No. 629,393. Patented July 25, 1899.

F. RAYMOND.

CARTRIDGE LOADING MACHINE.

(Application filed Sept. 26, 1898.)

(No Model.)

Fig. 1.

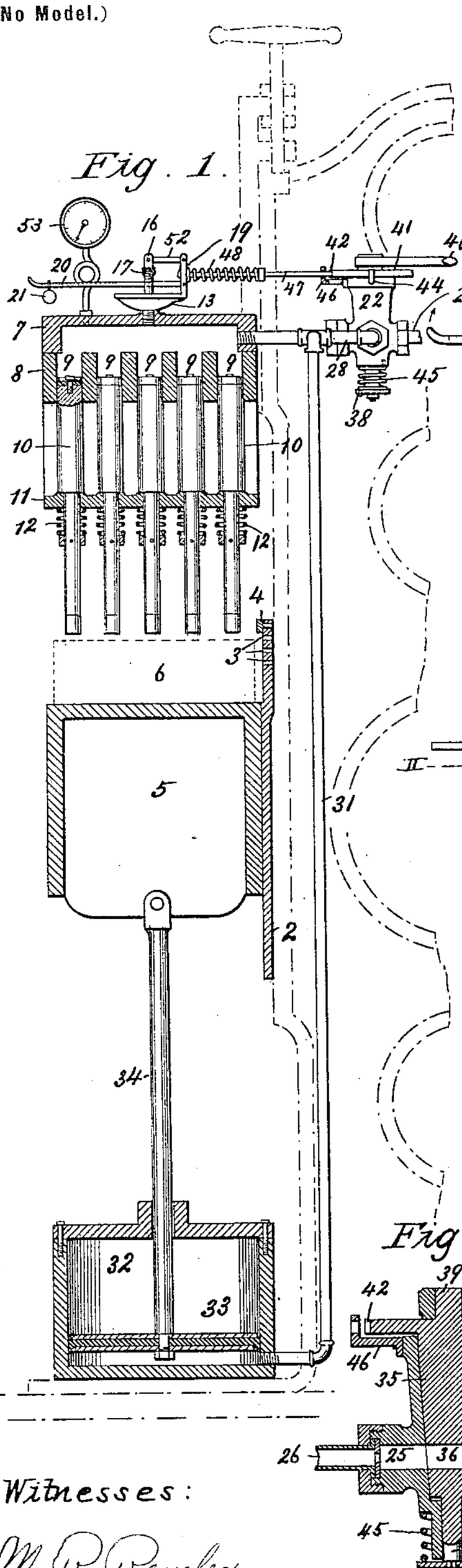


Fig. 2.

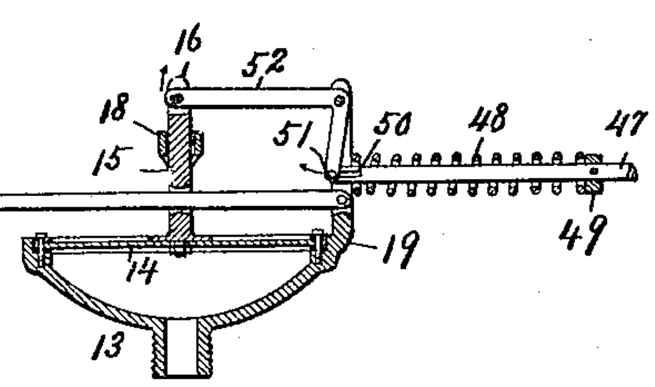


Fig. 3.

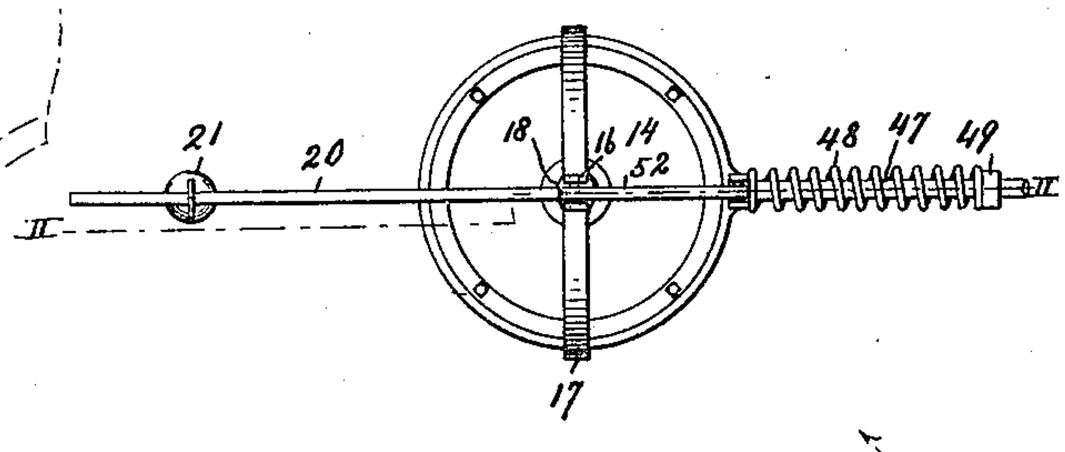


Fig. 4.

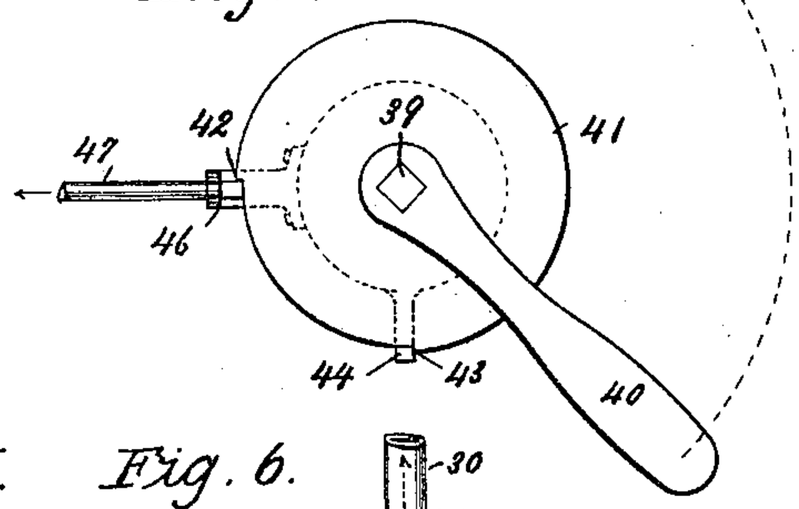
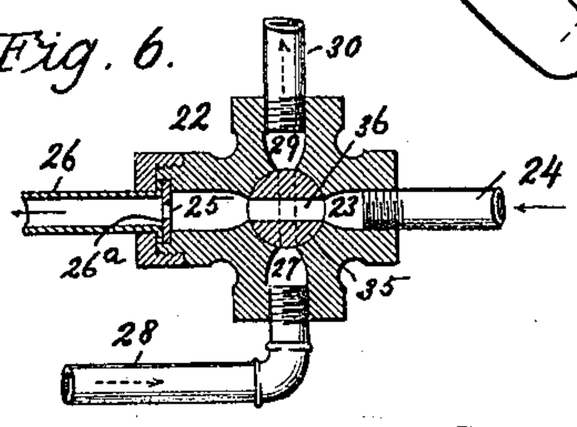


Fig. 5.

Fig. 6.



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UNITED STATES PATENT OFFICE.

FREDERICK RAYMOND, OF SEDALIA, MISSOURI.

CARTRIDGE-LOADING MACHINE.

SPECIFICATION forming part of Letters Patent No. 629,393, dated July 25, 1899.

Application filed September 26, 1898. Serial No. 691,856. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK RAYMOND, of Sedalia, Pettis county, Missouri, have invented certain new and useful Improvements in Cartridge-Loading Machines, of which the following is a specification.

My invention relates to cartridge-loading machines, and has for its object the provision of a machine of this character by which the loading of shells may be accomplished quickly and reliably, this invention being designed particularly as an improvement over the similarly-entitled invention patented by me on April 12, 1898, No. 602,143.

With this object in view the invention consists in certain novel and peculiar features of construction and combinations of parts, as hereinafter described, and pointed out specifically in appended claims, and in order that the invention may be fully understood reference is to be had to the accompanying drawing, in which—

Figure 1 is a vertical section of that part of the machine wherein my improvements reside. Fig. 2 is a vertical section taken on the line II II of Fig. 3. Fig. 3 is a top plan view of the device for regulating the amount of pressure which it is desired to apply in the cartridge-loading operation. Fig. 4 is a top plan view of a four-way valve forming a part of my invention. Fig. 5 is a vertical central section of the same. Fig. 6 is a horizontal section of the same.

In the said drawings the frame or stand which carries the operative parts of the machine is illustrated in dotted lines, as shown at 1.

2 designates an arm or plate secured to said frame and provided at its upper end with a vertical series of holes 3, preferably four in number.

4 designates a stop-pin adapted to engage one or another of the holes in order to limit the vertical sliding movement of the table 5, upon which is mounted the usual or any preferred type of loading-block 6, said block being illustrated by dotted lines. Vertically above said block and a suitable distance therefrom and also carried by the frame is a reservoir 7, and secured to the under side of the same with an air-tight joint in any suitable manner is a metallic block 8, provided with vertical holes or chambers 9 drilled therethrough, equal in number to the holes in the loading-block.

10 designates a corresponding number of vertical rammers, having their upper ends occupying said chambers 9 and arranged in axial alinement with the loading-block holes below, and said rammers are provided with air or gas tight packing at the top to prevent leakage, and their lower ends are of reduced diameter. The rammers are guided to reciprocate vertically in guide-brackets 11, connected to or formed integral with the block 8, and said bracket also serves to limit the downward movement of the rammers. Encircling retractive springs 12, below the block 11, tend to withdraw or reëlevate the rammers to normal position after the pressure is removed.

The parts thus far described are of precisely the same construction as in the patent hereinbefore mentioned, with the exception of the perforations 3 and the stop-pin 4, and for a more thorough and complete understanding of the construction of said parts reference is made to said patent.

13 designates a shallow basin in connection with the reservoir 7 through the medium of its tubular stem, screwed or otherwise secured to the top of said reservoir, and 14 designates a diaphragm for said basin, which is of suitable proportions and material to respond to a predetermined pressure of air, gas, or other equivalent by moving or bulging upwardly, for a purpose which will hereinafter appear. Secured centrally to and projecting vertically from said diaphragm is an apertured rod or stem 15, having its upper end bifurcated by preference, as shown at 16.

17 designates an arch cast with or secured to the basin and provided centrally with a vertical sleeve portion embracing and therefore insuring a direct vertical movement of said stem. The basin is also provided with a bifurcated arm 19 at one side, to which is pivoted the rear end of a scale-beam 20, extending through the apertured stem, and carried by said beam is an adjustable poise 21 of any preferred type. By the proper adjustment of this poise or weight upon the scale-beam the latter is caused, by pressing down upon the stem 15, to hold the diaphragm 14 unresponsive to any internal pressure less

than a given amount. In practice it generally requires from sixty to eighty pounds on each shell, and as there are usually fifty shells in a single loading-block the capacity of the machine will be from three thousand to four thousand pounds and the poise or weight will be adjusted accordingly.

22 designates a valve-casing provided with the inlet-port 23, connected by a pipe 24 to the source of power, with an outlet-port 25 diametrically opposite the inlet-port and connected by a pipe 26 with the reservoir 7. A partition 26^a, provided with a relatively small perforation, separates port 25 and pipe 26 in order that the immense pressure shall be applied upon the rammers gradually, and thereby obviate chance of injury thereto and to the associated parts. The valve-casing is furthermore provided with a return-port 27, connected by a pipe 28 with the reservoir, and with an escape-port 29, provided with an escape-pipe 30 to conduct the waste air to a suitable point of discharge. To the pipe 28 is coupled a pipe 31, communicating at its lower end with the cylinder 32, below the piston 33 thereof, and the stem 34 of said piston is connected to the sliding table 5, to the end that the movement of the latter shall accord with that of the piston.

35 designates the plug or valve proper of the casing 22, provided with a diametric passage 36, which is adapted to connect ports 23 and 25 or 27 and 29, accordingly as it is desired to operate the rammers or not. The valve is provided at its lower end with a reduced cylindrical stem 37, having a squared extension, upon which is clamped the disk 38, and the valve at its upper end is formed with an angular stem 39, upon which is secured a lever 40, and with a large disk 41, reduced in diameter for about one-fourth of its periphery in order to form the shoulders 42 and 43, adapted for alternate engagement with a stop-arm 44, projecting from the valve-casing. The diametric reduction of said disk also provides a recess occupied by said stop-arm, and its base is preferably concentric to the axis of the valve, and encircling the lower part of the casing and secured thereto at one end and at its opposite end to the disk 38 is a spring 45, which tends to hold the valve 40 in the position shown in Fig. 4.

At right angles to the stop-arm 44 and coincidental with the position of the shoulder 42 when the arm 40 is in its initial position is an apertured guide-arm 46, projecting from the casing, and 47 designates a slide-latch extending therethrough and held always with a yielding pressure against the periphery of the disk by the spring 48, said spring bearing at its opposite ends against the bifurcated standard 19 and the collar 49 upon said latch-bar. The opposite end of the latch-bar is provided with a longitudinal slot 50, through which the pivot-pin 51 extends, carried by the pendent arm of a bell-crank lever 52, said lever being fulcrumed in the upper end of the standard 19 and pivotally connected at its opposite end in the bifurcated end 16 of the diaphragm-stem 15.

In order that the increasing pressure of the reservoir and cylinder may be ascertained at any time during the operation, I preferably provide said reservoir with a pressure-gage 53 of the usual or any preferred type. The elevation of the poise of course will instantly determine when the pressure has attained the desired height.

When the shell-block has been properly positioned upon the reciprocatory table and compressed air, gas, or other equivalent is entering the reservoir and, through the medium of pipes 28 and 31, entering the cylinder, and thereby synchronously depressing the rammers and elevating the loading-block, the pressure-controlling mechanism is positioned as shown in Fig. 2 and the valve mechanism as shown in Figs. 4, 5, and 6.

In the preliminary operation a thin wad is adapted to be pressed down upon the powder in the shell. As in this operation the relative movement toward each other of the table and the rammers is greater than in the subsequent loading operations, the stop-pin 4 to limit the upward movement of the table is fitted in the topmost hole of the series 3, and if the amount of powder or the thickness of any of said wads varies the uniform pressure upon all is maintained, because the rammers work independently and will move a variable distance. This feature of the operation is clearly set forth in my former patent referred to and need not be enlarged upon here. As the pressure in the reservoir attains the predetermined height the poise is overbalanced and the diaphragm bulges upward at its middle and through the medium of the bell-crank lever 52 moves the latch-bar 47 in the direction indicated by the arrow in Fig. 4 until it clears the shoulder 42 of disk 41. At the instant this takes place the spring 45, which is wound up when the handle is in the position shown in Fig. 4, swings said handle, as indicated by the dotted arrow, same figure, through ninety degrees of space or until the shoulder 42, previously engaging the latch-bar, strikes the stop-arm 44 and limits such movement of the handle, and consequently of the valve. As the valve assumes this new position its passage 36 places the return-port 27 and waste-port 29 in communication, and instantly thereafter the pressure in the reservoir and cylinder is reduced to that of the atmosphere. This reduction of pressure of course is accompanied by the descent of the table and the re-elevation of the rammers. This reduction of pressure, furthermore, removes the over-balancing power which elevated the diaphragm and poise and permits the latter, therefore, to instantly depress the diaphragm to its original position. In this operation the pivot-pin 51 of bell-crank 52 swings inoperatively in the slot 50 of latch-bar 47, which at this time is held by the power of spring 48 against the periphery of

disk 51 at a point diametrically opposite the shoulder 43, as will be readily understood. After a felt wad has been placed in each shell the stop-pin 4 is fitted in the hole 3 next below its former position and the lever 40 is grasped and swung back to its initial position, as shown in Fig. 4, thereby rewinding spring 45 and permitting spring 48 to reseat the latch-bar against shoulder 42, and thus prevent spring 45 from moving the valve until the proper time arrives. By swinging the handle back to its initial position the valve-passage 36 again connects the ports 23 25 and permits the compressed air or gas to enter the reservoir and the cylinder and cause the descent of the rammers and the ascent of the table, as before explained. When the pressure again reaches the predetermined height, the operations of the pressure-regulating mechanism and of the valve mechanism are repeated, and with each succeeding operation until the shell is completely loaded the stop-pin 4 is lowered one hole, as will be understood.

Thus it will be seen that I have produced a machine of the character described which is of more compact, durable, and reliable construction than that of my former patent, and it is to be understood that various changes in the form, proportion, detail construction, and arrangement of the parts may be made without departing from the spirit and scope or sacrificing any of the advantages of the invention.

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

1. In a machine of the character described, a reciprocating table, a shell-carrying block thereon, a plurality of rammers, and an adjustable stop to limit the movement of said table toward the rammers, substantially as described.

2. In a machine of the character described, a reciprocating table, a shell-carrying block thereon, a plurality of rammers, an arm or plate provided with a vertical series of holes, and a stop-pin adapted to engage one or another of said holes and thereby limit the movement of said table toward the rammers, substantially as described.

3. In a machine of the character described, a plurality of rammers, a loading-block-carrying table, the loading-block thereon adapted to contain shells equal in number to the rammers, a cylinder having its piston connected to said table, and instrumentalities for introducing compressed air, gas, or other equivalent into the cylinder to raise said table in the loading of the shells, and automatic means to permit the air, gas or other equivalent to escape after the predetermined pressure has been attained, substantially as described.

4. In a machine of the character described, a suitable frame or stand, a cylinder, a reservoir, a reciprocatory loading-block-carrying table between the two and connected to the stem of the cylinder-piston, a plurality of rammers, and means for introducing compressed air, gas, or other equivalent into said reservoir and cylinder and equalizing it upon the rammers and piston, and automatic means to permit the air, gas, or other equivalent to escape after a predetermined pressure is obtained, substantially as described.

5. In a machine of the character described, a cylinder, a reservoir provided with a plurality of suitably-guided rammers, a loading-block-carrying table connected to the piston of the cylinder, a valve-casing provided with inlet, outlet, return and waste ports, a rotary plug therein provided with a passage, adapted to connect the inlet and outlet ports or the return and waste ports, a spring-actuated latch-bar to hold the valve with the inlet and outlet ports connected, a diaphragm to receive with the rammers and the piston the pressure of the air, gas, or other equivalent introduced into the reservoir and the cylinder by way of said ports and valve-passages, and instrumentalities actuated by the diaphragm as it yields to such pressure for tripping said latch-bar and permitting the valve to be rotated, substantially as described.

6. In a machine of the character described, a cylinder, a reservoir provided with a plurality of suitably-guided rammers, a loading-block-carrying table connected to the piston of the cylinder, a valve-casing provided with inlet, outlet, return and waste ports, a rotary plug therein provided with a passage adapted to connect the inlet and outlet ports or the return and waste ports, a spring-actuated latch-bar to hold the valve with the inlet and outlet ports connected, a diaphragm to receive with the rammers and the piston the pressure of the air, gas, or other equivalent introduced into the reservoir and the cylinder by way of said ports and valve-passages, instrumentalities actuated by the diaphragm as it yields to such pressure for tripping said latch-bar and permitting the valve to be rotated, and a pivoted scale-beam provided with an adjustable poise which yields under the elevation of the diaphragm by the predetermined pressure, and which returns said diaphragm to its original position after such pressure is removed, substantially as described.

7. In a machine of the character described, a cylinder, a reservoir provided with a plurality of suitably-guided rammers, a loading-block-carrying table connected to the piston of the cylinder, a valve-casing provided with inlet, outlet, return and waste ports, a rotary plug therein provided with a passage adapted to connect the inlet and outlet ports or the return and waste ports, a spring-actuated latch-bar to hold the valve with the inlet and outlet ports connected, a diaphragm to receive with the rammers and the piston the pressure of the air, gas, or other equivalent introduced into the reservoir and the cylinder by way of said ports and valve-passages, instrumentali-

ties actuated by the diaphragm as it yields to such pressure for tripping said latch-bar and permitting the valve to be rotated, and a stop-arm to limit said rotatable movement, substantially as described.

8. In a machine of the character described, a cylinder, a reservoir provided with a plurality of suitably-guided rammers, a loading-block-carrying table connected to the piston of the cylinder, a valve-casing provided with inlet, outlet, return and waste ports, a rotary plug therein provided with a passage adapted to connect the inlet and outlet ports or the return and waste ports, and with a shoulder, a spring-actuated latch-bar to engage said shoulder and hold the valve with the inlet and outlet ports connected, a diaphragm to receive with the rammers and the piston the pressure of the air, gas, or other equivalent introduced into the reservoir and the cylinder by way of said ports and valve-passages, instrumentalities actuated by the diaphragm as it yields to such pressure for tripping said latch-bar and permitting the valve to be rotated, a stop-arm to limit said rotatable movement, and a lever carried by the valve, by which it is rotated in the opposite direction until the latch-bar reëngages said shoulder, substantially as described.

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

FREDERICK RAYMOND.

Witnesses:
M. R. REMLEY,
F. S. THRASHER.