartridge-loading machine, the combination of the vertically-reciprocating-shaft, the rammers or plungers carried thereby, the shell-holder, and the means for rotating said holder to carry its shells under the several rammers or plungers, consisting of the series of separated tappet-lugs on the periphery of the shell-holder and the cam carried by the shaft and having the yielding spring, said cam operating between said lugs, substantially as herein described.

8. In a cartridge-loading machine, the combination of the vertically-reciprocating shaft, the plungers or rammers carried thereby, the shell-holder, and the means for rotating it, consisting of the series of separated tappet-lugs on the periphery of the shell-holder, the plate P, carried by the shaft, and the cam carried by the plate and having the spring on its face operating between the lugs of the shell-holder, substantially as herein described.

9. In a cartridge-loading machine, the combination of rotating magazines for containing the material with which the shells are to be loaded, the vertically-reciprocating shaft, and power-transmitting connections between said shaft and the magazines, whereby the latter are rotated, substantially as herein described.

10. In a cartridge-loading machine, the combination of the rotary material-magazines, the vertically-reciprocating shaft, and the means for rotating said magazines, consisting of the series of tappet-lugs carried by the magazine, and a cam or cams carried by the reciprocating shaft and having the spring operating between the lugs, substantially as herein described.

11. In a cartridge-loading machine and in combination with the separated tappet-lugs on the periphery of a rotary part, the reciprocating cam having an inclined edge and a straight edge, and the yielding spring on the inclined edge and having a projecting end, substantially as herein described.

12. In a cartridge-loading machine, the combination of the vertically-reciprocating shaft, the plungers or rammers carried thereby, the rotary material-magazines, the rotary shell-holder, and power connections whereby the movement of the shaft transmits a rotary movement to the magazines and shell-holder, substantially as herein described.

13. In a cartridge-loading machine, the combination of the vertically-reciprocating shaft, the rammers or plungers carried thereby, the rotary material-magazines, the rotary shell-holder, the intervening fixed delivery-chutes, and power-transmitting connections whereby the movement of the shaft transmits a rotary movement to the magazines and shell-holder, substantially as herein described.

14. In a cartridge-loading machine, the combination of a fixed plate, a series of connected open-ended tubes mounted and adapted to rotate upon said plate, openings in the plate over which the tubes are successively brought to deliver their contents, fixed directing-chutes under the plate and communicating with the openings, and means for operating the same, substantially as herein described.

15. In a cartridge-loading machine, the combination of the lower and upper fixed plates, the openings in the upper plate, the rotating shell-holder on the lower plate, the rotating series of magazines on the upper plate, consisting of open-ended tubes, and the intervening fixed chutes communicating with the openings in the upper plate, substantially as herein described.

16. In a cartridge-loading machine, the combination of the fixed plates C and D, the vertically-reciprocating shaft passing through said plates, rammers or plungers carried by said shaft, the rotating shell-holder consisting of a series of tubes mounted upon the lower plate, the rotating annular series of material-magazines mounted on the upper plate, and intervening fixed directing-chutes, substantially as herein described.

17. In a cartridge-loading machine, the combination of the fixed plates C and D, having openings, the reciprocating shaft passing through said plates, rammers or plungers carried by said shaft, the rotating shell-holder consisting of a series of open-ended tubes mounted on the lower plate, the rotating annular series of material-magazines mounted on the upper plate, intervening fixed directing-chutes communicating with the openings in the upper plate, and power connections between the reciprocating shaft and the shell-holder and material-magazines, whereby the latter are rotated, substantially as herein described.

18. In a cartridge-loading machine, the combination of the inner and outer concentric magazine-tubes, means for supporting and rotating the same, and a powder-magazine suitably supported above said tubes, substantially as herein described.

19. In a cartridge-loading machine, the rotating series of magazine-tubes, consisting of the separate annular series of tubes L, M, and N in concentric series, in combination with means for rotating the same, substantially as herein described.

20. In a cartridge-loading machine, the concentric series of magazine-tubes L, M, and N and the fixed powder-magazine between the series of tubes L and the adjacent series of tubes M, substantially as herein described.

21. In a cartridge-loading machine, the concentric series of magazine-tubes M and N, connected together, in combination with the means for rotating them simultaneously, consisting of the ring on the inner surfaces of the tubes N, having the separated lugs, and the vertically-movable cam with its spring operating between said lugs, substantially as herein described.

22. In a cartridge-loading machine, the combination of the rotary series of tubes forming the material-magazines, said tubes having apertures or openings in their lower portions, and stationary cut-off plates over which said openings pass to regulate the feed of the contents of the tubes, substantially as herein described.

23. In a cartridge-loading machine, the rotating series of tubes forming the material-magazines, said tubes having openings at their lower portions, and vertically-adjustable stationary cut-off plates over which said openings pass to regulate the feed of the material, substantially as herein described.

24. In a cartridge-loading machine, the combination of a shell-holder, a shell-magazine above, a directing-chute Q, communicating with said magazine, and a vertically-movable arm for receiving the shell from the chute and raising it into the shell-holder, substantially as herein described.

25. In a cartridge-loading machine, the combination of the shell-holder having an open lower end, the spring-rests q^3, projecting under said end, and the vertically-movable arm for raising the shell through the spring-rests into the shell-holder, substantially as herein described.

26. In a cartridge-loading machine, the combination of the shell-holder, the directing-chute for the shells, the vertically-movable arm for receiving said shell and raising it into the shell-holder, and the vertically-movable gate for closing and opening the directing-chute, substantially as herein described.

27. In a cartridge-loading machine, the combination of the shell-holder, the directing-chute for the shells, the hopper q' for receiving the shells, the arm for supporting them, and the vertically-movable shaft A, carrying said arms, substantially as herein described.

28. In a cartridge-loading machine, the combination of the rotary shell-holder having open-ended tubes, the spring-rests q^3, over which said tubes are successively carried, the directing-chute for the shells, the receiving-hopper, the arm for supporting the shell, the vertically-movable shaft, the plate P, carried by the shaft and supporting the arm, and the gate or flange of said plate for closing and opening the directing-chute, substantially as herein described.

29. In a cartridge-loading machine, the combination of the fixed plate C, having the opening c^2, a rotary shell-holder on said plate and adapted to bring its shells successively over the opening c^2, the vertically-reciprocating shaft A, and the decapping-plunger F, carried by said shaft, substantially as herein described.

30. In a cartridge-loading machine, the combination of the fixed plate C, the rotary shell-holder upon said plate, the series of open-ended cap-magazine tubes carried by the shell-holder at points between its shell-tubes, the plunger k' in the plate C, forming a socket for receiving a cap from each magazine as it passes over it, and the vertically-movable contact-screw k^3, adapted to come in contact with the plunger and raise it to force a cap into a succeeding shell, substantially as herein described.

31. In a cartridge-loading machine, the combination of the fixed plate C, the rotary shell-holder mounted upon said plate, the open-ended cap-magazine tubes carried by said holder at points between its shell-tubes, the plunger operating in said plate in the path of rotation of the tubes of the holder and forming a socket in said plate to receive a cap from the cap-magazine tubes, a vertically-movable shaft A, the plate P, carried by said shaft, and the contact-screw carried by the plate and adapted to operate the plunger to force a cap into a succeeding shell, substantially as herein described.

32. In a cartridge-loading machine, the combination of the powder-magazine having the discharge-pipe, the measuring-cup on the lower end of the pipe, the alternately-acting cut-off plates traversing said cup, the vertical turn-rod carrying said plates, and the means for operating the turn-rod, consisting of the spring-controlled arm o^6 thereof, the vertically-movable rod o^8, and the cam o^9 on said rod, having an inclined face with spring o^{10}, and a guide-flange o^{11}, operating against the arm of the turn-rod, substantially as herein described.

33. In a cartridge-loading machine and in combination with the powder-magazine and its discharge-pipe, the telescopic measuring-cup on its lower end, the turn-rod o^4, the upper

cut-off plate fixed on said rod, and the lower cut-off plate adjustable upon said rod, substantially as herein described.

34. In a cartridge-loading machine, the combination of the vertically-movable shaft A, the head *a'*, carried by its upper end, a wad-rammer carried by said head, a rotary series of shell-carrying tubes adapted to be brought successively in line with the wad-rammer, and a spring-controlled wad-chute to form a guide for the wad, substantially as herein described.

35. In a cartridge-loading machine, the shell-holder and the reciprocating wad-rammer, in combination with the swinging spring-controlled wad-chute having spring-fingers at its lower end bent in different directions to enter the shell and to pass outside of it to form a guide for the wad as the rammer presses it into the shell, substantially as herein described.

36. In a cartridge-loading machine, the combination of the bullet-rammer, the directing-chute for the bullets, and the two-part spring-controlled hopper at the lower end of the chute and embracing the rammer, substantially as herein described.

37. In a cartridge-loading machine, the combination of the reciprocating bullet-rammer having the spring-controlled presser-pin in its lower end, the directing-chute U for the bullets, and the spring-controlled two-part hopper at the lower end of the chute and embracing the bullet-rammer, substantially as herein described.

38. In a cartridge-loading machine, the combination of the vertically-adjustable shaft A, the discharge-plunger I, carried by said shaft, and the rotary shell-holder adapted to carry its several shells successively into alignment with the rammer, whereby the cartridges are discharged, substantially as herein described.

39. In a cartridge-loading machine, the loading-cylinder or shell-holder consisting of an upper and a lower plate and a double series of concentric tubes carried by and between said plates, substantially as herein described.

40. In a cartridge-loading machine, the loading-cylinder or shell-holder consisting of an upper and a lower plate, the series of shell-tubes between the plates, and a series of smaller cap-tubes carried by the plates and alternating with the shell-tubes, substantially as herein described.

41. In a cartridge-loading machine, the loading-cylinder or shell-holder having an upper and a lower plate carrying between them a series of tubes, each plate being made in halves and connected by cross-clips *j* and bolts *j'*, substantially as herein described.

In witness whereof I have hereunto set my hand.

GEORGE BENJAMIN JACOBS.

Witnesses:

JNO. JULIAN,

A. KRAHANER.