

July 30, 1957

R. GERSTENBERGER
SHELL RELOADING MACHINE

2,800,830

Filed Feb. 16, 1954

4 Sheets-Sheet 1

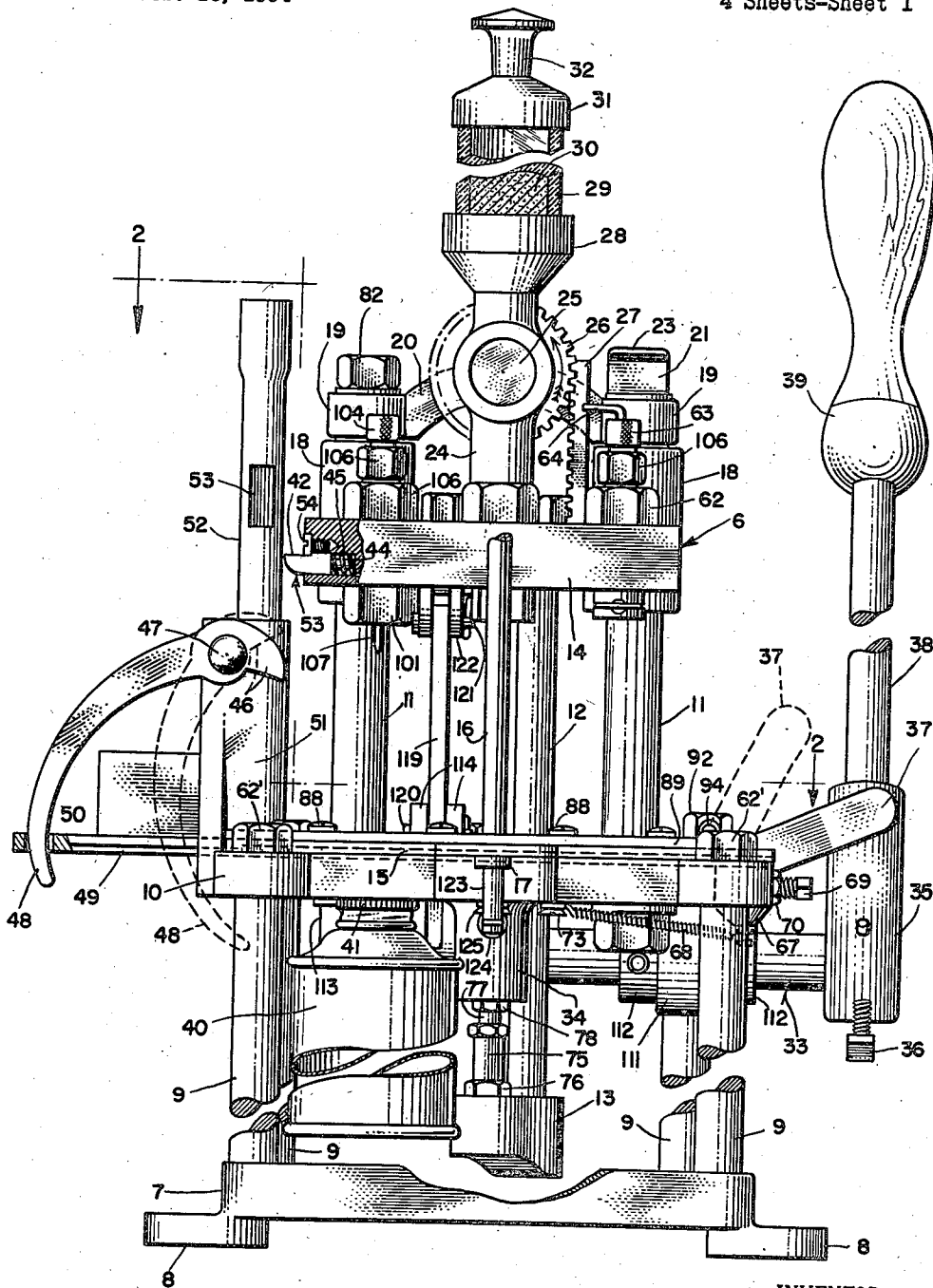


Fig. 1

INVENTOR,
RICHARD GERSTENBERGER
BY MARGARET GERSTENBERGER
ADMINISTRATOR,
BY *David M. Hellen*
ATTORNEY

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4 Sheets-Sheet 2

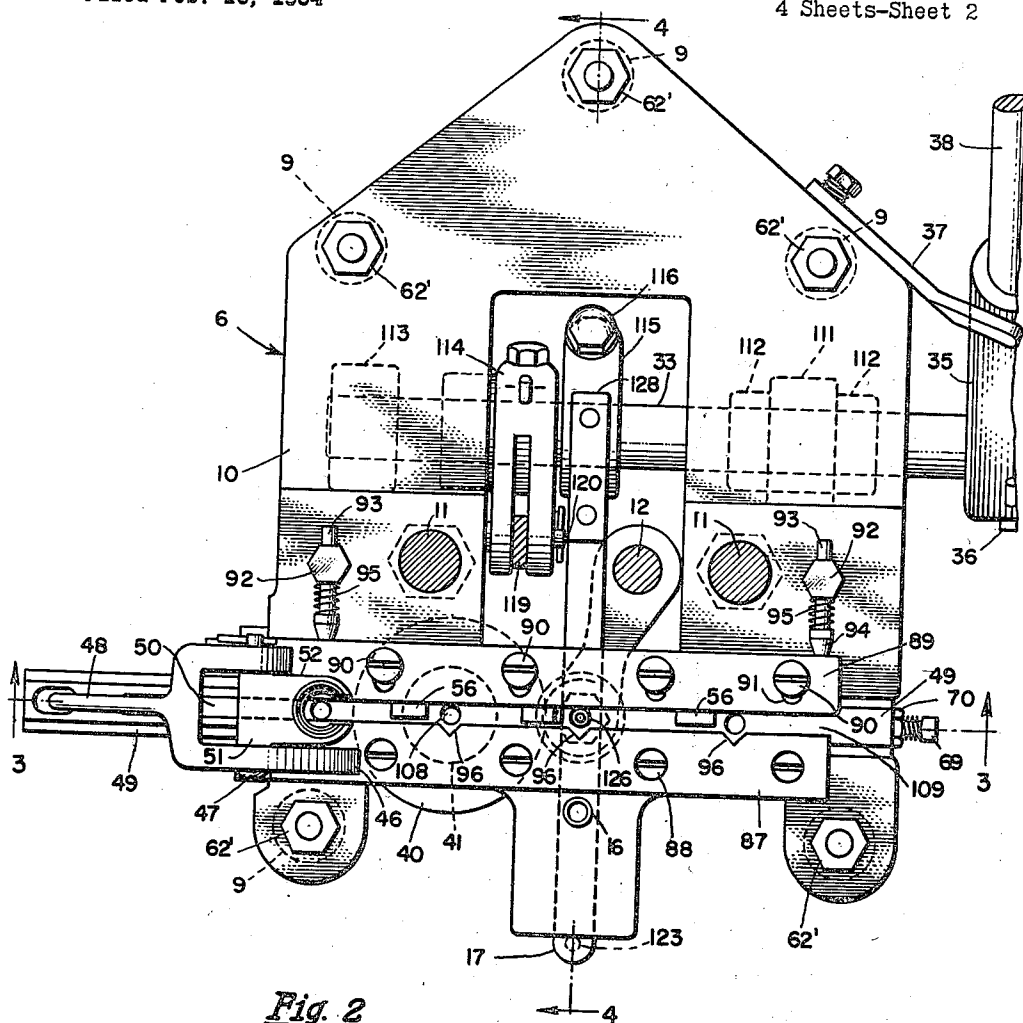


Fig. 2

INVENTOR.
RICHARD GERSTENBERGER,
deceased,
BY MARGARET GERSTENBERGER
administratrix,
David W. Heller
ATTORNEY

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R. GERSTENBERGER

2,800,830

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4 Sheets-Sheet 3

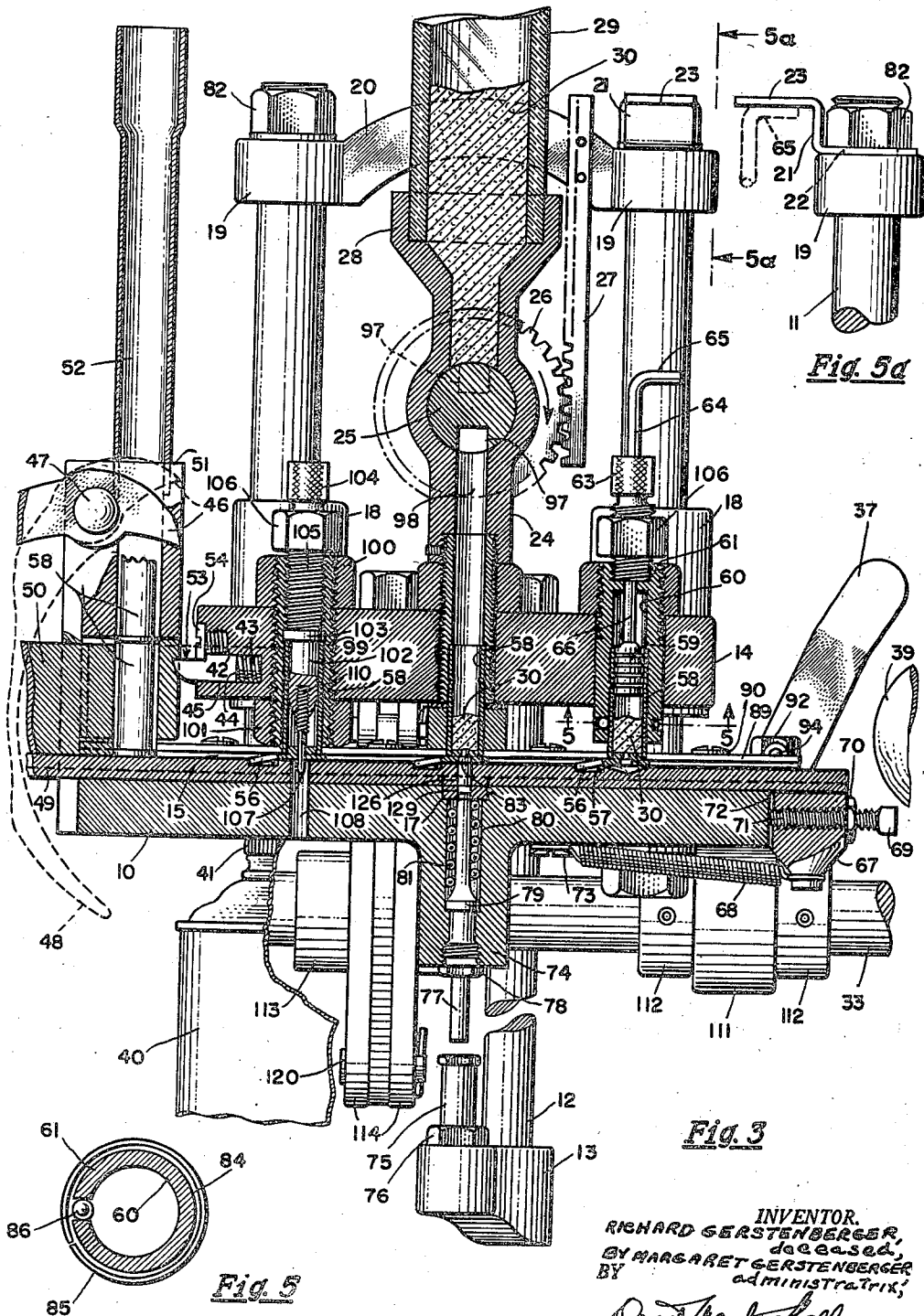


Fig. 5a

Fig. 3

Fig. 5

INVENTOR.
RICHARD GERSTENBERGER,
deceased,
BY MARGARET GERSTENBERGER,
administratrix;

David Harry Heller.

ATTORNEY

July 30, 1957

R. GERSTENBERGER

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4 Sheets-Sheet 4

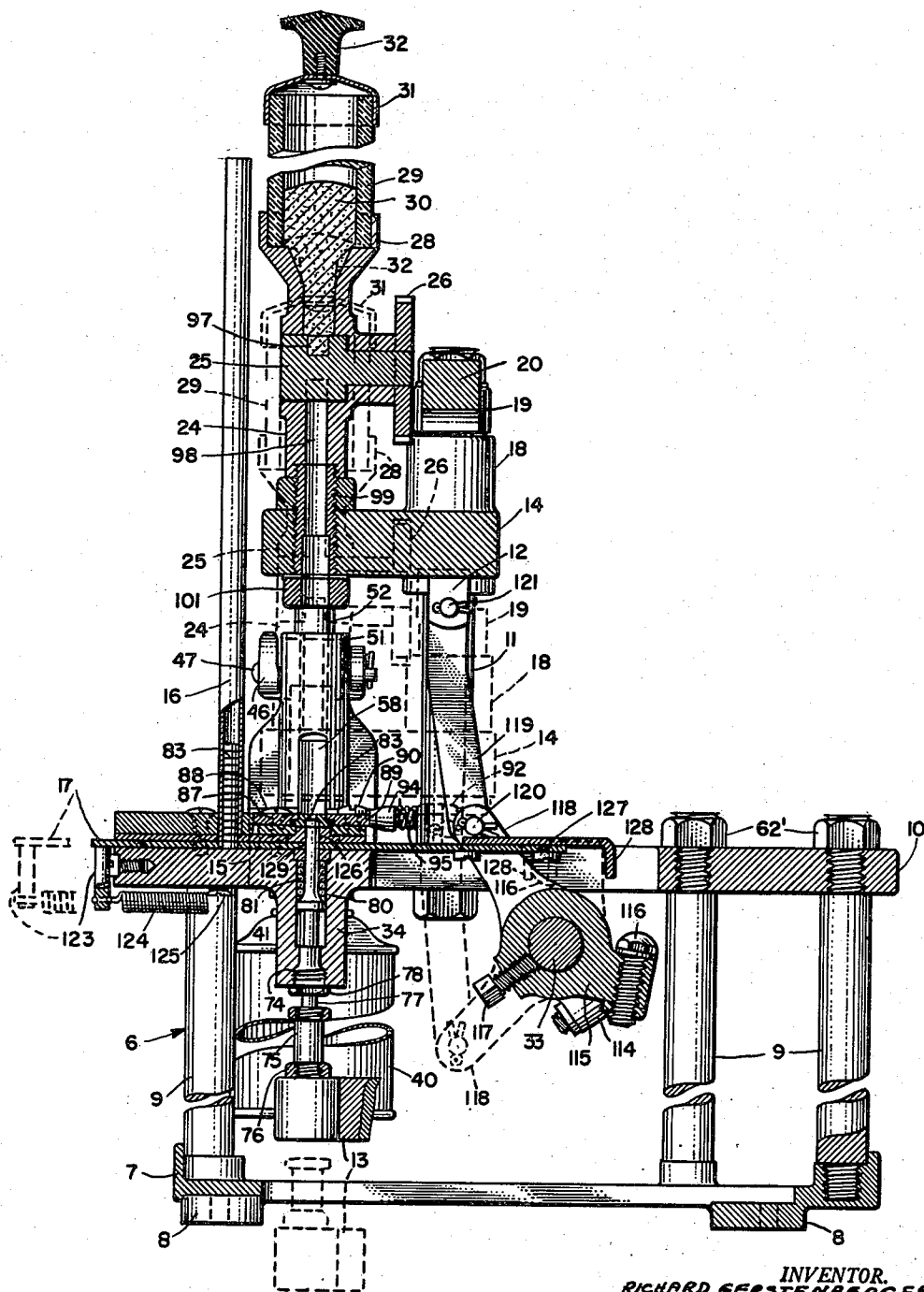


Fig. 4

INVENTOR.
RICHARD GERSTENBERGER
deceased,
BY MARGARET GERSTENBERGER
ADMINISTRATRIX,

David M. H. Allen
ATTORNEY

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2,800,830

SHELL RELOADING MACHINE

Richard Gerstenberger, deceased, late of Chicago, Ill., by
Margaret Gerstenberger, administratrix, Chicago, Ill.

Application February 16, 1954, Serial No. 410,602

2 Claims. (Cl. 86—23)

This invention relates to shell reloading mechanism.

An important object of this invention is to provide shell reloading mechanism of the aforementioned character which is provided with shell feed slide mechanism intermittently operated to advance a shell from a shell receiving station to a shell mouth flaring and primer knockout station to a shell powder filling station and primer inserting station, and ultimately to a bullet inserting station completing the cycle of reloading a shell.

Another object of this invention is to provide, in a shell reloading mechanism of the aforementioned character, primer feed slide mechanism positioned in transverse operative relationship to the said shell feed slide mechanism and adapted to selectively align a single primer with respect to the primer inserting station.

A still further object of this invention is to provide, in a shell reloading mechanism of the aforementioned character, anvil means for actuating a primer inserting mechanism operating through the said primer feed slide mechanism, and also through the said shell feed slide mechanism, the same reaching congruent alignment to permit passage of the primer element to the bottom of a shell.

A still further object of this invention is to provide, in a mechanism of the aforementioned character, guide rods on which a vertical slide mechanism operates, which is equipped with primer ejection mechanism, powder shell filler mechanism and bullet securing mechanism, the said vertical slide mechanism by virtue of pawl mechanism actuating the said shell feed slide mechanism and also the said anvil mechanism.

A still further object of this invention is to attain the foregoing objects and operations of the mechanism by the motivation of a handle element being motivated through an orbit of approximately 100°.

Other objects and ancillary advantages inherent in this invention will become apparent from an examination of the accompanying drawings, bearing further elucidation in the ensuing description, wherein like symbols designate like parts, and in which:

Fig. 1 is a front elevational view of this invention with certain portions cut away in cross section so as to more clearly illustrate the relationship of elements.

Fig. 2 is a staggered cross-sectional view taken substantially on the lines 2—2 of Fig. 1.

Fig. 3 is a cross-sectional view taken, substantially, on the lines 3—3 of Fig. 2.

Fig. 4 is a cross-sectional view taken, substantially, on the lines 4—4 of Fig. 2.

Fig. 5 is a cross-sectional view taken, substantially, on the lines 5—5 of Fig. 3.

Fig. 5a is a fragmentary side view looking in the direction of arrows 5a—5a on Fig. 3.

Referring to the various views, this invention is generally designated 6, and consists of a base plate 7 having feet 8 adapted to secure the entire assemblage on a working table or working stand.

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The base 7 is secured to the shell motivating slide support 10 by means of rigid pins 9 held securely in place by nuts 62'. The shell slide support 10 has rigidly secured thereto liner pins 11 which act as guides for the vertical slide 14. The liner pins 11 are secured in place by a yoke 20 having hubs 19 and nuts 82 securing the same firmly and rigidly in place.

The slide bed plate element 10 has a recessed portion provided by spacers 15 and gibs 87 and 89 held in place by screws 88 and 90 (see Fig. 2).

The vertical slide mechanism is equipped with liner bushings 18 slidably operated on liner pins 11 and has secured thereto the yoke 122 fastening by means of the cotter pin 121 to secure the motivating linkage 119 articulately at points 121 and 120.

A shell feeding tube 52 having a inspection window 55 therein is secured to a bracket 51 which in turn is attached to the slide bed element 10. The shells are fed with their open ends upwardly and superimposed within the said tube 52. The shell feeding slide 49 is provided with a recess 130 through which extends the operative end 48 of the pawl 46 which is articulately secured at 47. A companion pawl 53 having undercut portion 42 and a reduced shank 43 is held in place by the screw 54, a spring 44 located in bore 45 urging the pawl 53 into operative position.

The vertical slide element 14 has a yoke 122 attached thereto in order to secure articulately the link element 119 by means of cotter pin connection 121. The lower portion of the link 119 is articulately secured by cotter pin 120 to the bifurcation 118 of a yoke 114 in turn attached to shaft 33. Shaft 33 is secured through the hub element 35 by means of set screw 36, the hub element 35 having a handle rod 38 secured to the hub element 35, the other terminal portion of the rod 38 being secured to a motivating handle 39. When the handle 39 is motivated downwardly, after first moving the stop finger 37 to the dotted position indicated Fig. 1, and through the aforementioned linkage 119, the vertical slide 14 will be motivated downwardly. The pawl 53 in passing the pawl 46 will cause the spring 44 to be compressed, thus allowing it to pass the tooth of the pawl 46 without actuating the same. When the vertical slide 14 has reached its lowermost point and is subsequently returning to the position shown in Fig. 1, by means of rotating the handle element 39 to its original position, the tooth portion 42 of the pawl 53 will engage the tooth portion of the pawl 46, actuating the pawl 46 about its pivot 47 and causing its operative tail portion 48 to motivate the slide 49 to the right or as indicated by the dotted position Fig. 1. When the slide 49 is actuated by the pawl 46 the shell motivating block 50 will advance the bottom shell 58 and move it to the primer ejecting and shell flaring station. The operation is performed by the slide pawls 56 being pivoted and urged to the angular position by springs 57 so that when the slide returns the action of the pawls 56 will be inoperative. When the slide 49 moves to the right, the extended tooth of the pawls 56 will engage the bottom of the shell 58 and successively move it to be engageable by the first pawl 56, then the shell will be advanced to the second pawl 56, and lastly it will be ejected by the last pawl 56. The shaft 33 is maintained in a bracket extension 111 and a bracket extension 113 secured rearwardly on the bed plate 10, collars 112 and suitable set screws preventing lateral displacement of the shaft 33. The slide 49 motivates the shells 58 by means of the pawls 56 heretofore described and, looking at Fig. 2, it will be noted that the gib 87 is held down firmly by screws 88 and is provided with V-shaped notches 96 which aid in locating the shells concentrically with respect to the opening 126 and

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the opening 108. The gib 89 is arranged to be yieldable so as to permit enlargement of the space 109 between the inner edge of gibs 87 and 89. In this connection it will be noted that the screws 90 are shoulder screws having shoulders operating in the elongated slots 91. The space 109 between edges of gibs is maintained by the pressure rods 94 having extensions 93 mounted slidably in bolts 92, being equipped with springs 95, which urge the holding elements 94 into intimate contact relationship with the outer edges of the gibs 89.

Thus the gib 89 yields to the larger diameter of the shell 58 and allows the same to be held firmly, and to be located firmly, in the notches 96.

Referring to Fig. 3 it will be noted that the primer ejecting and shell mouth flaring station consists of a threaded bushing 99 held in place by lock nuts 100 and 101, the said threaded bushing 99 having a partially threaded portion to receive the screw thread 105 in adjusted relationship; the screw 105 having a knurled head 104 and a locknut 106 securing the same in proper position. A plunger support 102 having an enlarged head 103 is retained firmly by the screw 105 and has a threaded portion adapted to receive the enlarged threaded shank 110 of the primer knockout pin 107; a clearance hole 108 being provided in the bed plate 10 under which the threaded cap 41 is secured, and to which the container 40 is removably secured and collects the ejected primers to be discarded.

Thus, when the vertical slide 14 is brought downwardly, as indicated in Fig. 3 the primer ejector pin 107 will eject the primer from the shell 58, causing it to pass into the receptacle 40. Simultaneously with that action the partially spherical bottom portion of the element 102 will flare out the mouth of the shell 58, rendering the same in condition for receiving a bullet 59. On the upward stroke of slide 14 the shell 58 is advanced to the powder filling and primer injecting station so that when the vertical slide element 14 is brought downwardly the rack 27 which is secured to the yoke 20, and which is enmeshed with a gear 26 secured in turn to the rotating shaft 25, will cause the said shaft 25 to rotate in the direction of the arrow.

The powder measuring pocket 97 is thus brought into alignment with the bore 98, allowing the measured dose of powder 30 to drop into the shell 58. In the prior upward movement of the vertical slide 14, and immediately before completing the upward movement the primer injecting element 77 causes a primer 83 to enter the shell 58 positioned at the powder filling and primer injecting station. In the movement of the vertical slide 14, through the connecting rod 12 which is secured to the anvil 13, the anvil element 75 comes in contact with the primer injecting rod 77, the nut 76 being utilized for suitable adjustment of the anvil element 75. The primer injecting element 77 is held in place in the hub 74 by a threaded bushing 78 and is provided with a shoulder 79 operating in the bore 80 of the hub 34 on the bed plate 10. The primer injecting element 77 has a reduced inserting end which takes a primer that has been brought into proper alignment, and pushes the same through the aligned openings 126 and 129 into the bottom primer recess of the shell 58, the spring 81 returning the primer injecting element 77 to normal position. The primer injecting operation is best indicated in Fig. 4.

The shaft 25 is mounted in a casting 24 which has an upper open section 28 to which is fitted the powder retaining tube 29, the upper portion of which is covered by a cap 31 having a handle 32. The slide 49 is returned to its normal position after having been actuated by the tail portion 48 by means of a spring 68 which is anchored to the screw 73 and also to the anchoring hub 67. An adjustment screw 69 having its end 71 in contact with the edge 72 of the bed plate 10 acts as a stop to limit the return movement and permit exact alignment of the slide with respect to its travel. A locknut 70 maintains the

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adjustment screw 69 in its proper position. The slide element 49, after being operated a third time will advance the first shell to the bullet inserting station. This consists of a sleeve 61 held in place by a nut 62, a knurled screw 63 having a bore therethrough to receive the knockout 64, the end thereof 66 being used to inject the bullet 59 into the shell 58 whenever it is desired to inject a shell 59. The knurled head screw 63 is secured to the bushing 61 and held in locked adjustment by means of locknut 106. The bullet 59 is confined in the bore 60 and is held in place by an undercut portion 84 (see Fig. 5) in which a single coil spring 85 holds a clutch ball 86 which is adapted to engage the contour of the bullet 59 when it is placed manually into the lower portion of the bushing 61 preparatory to its being assembled to the shell 58. Thus, when initiating the operation of this mechanism the first shell 58 is advanced to the primer ejecting and shell mouth flaring station. When the vertical slide 14 is brought down a second time, a second shell 58 is advanced to the primer ejecting and shell mouth flaring station, and the first shell is advanced to the powder filling and primer injecting station. On the third movement, or operation, of the vertical slide downwardly, a third shell is advanced to the primer ejecting and shell mouth flaring station, the second shell is advanced from the primer ejecting and shell mouth flaring station to the powder filling and primer injecting station, simultaneously therewith the first shell is advanced to the bullet inserting station for the completion of the operation on the first shell thus fed through the mechanism, and subsequently thereafter a shell is being operated upon at the primer ejecting and shell mouth flaring station simultaneously while another shell is being operated upon at the shell filling and primer injecting station simultaneously therewith, while still another shell is being operated upon by the bullet inserting section.

For safety reasons the shell knockout element 64 is provided with a handle 65 which in the event of slight explosion would cause the same to be arrested when it meets the abutment provided by the safety bracket 21, its extension 23 acting as a stop; the said bracket being of the formation indicated and having an opening 22 therein to be firmly secured against the hub 19 of the yoke 20 by means of nuts 82. The primers are fed in a tubular gravity feed 16 showing the primers 83 superimposed therein. The shaft 33 (see Fig. 4) is secured to a yoke 115 having a motivating element in the form of a screw having a hemispherical head 116 which is adapted to motivate the primer selector slide 17 by means of the connection 128 which is attached by screws 127 to the slide 17. The slide 17 is held in normal position indicated in Fig. 4 by means of spring 124, which is anchored to the anchoring pin 123 and the anchoring screw 125, and is motivated to the dotted lines indicated in Fig. 4. The set screw 117 fastens the yoke 115 to shaft 33.

Thus when the vertical slide 14 is moved downwardly the slide 17 is moved to the left of Fig. 4 to the dotted position, allowing a primer 83 to drop into the opening 129 in slide 17, which is in alignment with the opening 126 in slide 49. Thus when the vertical slide 14 is returned to its normal position the anvil 77 will inject the primer 83 into the bottom of the shell 58.

Broadly outlining the operation, it consists of the rotation or motivation of the handle 39 substantially through an arc of approximately 100°, which actuates slide 49 in order to bring the shells in alignment with the various shell operating stations heretofore mentioned, simultaneously operating the transverse shell or primer selector slide 17 in proper synchronism, so that a shell will have the primer ejected therefrom, the mouth portion thereof flared or smoothed for receiving a new bullet, the powder loading station will measure out and fill the proper dosage of explosive powder, injecting a new primer into the bottom of a shell and ultimately capping the shell with a bullet, completing the entire shell reloading.

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While the invention has been herein described in its preferred form it is to be understood that it is not limited to the specific construction herein shown and that it may be practiced in other forms without departing from the spirit and scope thereof.

Having thus described and revealed this invention, what is claimed as new and desired to secure by Letters Patent is:

1. In a shell-reloading mechanism, the combination of a magazine for holding shells, a series of dies, a vertical slide carrying the said dies, a shell feeding slide adapted to reciprocate horizontally under the said magazine and the said dies and having members arranged to engage and feed shells singly from the said magazine and progressively move the shells to positions below the said dies, means actuated from the said vertical slide for reciprocating the said shell feeding slide, gib plates arranged at the sides of the said shell feeding slide and one being shiftable toward and away from the said shell feeding slide, one of the said gib plates serving to guide sliding movement of the said shell feeding slide and being provided in its inner edge with locating recesses adapted to receive portions of successive shells and arrest their movement at points below the said dies, gravity fed primer selector slide means operating in transverse relationship to the said shell feeding slide and cooperating with the said dies to supply primers to the shells successively, the said dies including a shell mouth flaring and primer ejecting station, a powder filling and primer injecting station, and a bullet assembling station, rack and pinion means associated with the said vertical slide for actuating the powder filler of the said powder filling and primer injecting station, anvil means secured to the said vertical slide, primer injecting means mounted above the said anvil means and being actuated thereby to inject a primer successively into the said shells, a bed plate support, a shaft mounted below the said bed plate support, and a yoke secured to the said shaft and linkage means interconnecting the said yoke and the said vertical slide.

2. In a shell-reloading mechanism, the combination

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of a magazine for holding shells, a series of dies, a vertical slide carrying the said dies, a shell feeding slide adapted to reciprocate horizontally under the said magazine and the said dies and having members arranged to engage and feed shells singly from the said magazine and progressively move the shells to positions below the said dies, means actuated from the said vertical slide for reciprocating the said shell feeding slide, gib plates arranged at the sides of the said shell feeding slide and one being shiftable toward and away from the said shell feeding slide, one of the said gib plates serving to guide sliding movement of the said shell feeding slide and being provided in its inner edge with locating recesses adapted to receive portions of successive shells and arrest their movement at points below the said dies, and gravity fed primer selector slide means operating in transverse relationship to the said shell feeding slide and cooperating with the said dies to supply primers to the shells successively, the said dies including a shell mouth flaring and primer ejecting station, a powder filling and primer injecting station, and a bullet assembling station, rack and pinion means associated with the said vertical slide for actuating the powder filler of the said powder filling and primer injecting station, anvil means secured to the said vertical slide, primer injecting means mounted above the said anvil means and being actuated thereby to inject a primer successively into the said shells, a bed plate support, a shaft mounted below the said bed plate support, a yoke secured to the said shaft and linkage means interconnecting the said yoke and the said vertical slide, and a second yoke secured to the said shaft and adapted to motivate the said primer selector slide means.

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