March 29, 1966 T. J. BACHHUBER 3,242,790

SHOTGUN SHELL RELOADER

Filed Jan. 24, 1963 4 Sheets-Sheet 1

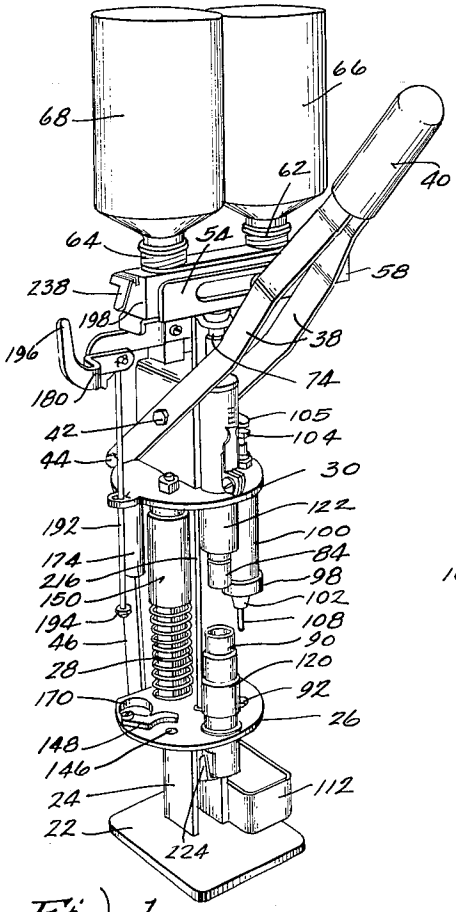

Fig. 1

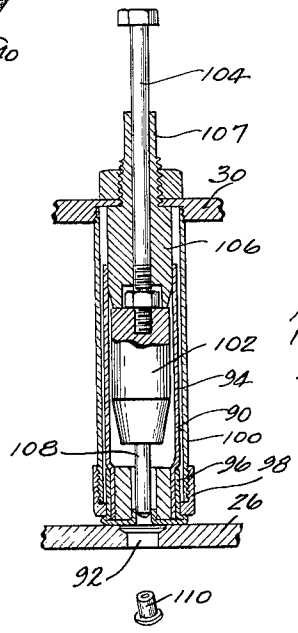

Fig. 5

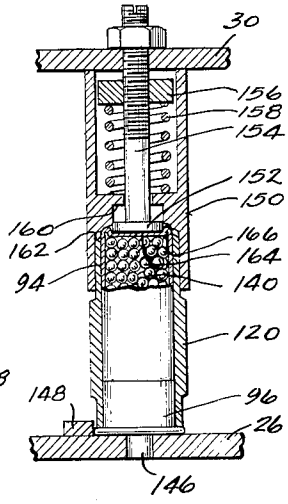

Fig. 13

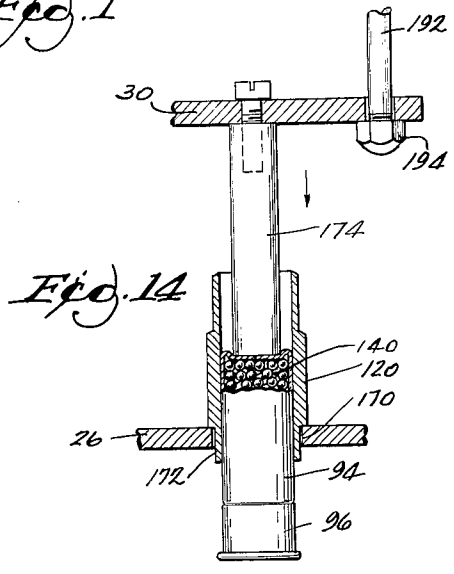

Fig. 14

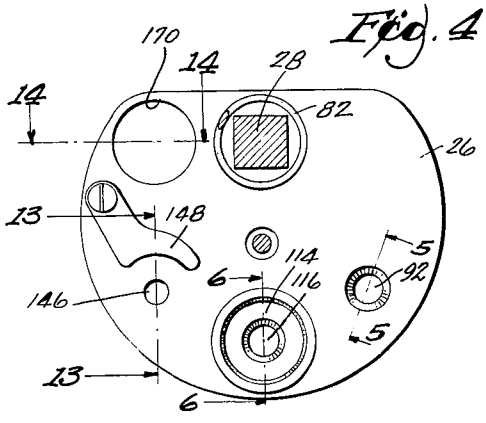

Fig. 4

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SHOTGUN SHELL RELOADER

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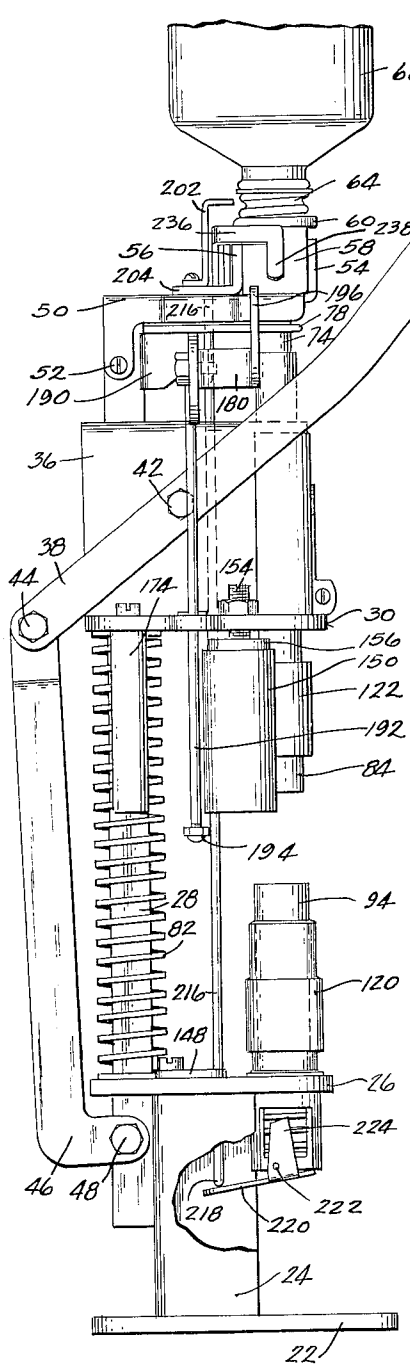

Fig. 2

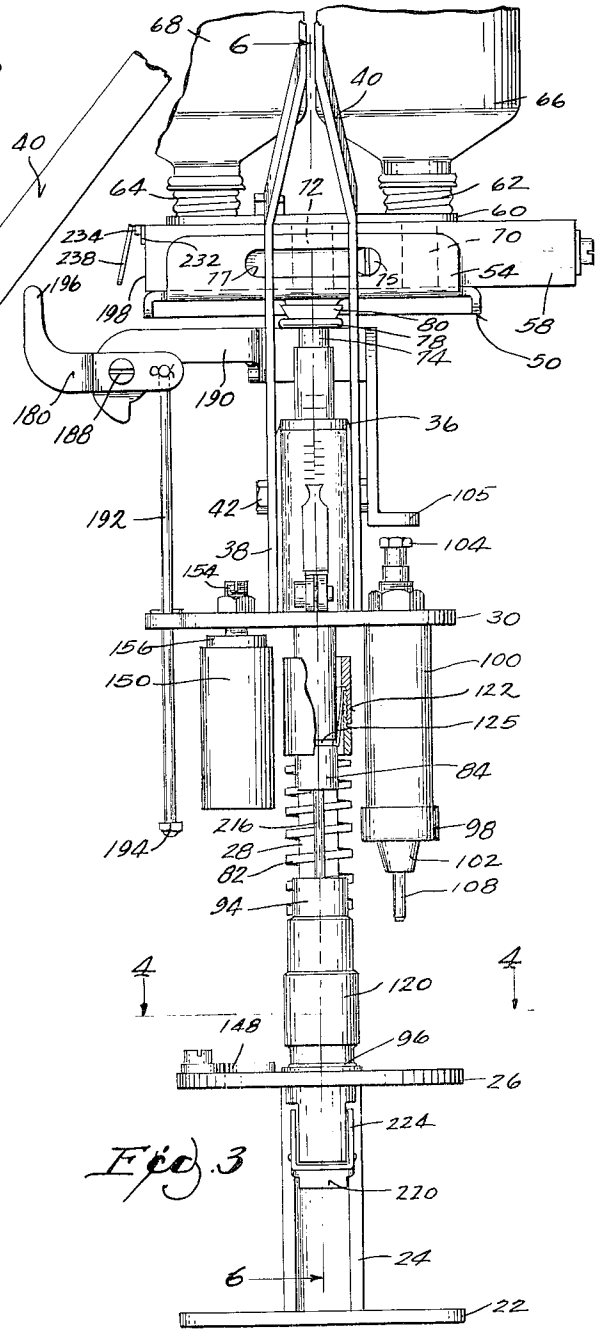

Fig. 3

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Fig. 6

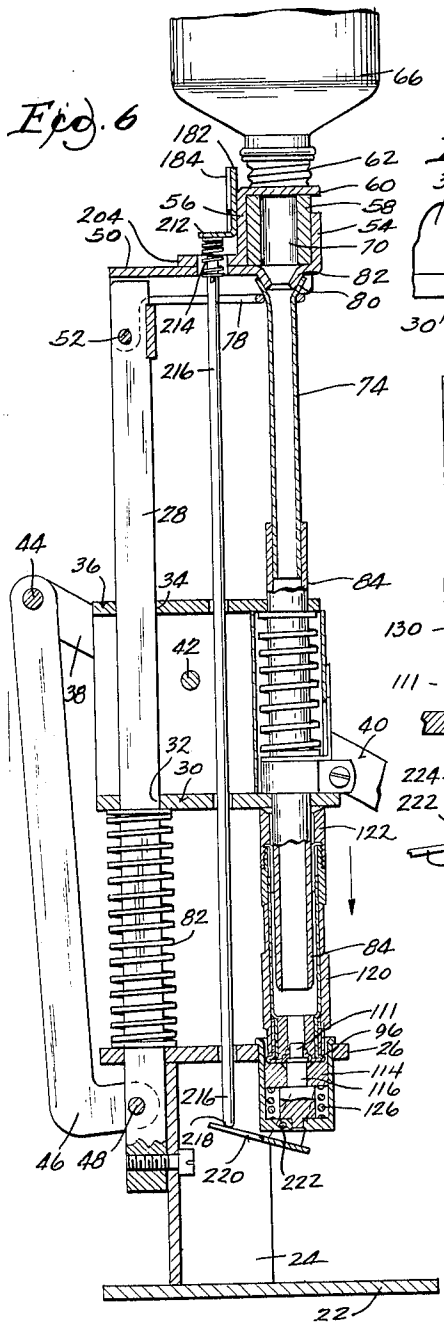

Fig. 8

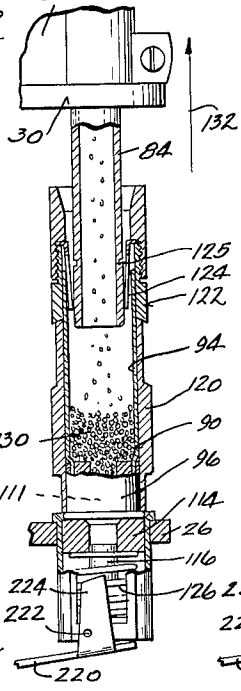

Fig. 9

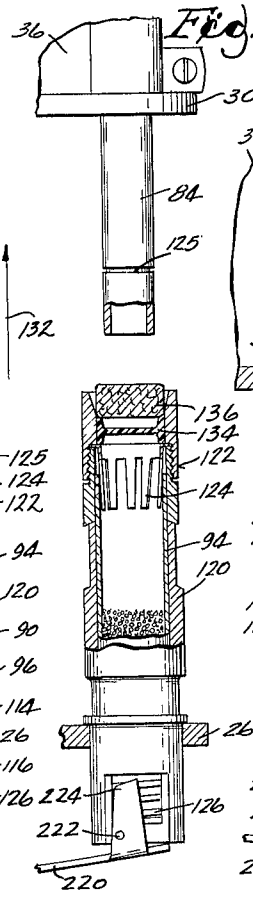

Fig. 10

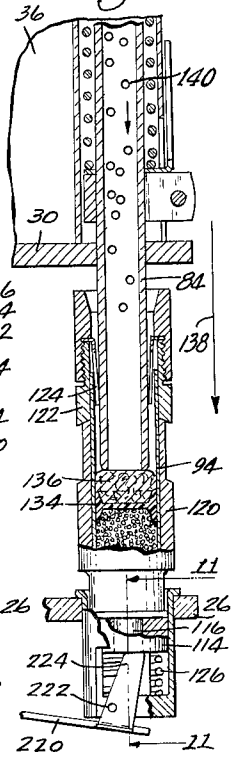

Fig. 12

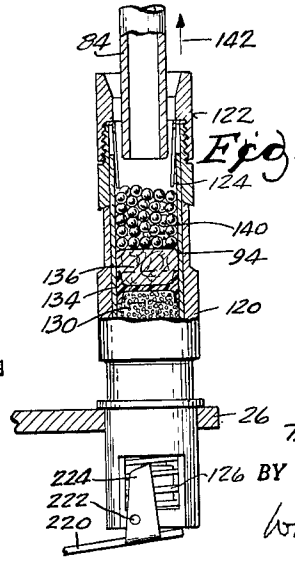

Fig. 11

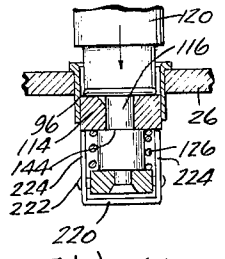

Fig. 7

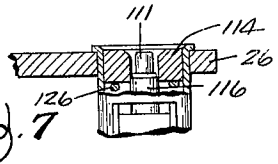

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Fig. 15

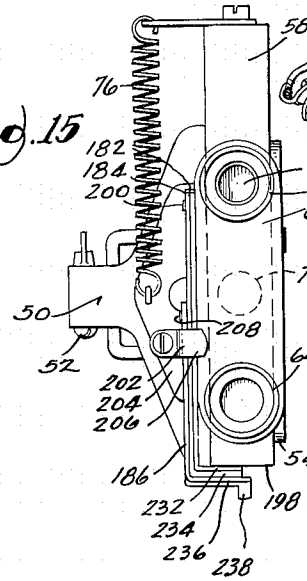


Fig. 16

Fig. 17

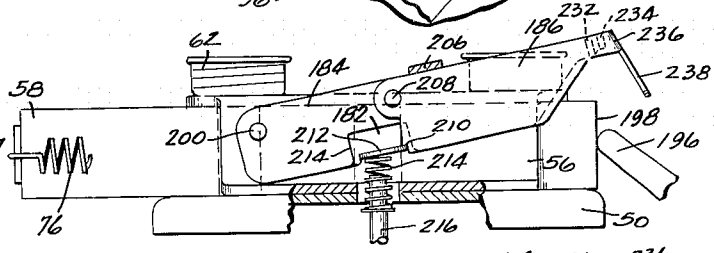


Fig. 18

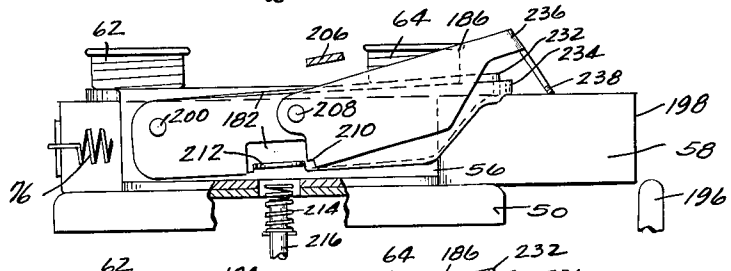


Fig. 19

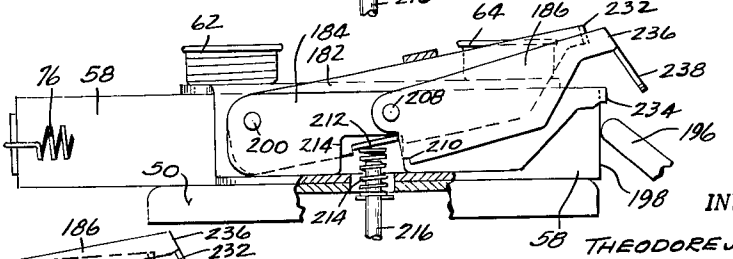
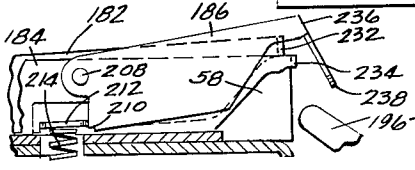


Fig. 20



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United States Patent Office 3,242,790 Patented Mar. 29, 1966

3,242,790

SHOTGUN SHELL RELOADER

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Filed Jan. 24, 1963, Ser. No. 253,628
12 Claims. (Cl. 86—29)

This invention relates to a shotgun shell reloader. The present device is an improvement upon a reloader disclosed in my companion application Serial No. 803,754, filed April 2, 1959, now Patent No. 3,105,408.

A base supports a table upon which a shotgun shell is positioned at successive locations while work is performed thereon by tools mounted on a tool carrier which is vertically reciprocable on a column rising from the base. The carrier is operated by a hand lever which is pivoted to the carrier and linked to the base.

In a first operation the shell is de-primed and re-sized. At another station, a new primer is pressed into place and as the die is being retracted a charge of powder is delivered into the shell. These two operations differ from those disclosed in my prior application above identified.

In the next successive descent of the tool carrier at the same station, wads are rammed above the powder and, as the die is being retracted, shot is delivered above the wad. This is also specifically different from the disclosure of my prior application.

The crimping which follows in the next operation is performed in a single step, this also being a novel feature, as is the ejection of the completed shell.

A major feature of novelty is the simple and effective means whereby the machine is programmed to discharge powder and shot automatically in correct order and at correct times in the reloading procedures. The metering slide valve which passes beneath the powder and shot containers and discharges into a drop tube is essentially the same as in my former application. However, in the present device, the slide valve is subjected to spring bias in one direction. Associated with the way in which the slide valve operates, there are programming levers which coact with each other and with the valve and are controlled and actuated in the course of the movements of the carrier, the net result being to operate the valve automatically in the course of carrier manipulation.

In the drawings:

FIG. 1 is a view in perspective of a shell reloading device embodying the invention.

FIG. 2 is a view of the device on an enlarged scale as it appears in side elevation with portions broken away.

FIG. 3 is a view in front elevation on the scale of FIG. 2, portions being broken away.

FIG. 4 is a view taken in transverse section on the line 4—4 of FIG. 3.

FIG. 5 is a detail view in axial section through a shell which is being de-primed and sized, portions of the table and tool carrier being shown in section, portions of one of the tools being broken away.

FIG. 6 is a detail view taken in section on the line 6—6 of FIG. 5.

FIG. 7 is a fragmentary detail view similar to a portion of FIG. 6 showing the parts in different positions.

FIG. 8 is a fragmentary detail view largely in section comparable to that of FIG. 6 but on a somewhat enlarged scale and showing the parts in different positions.

FIG. 9 is a view similar to FIG. 8 showing the parts in other positions, and with some portions in side elevation which are in section of FIG. 8.

FIG. 10 is a view similar to FIG. 9 showing the parts in still different positions.

FIG. 11 is a fragmentary detail view on the line 11—11 of FIG. 10.

FIG. 12 is a view similar to FIG. 10 showing the parts in subsequent positions.

FIG. 13 is a detail view taken in section through the crimping tool engaged in a crimping operation, the shell being partially in elevation and partially in section.

FIG. 14 is a detail view partly in section and partly in side elevation showing shell ejection from a sleeve in which it is supported during crimping.

FIG. 15 is a plan view of the apparatus with the powder and shot receptacles removed.

FIG. 16 is an enlarged perspective view of the upper portion of the apparatus with the receptacles removed.

FIG. 17 is a detail view of programming levers as they appear in side elevation, portions of the structure being broken away.

FIG. 18 is a view similar to FIG. 17 showing the parts in different positions.

FIG. 19 is a view similar to FIGS. 17 and 18 showing the parts in different positions.

FIG. 20 is a fragmentary view similar to a portion of FIGS. 17 to 19 but illustrating the parts in different positions.

The base 22 includes legs 24 which support a table 26. Extending through the table and projecting thereabove is a column 28 which is of non-circular cross section, being illustrated as square for the purposes of the present disclosure.

Vertically reciprocable upon the column 28 is the tool carrier 30 which has an opening corresponding in cross section to the cross section of the column, to provide a bearing at 32 thereon. The carrier has another bearing 34 which is provided by the inverted channel 36. The flanges of this channel are embraced between bifurcated leg portions 38 of a hand lever 40. The lever is pivoted to the carrier by means of a pintle bolt 42 which spans the two side flanges of the channel 36 as clearly appears from FIGS. 1 and 6. At the rear end of the hand lever 40, the legs 38 are connected by a pivot bolt 44 with links 46 which are pivoted by means of bolt 48 to the lower end of the column 28 (FIGS. 2 and 6).

A plate 50 is invertibly pivoted to the upper end of the column by means of pintle bolt 52. An upstanding flange 54 cooperates with the angle 56 secured to the plate to provide a way in which the metering valve 58 is reciprocable. To the flange 60 of angle 56 are attached apertured caps 62, 64 with which the containers 66, 68 are detachably connected to dispense powder and shot. The metering slide 58 has pockets 70 and 72 as disclosed in my companion application above identified. In FIG. 15, pocket 70 is registering with the apertured cap 62 to receive powder. When the metering slide 58 reciprocates under the bias of its spring 76 to its other extreme position, the pocket 72 will receive shot from the apertured cap 64 of the container 68 while the pocket 70 will now register with the drop tube 74 as shown in FIG. 6. As best shown in FIG. 3, a stop screw 75 connected with the slide moves in a slot 77 of the way to define the extreme positions in which the respective pockets of the slide register with the drop tube. Actually, the stop is not required in the position of the parts shown in FIG. 3 since the movement of the slide to the right as viewed in FIG. 3 is effected by the finger 196 of lever 180 as hereinafter described and its position is then determined by the arm 232 (FIGS. 15 and 16). However, when the stop arm 232 is out of the way and the slide is moved under the bias of spring 76 in a direction which is toward the left in FIG. 3 (to the right in FIG. 18), the finger is out of contact with the slide in the final position of the parts and the slide position is determined by the stop screw 75 in contact with the way at the lefthand end of slot 77.

The purpose of making the plate 50 invertible along with the containers 66 and 68 is, as explained in the com-

panion application above identified, to enable containers to be attached and detached without spillage of their contents. When the plate **50** is inverted, the containers **66** and **68** are at least nearly right side up so that, in screwing them into the caps **62** and **64** or withdrawing them from those caps, the contents will remain in the container.

The drop tube **74** is carried by bracket **78** from the column **28**, where it remains in fixed position with respect to the column. It has a flared upper end **80** which receives the funnelling downwardly embossed portion **82** of the way when the invertible plate **50** is restored to its normal position shown in FIG. 6.

The tool carrier **30** is normally elevated by compression spring **82** which conveniently encircles the column **28** and is compressed when the carrier is forced downwardly against the bias of such spring by the hand lever **40** as shown in FIG. 6.

Fixed in the carrier is a tubular ram **84** in which the lower end of the drop tube **74** is telescopically received. The functions of the tube **74** and the ram **84** will hereinafter be described. For the present, it is desired to note only that the ram acts as an extension of the drop tube.

The various tools used in the operation of reloading will now be described.

In FIG. 5 I have shown the shell **90** in a position on the table **26** over the aperture **92** with which the table is provided. The shell **90** comprises a cardboard shell case **94** and a metal ferrule **96** commonly made of brass. As the tool carrier **30** is caused to descend, a sizing die **98** supported from the carrier by means of sleeve **100** moves downwardly about the outside of the shell case **94** while the floating inner die **102** enters the interior of the shell. The die **102** is suspended adjustably by means of bolt **104** from the carrier **30**. The bolt is reciprocable through a secondary interior sizing die **106** which is fixed to the carrier. At its lower end the interior die **102** carries a punch **108** which ejects the spent primer **110** as shown in FIG. 5. A box **112** is positioned to receive the spent caps as they fall through the opening **92** in the table.

The interior die **102** and punch **108** will normally hang well below the exterior sizing die **98** as shown in FIG. 1. However, the resistance of the cap may cause the die **102** to dwell during continued descent of carrier **30** until die **102** is struck by the lower end of secondary inner die **106** as shown in FIG. 5, whereupon the primer cap **110** will necessarily be ejected. Meantime, the shell case and ferrule will have been re-sized by the tools described.

The operator then releases the handle and the carrier will then rise to the position of FIG. 1. Either by means of the bias of spring **82** or by manipulation of handle **40** by the operator, it is necessary, in order to eject the sized shell from the sizing die **98**, that the plunger **104** shall strike sharply against the stop **105** which is carried by the column. As shown in FIG. 5, the plunger **104** projects materially above the threaded shank **107** and will so project when the die **102** encounters the insert in the interior of the shell. Accordingly, a sharp blow of plunger **104** on stop **105** will eject the shell.

Thereupon, the de-primed shell **90** will be moved to a second station where it rests on a yieldable table **114** which surrounds a fixed post **116** on which a live primer cap **111** has been placed as shown in FIG. 7. The table **114** has a diameter sufficient to receive the ferrule **96** of the shell **90** which is being reloaded. When the table yields under pressure exerted on the shell through means presently to be disclosed, the ferrule is forced downwardly about the live primer **111**, the primer thereby being seated in the opening provided therefor in the ferrule.

The downward pressure which engages the shell with the live primer is exerted by a free supporting sleeve **120** which is placed manually about the cardboard shell case **94** at the time it is positioned at this station. This supports the shell case against the pressure exerted by the ramming of the powder and the shot.

Extension ring **122** is made in two parts to support the guide fingers **124** for use in introducing the wads. Due to the spring fingers **124** which frictionally engage the ram **84**, the extension ring **122** tends to move up and down with the ram as shown in FIGS. 2 and 3. If desired, the ram may be provided with a shallow groove at **125** which the fingers may engage. However, this is not ordinarily necessary.

When the carrier **30** descends to the position of FIG. 6, the tubular ram enters the shell and the surrounding sleeve **120** which supports the shell. In consequence, the extension ring **122** engages the supporting sleeve **120** and is in turn engaged by the carrier to transmit thrust through the sleeve **120** to the rim of the ferrule which is thereby pressed on table **114** against the compression of the supporting spring **126** to insert the primer **111**.

As the carrier **30** moves upwardly, the metering valve slide **58** is caused by means hereinafter to be described to reciprocate to move pocket **70** which has been filled with powder from container **66** into registry with the funnel **82**, from which the powder is discharged through drop tube **74** and the tubular ram **84** into the primed shell. The body of powder accuring in the primed shell is shown at **130** in FIG. 8, the carrier being acsending as indicated by the arrow **132**. The operator will normally hold the extension ring **122** in place on sleeve **120** so that the tubular ram **84** will be withdrawn from the extension ring to permit the introduction of the wads.

As soon as the tool **84** clears the ring **122** at the mouth of the shell, the wads **134** and **136** (of any desired number and type) are placed manually within the ring **122**, where they are supported on the fingers **124**. Handle **40** is then manipulated to cause the descent of the carrier **30** from the position of FIG. 9 to that of FIG. 10 as indicated by the arrow **138** in FIG. 10. In FIG. 10, the tubular ram **84** has pushed the wads **134** and **136** home on the charge **130** of the powder. Meantime, through means hereinafter to be described, the slide valve has automatically moved to the position of FIG. 3 whereby to register its pocket **72** with the funnel **80** and drop tube **74** for discharging a charge of shot **140** on top of the wad **136**. The ascending movement of the tubular ram **84** as indicated by the arrow **142** in FIG. 12 completes the step of depositing the shot charge in the shell. In these operations, the shell **96** will be supported on the yieldable table **114** which has very limited yielding movement before it bottoms on the shoulder **144** of post **116**, shown in FIG. 11.

The shell now having been refilled with fresh charges of powder and shot and supplied with a new primer, it remains to recrimp the case **94**. The filled shell, still contained in supporting sleeve **120**, is moved manually from the yieldable table **114** on which it is shown in FIGS. 1 and 6 and 12 and is now centered over the table aperture **146** as shown in FIG. 13. The aperture **146** protects the primer against accidental firing. The part shown at **148** is a guide to facilitate accurate registration of the shell where it will not only be centered over the opening **146** but will be aligned with the tubular external crimping die **150**. This die surrounds, and rests upon, an interior crimping die **152** adjustably supported by bolt **154** from the carrier **30**. A spring seat **156** on the bolt is engaged by a compression spring **158** which supplements the weight of the die **150** in urging it downwardly until its shoulder **160** engages the die **152**. The interior shoulder **162** is engaged with the previously crimped rim of the shell case **94** to recrimp it as shown at **164** in FIG. 13.

Thereupon, as continued pressure of carrier **30** drives the inner die **152** downwardly past the shoulder **162**, the crimped portions **164** are dished inwardly as indicated at **166**, thus recessing the end of the shell in the preferred manner. It will be noted that the entire crimping and recessing operation is a single operation performed in one downward movement of the tool carrier **30**.

Upon completion of this operation, pressure on the handle **40** is released to permit the carrier to move upwardly to its FIG. 1 position whereupon the completed shell, still in its confining sleeve **120**, is moved over into registry with the larger opening **170** into which the reduced extremity **172** of sleeve **120** enters as shown in FIG. 14. Now on the next down strokes of the tool carrier **30** the ejection plunger **174** forces the completed recharged shell from the confining sleeve **120** as shown in FIG. 14.

The means for automatic operation of the metering slide will now be described.

The metering slide **58** is automatically controlled by means of an actuating lever **180** and three programming levers **182**, **184** and **186** as best shown in FIGS. 16 to 20.

The actuating lever **180** is pivoted at **188** from a bracket **190** mounted at the upper end of post **28**. Connected to one end of lever **180** is a link **192** which has a head **194** in the path of descent of the tool carrier **30**. When the tool carrier engages a head **194** at the lower end of link **192**, lever **180** is oscillated clockwise as viewed in FIG. 3 (counterclockwise as viewed in FIG. 16) to engage its finger **196** with the end **198** of the slide **58** for the reciprocation of the slide in opposition to the bias of the tension spring **76**. The movement of the slide may be relatively slight if it is already in the position shown in FIG. 16 or it may be relatively great if the slide is in the retracted position in which it is shown in FIG. 18.

At the initiation of automatic operation of the metering slide, the parts are in the position shown in FIG. 16. The levers **182**, **184** and **186** are side by side. Levers **182** and **184** are individually pivioted on a headless pin **200**, on which they are held by the retainer **202** which is screwed to base **204** of the angle **56** which contributes to the formation of the way in which the metering slide **58** is reciprocable. The overhanging finger **206** at the upper end of the retainer **202** acts as a stop to limit the upward pivotal movement of the several levers **182**, **184**, **186**.

Lever **186** is short. It is mounted on a headless pin **208**, projecting from an intermediate portion of lever **184**. The retainer **202** likewise holds lever **186** in position on its pin. At its lower margin, lever **186** has a notch which forms a shoulder **210** that engages a side margin of a tab **212** that projects rearwardly from the inner lever **182** through a notch **214** in the intermediate lever **184**.

The tab **212** receives the thrust of a light compression spring **214** mounted upon and projecting from the end of a push rod **216** which is suitably guided in openings in the carrier **30** and the table **26** and has a rounded lower end **218** resting on a bell crank lever **220** which is pivoted at **222** and has a free end portion **224** disposed beneath the yieldable annular table **114**, whereby the depression of the table will oscillate the bell crank **220** from the position of FIGS. 2, 8 and 9 to the position of FIGS. 6 and 10. Such oscillation is brought about by handle-induced lowering of tool carrier **30** acting either through the tubular ram **84**, as in FIG. 10 or through the series of sleeves **120**, **122**, as in FIG. 6, to depress the partially completed shell thereby to depress the annular yieldable table **114** against the bias of spring **126**.

The several levers **182**, **184** and **186** are respectively provided with forwardly projecting arms **232**, **234** and **236**, all of which, in the position of the parts shown in FIG. 16, extend across the end **198** of the metering slide **58** in the path of retraction thereof under bias of spring **76**. The arm **236** of lever **186** has at its remote end a downwardly depending finger **238**.

The operation is as follows:

In the position of the parts shown in FIGS. 15 and 16, the slide **58** is in its advanced position in the sense that spring **76** is tensioned. The slide is held in this position by finger **232** of the inner lever **182** which engages the end surface **198** of the slide. The slide pocket **70** is beneath the apertured screw cap **62** which supports the powder container **66** as shown in FIG. 1. The slide pocket **72** which transports the shot from the container **68** is empty at this time and is centered in registry with the drop tube. This position of the parts is also shown in FIG. 3. The spent primer has been ejected as shown in FIG. 5.

Ejection of the spent primer has not in any manner actuated any of the control mechanism because the length of link **192** in relation to the travel of the carrier is such that the finger **196** of lever **180** will only just displace slide **58**, the slide being already retracted and held by the arm **232** of programming lever **182**.

Only after the loose sleeve **120** is slipped over the shell and surmounted by the sleeve **122** as shown in FIG. 8, can there be any displacement of push rod **216**. The sequence of steps which involves the programming of the slide starts with FIG. 6, which shows the tool carrier **30** depressed by handle **40** against the bias of spring **82** to an extent such that motion is communicated through the superimposed sleeves **122** and **120** to the rim of the ferrule **96** of the shell which is being reloaded, thereby displacing the table **114** for the dual function of inserting the post-supported primer cap **111** and displacing the bell crank **220** to operate the push rod **216**.

The upward displacement of push rod **216** elevates all three of the programming levers **182**, **184** and **186**. The spring **214** at the upper end of the push rod acts primarily on the tab **212** of the inner lever **182**. At this time, the shoulder **210** of the short outer lever **186** is engaged with the tab as shown in FIG. 17. Consequently, the outer lever **186** is lifted. Since the shoulder is virtually directly beneath the pin **208** on which the outer lever **186** is pivoted to the intermediate lever **184**, the intermediate lever is also lifted. Thus all three levers are elevated out of the path of the slide **58**, an operation which is facilitated by the fact that the arms of the several levers are all relieved of slide pressure by a slight advancing displacement of the slide to the left as viewed in FIG. 17 by engagement of the finger **196** of lever **180** with the end surface **198** of the slide.

When the operator permits the hand lever **40** to move upwardly with the tool carrier under bias of spring **82**, the resulting clockwise oscillation of lever **180** removes its finger from in front of the slide, thus permitting the slide to be retracted by its spring **76** from the position of FIG. 17 to that of FIG. 18. In this movement the slide is controlled by finger **196** of lever **180**, the slide moving only as fast as the finger is withdrawn in consequence of the rise of tool carrier **30**.

As the slide is retracted, it moves beneath the arms **232** and **234** of the inner and intermediate programming levers **182** and **184** so that the arms rest on top of the slide as shown in FIG. 18 without impeding its continued movement to the right. The short outer lever **186** is cammed upwardly and held in a raised position by engagement of the slide **58** with the depending finger **238**. This elevation of the outer lever frees the shoulder **210** from the tab **212** so that the intermediate lever **184** is no longer supported from the tab **212** of the inner lever **182**. The whole purpose of the short outer lever **186** is to function as a trigger for the release of the intermediate lever so that, the inner lever **182** being still supported by pressure on tab **212**, the intermediate lever will drop down where its arm **234** will engage and retain the slide as shown in FIG. 19 and described below, after the slide returns to its extreme advanced position.

In FIG. 18, the slide is in its extreme righthand (retracted) position in which the powder metering pocket **70** registers with the drop tube **74** to release the powder into the shell as shown in FIG. 8. Such release occurs during completion of the slide retraction movement and upward movement of the carrier and handle. At the same time, the shot metering pocket **72** has moved from the position of FIG. 15 and FIG. 6 to a position in which

it now registers with the aperture cap 64 and shot container 68 to receive a charge of shot.

It will be remembered that the operator now places the wads 134 and 136 beneath the annular ram tube 84 as shown in FIG. 9, thereupon operating the hand lever 40 once more to force the tool carrier downwardly to engage the wad with the powder as shown in FIG. 10. The pressure on the shell which is being re-loaded displaces the annular table 114 again to exert pressure on the bell crank 220 as shown in FIG. 10. This will raise the push rod 216 but the raising thereof is ineffective since, as shown in FIG. 18, the several programming levers are already elevated. However, the downward movement of the tool carrier 30 operates the link 192 to oscillate lever 180 thereby to engage the finger 196 of that lever with the end 198 of the slide 58 to move the slide from the position of FIG. 18 to the position of FIG. 19. The shot measuring pocket 72 now registers with the drop tube and the charge of shot is discharged into the ram tube 84 as shown in FIG. 12. As soon as the ram tube starts up, the shot will be released onto the wads within the shell.

In the FIG. 19 position of the parts, the inner programming lever 182 is being held up by the spring 214 at the end of push rod 216. The outer programming lever 186 is being held up by engagement with the side of the tab 212. However, the intermediate programming lever 184 has nothing to hold it up and its arm 234 engages with the end 198 of the slide 58 to hold the slide in this position.

The sequence of operations of the slide is now completed but the programming levers cannot resume the position of FIG. 16 for the moment because the arm 232 of the inner programming lever 182 still rests on top of the slide 58 and this prevents the short outer programming lever 186 from having its shoulder 210 engaged with tab 212. However, the next time the hand lever 40 is operated, as for ejection of the re-loaded shell as shown at FIG. 14, the carrier 30 engages the head 194 of the link 192 to oscillate the lever 180 just sufficiently so that finger 196 will nudge the slide 58 slightly to the left as viewed in FIGS. 19 and 20, thereby permitting the arm 232 to drop in the path of the slide, whereupon all of the levers will be restored to their FIG. 16 positions.

It will be observed that the presence of a shell beneath the drop tube and the tubular ram which serves as an extension thereof is a prerequisite to discharge of either powder or shot. The charge metering slide is restrained by the programming levers in a position in which it cannot move toward the point of delivery unless the program levers are first actuated from the metering slide by means of push rod 216. The push rod does not operate except by the displacement of the table 114 and this happens only when a shell is pushed downwardly against the table either by pressure of the carrier communicated thereto through the extension ring 122 and sleeve 120 (FIG. 6) or by pressure of the tubular ram 84 upon the wads 136, 134 and the powder charge 130 (FIG. 10). Even then, the powder is not released at the time of pressure but is released on the back stroke of the carrier as shown in FIG. 8.

Similarly as to the charge of shot, it is the downward movement of the ram 84 as in FIG. 10 which, in the state of the programming levers shown in FIG. 19, permits the finger 196 to move the slide to a position for discharging the metered charge of shot into the tube 84, from which the shot is released when the tube is retracted as shown in FIG. 12.

Thus the entire functioning of the metering slide is automatic. No charge can be delivered accidentally nor does the operator have to manipulate the slide consciously, all operations of the slide being dependent upon manipulation of the various tools used in re-loading operation.

I claim:

1. A shotgun shell reloader comprising a base having a resiliently yieldable table provided with mounting means for accommodating yielding movement and upon which may be supported a shotgun shell to be reloaded, a tool carrier movable to and from the table, a drop tube centered above the shell for delivery of a charge of powder thereto, a powder container offset from the drop tube, a metering slide having a powder receiving pocket and movable forth and back between positions of registry of said pocket with said container and with said drop tube, means for moving the slide, table actuated means for controlling slide movement, and means for communicating motion from the carrier through a shell in said table to said table and for thereby controlling the movement of said slide.

2. A shotgun shell reloader according to claim 1 in which said last mentioned means includes a ramming extension of said drop tube connected with said carrier and constituting a tool.

3. A shotgun shell reloader according to claim 1 in which said last named means includes a sleeve encircling said shell and an extension ring also encircling the shell and interposed between the sleeve and the carrier for transmitting motion of the carrier to said table.

4. A shotgun shell reloader according to claim 1 in which the means for controlling slide movement includes at least one programming lever having an arm normally interposed in the path of movement of the slide, and a push rod having a lever connecting it with said table to elevate the rod when the table is depressed by communication of motion thereto through the shell from the carrier, said push rod having means for displacing the programming lever from the path of the slide.

5. A shotgun shell reloader comprising the combination with powder and shot containers, of a drop tube intermediate the containers, a slide having powder and shot metering pockets selectively registrable with respective containers and with said drop tube, means for supporting a shell to be loaded, a tool carrier reciprocable to and from said means, mechanism for actuating said carrier to and from said means, a drop tube extension receivable into a shell and mounted on said carrier and telescopically associated with said drop tube for guiding into such shell charges of powder and shot released by said metering slide into said drop tube, a spring biasing said slide for movement in one direction, means including a lever for actuating said slide in the opposite direction against the bias of said spring, motion transmitting connections from said carrier to said lever for operating said slide in one direction in the course of downward movement of the carrier and for controlling the movement of the slide in the opposite direction under bias of said spring, means for automatically programming movement of the slide in accordance with movements of said carrier and means for transmitting actuating motion from said carrier to said programming means through a shell on said supporting means.

6. A loader in accordance with claim 5 in which said programming means includes first, second and third levers having arms interposed in the path of said slide in opposition to movement thereof by said spring, a tab on one of said levers, said shell supporting means being provided with resiliently yieldable mounting means and having mechanism including a push rod for engaging the tab to elevate said one lever upon displacement of the shell supporting means, means for communicating motion from said one lever to the second and third levers, said second and third levers constituting means for requiring a predetermined sequence of operations of said slide and for the restoration of said levers to their initial positions respecting said slide upon completion of said sequence.

7. A shotgun shell reloader comprising a base having a resiliently yieldable table provided with mounting means for accommodating yielding movement and upon which

may be supported a shotgun shell to be reloaded, a tool carrier movable to and from the table, a drop tube centered above the shell for delivery of a charge of powder thereto, a powder container offset from the drop tube, a metering slide having a powder receiving pocket and movable forth and back between positions of registry of said pocket with said container and with said drop tube, means for moving the slide comprising a spring biasing it for movement in one direction and a first lever provided with a terminal finger engageable with the slide in opposition to the spring, and lost motion means for actuating the lever from the carrier when the carrier has advanced the tool toward said table, table actuated means for controlling slide movement including at least one programming lever having an arm normally interposed in the path of movement of the slide, and a push rod having another lever connecting said rod with said table to elevate the rod when the table is depressed by communication of motion thereto through the shell from the carrier, said push rod having means for displacing the programming lever from the path of the slide, and means for communicating motion from the carrier through a shell in said table to said table and for thereby controlling the movement of said slide.

8. A shotgun shell reloader according to claim **7** in which the lost motion means for actuating the lever comprises a headed link, the carrier having an apertured portion and the lever having an apertured portion and said link extending through said portions and having freedom of movement through at least one of them until its head limits such freedom of movement.

9. A shell reloader comprising a shell support, a tool, means for moving said tool into engagement with a shell received in said support, means including said tool for performing a first operation on a shell received in said support in response to engagement of said tool with the shell, means including said tool for metering and delivering a charge of powder into a shell received in said support, and means including said tool for programming said metering and delivering means, said programming means being dependent upon the presence of the shell received in said support and the engagement of said tool with the shell received in said support.

10. A shell reloader comprising a shell support including a table and means yieldably mounting said table, a tool for conditioning a shell received in said support, said tool including a tubular ram having a drop tube, means for moving said tool into shell engagement, means for metering and delivering a charge of powder into a shell received in said support, said metering and delivering means comprising a powder container offset from said drop tube, a metering slide having a pocket selectively registerable with said container and said drop tube, and means for operating the slide including motion transmitting connections from said table for controlling the operation of said slide in response to movement of said table, and means for programming said metering and delivering means, said programming means being dependent upon the operation of said tool and the presence of a shell received in said shell support.

11. A shell loader comprising a support for receiving a shell, a manually operable tool movable relative to a shell on said support, a metering slide, means providing a way in which the slide is reciprocable, powder and shot containers for which the way provides openings, the slide having metering pocket means selectively registrable with said openings, the way being further provided with a third opening intermediate the powder and shot receiving openings and with which the metering pocket means is selectively registrable, means for effecting reciprocation of said metering slide in one direction including a spring for actuating the slide, a first lever, and motion transmitting means from said tool to a shell on said support and then from the shell on said support to said first lever for movement thereof in accordance with the operation of the tool to permit actuation of said slide by said spring in said one direction, and mechanism including a second lever for actuating the slide in the opposite direction.

12. A shell loader according to claim **11** in combination with means for controlling the operation of the slide and including a set of first, second and third programming levers beside the way, at least the first and second such levers including arms respectively projecting laterally across the path of movement of the slide in opposition to slide actuation by said spring, the first of said programming levers including a laterally projecting tab, the second program lever having a notch from which said tab projects, and the third programming lever being pivoted upon the second programming lever and having a shoulder normally engaged laterally with said tab, the pivotal connection between the second and third programming levers being substantially directly above said shoulder, and means for exerting upward pressure on said tab for lifting all three of said levers, the third programming lever having cam means in the path of movement of said slide for elevating said third lever sufficiently to clear said shoulder from said tab whereby to permit the second programming lever to fall toward its initial position, whereby its said arm of the second programming lever will engage said slide to restrain its movement notwithstanding that the first said lever is in a position in which its said arm cannot do so.

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