Oct. 9, 1962 A. E. BEHRENS 3,057,247

METHOD OF AND APPARATUS FOR RELOADING SHELLS

Filed Aug. 13, 1959 4 Sheets-Sheet 1

Fig. 1.

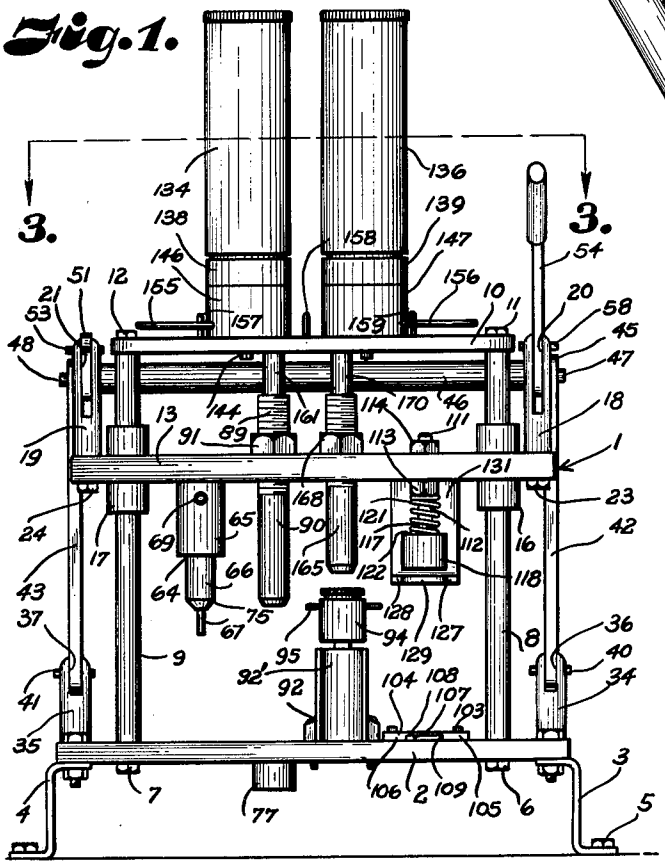


Fig. 2.

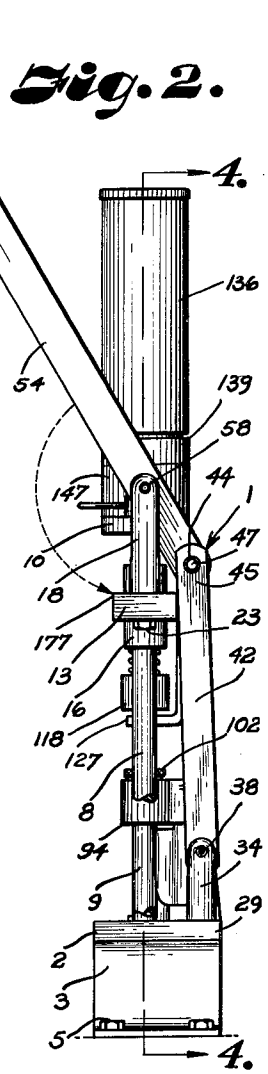
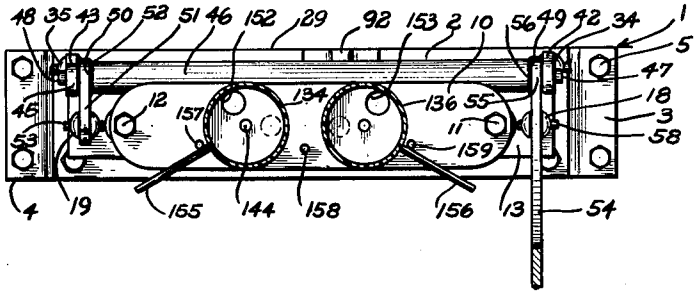


Fig. 3.



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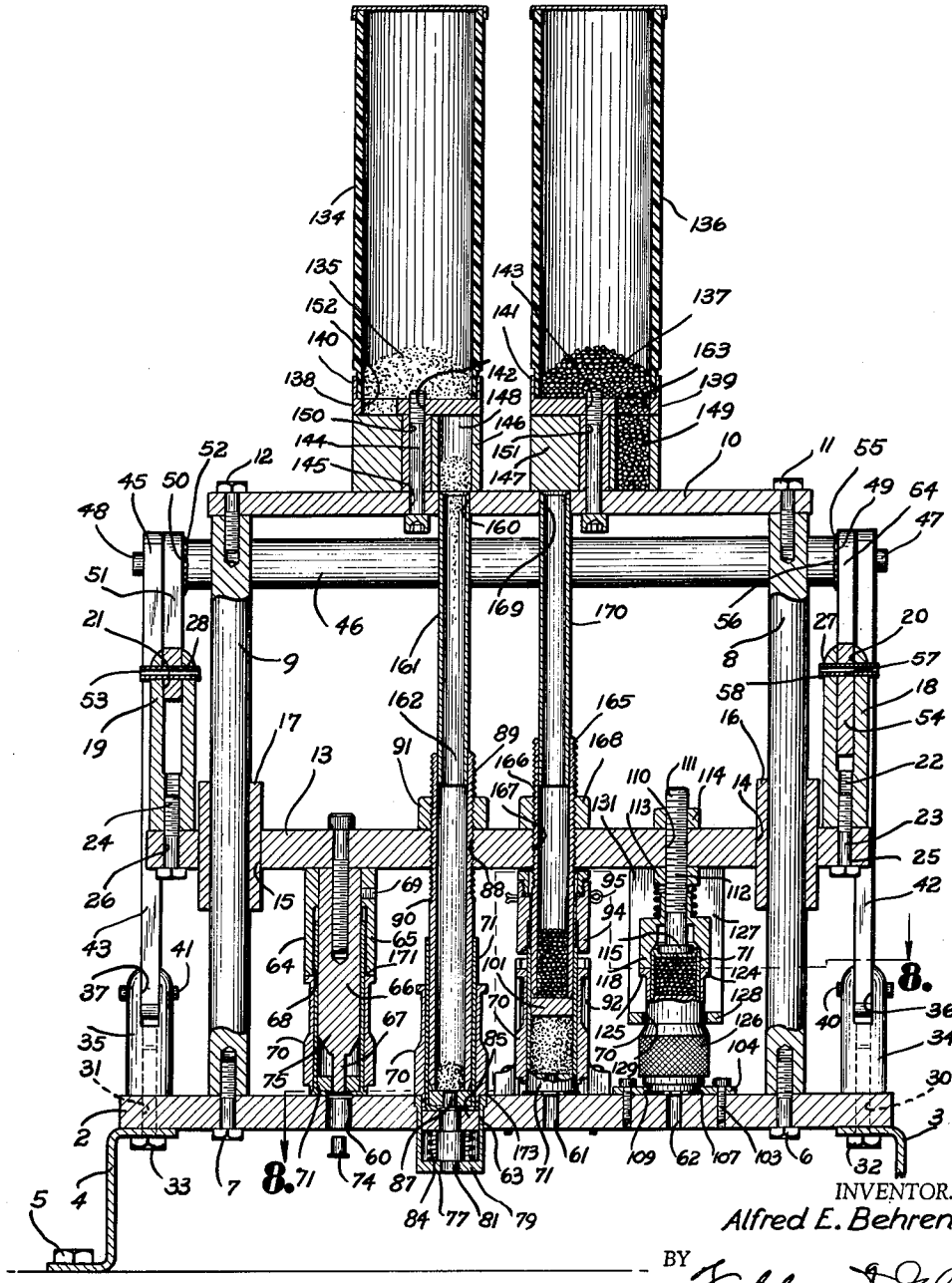
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METHOD OF AND APPARATUS FOR RELOADING SHELLS

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Fig. 4.



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METHOD OF AND APPARATUS FOR RELOADING SHELLS

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Fig. 5.

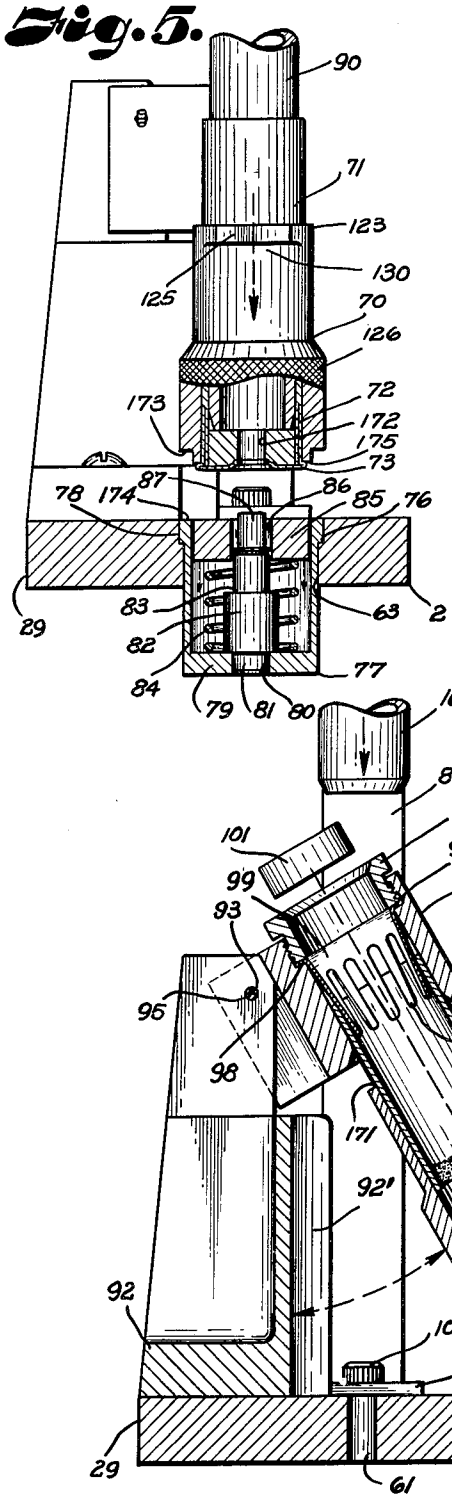


Fig. 7.

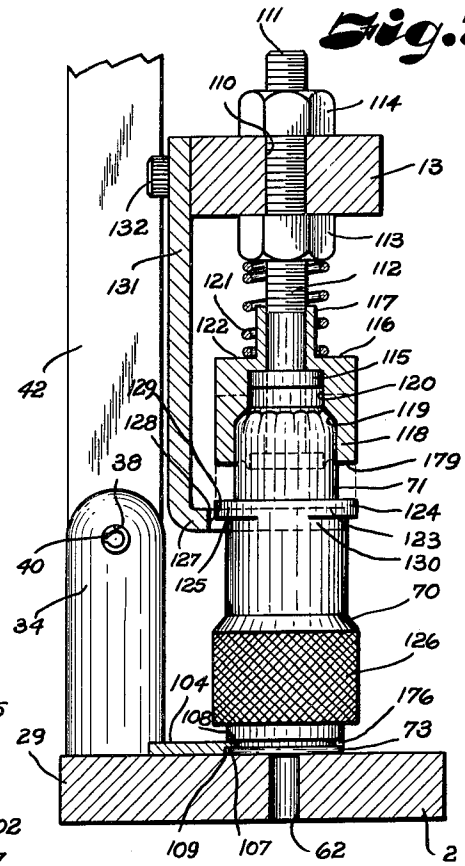


Fig. 6.

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Fig. 8.

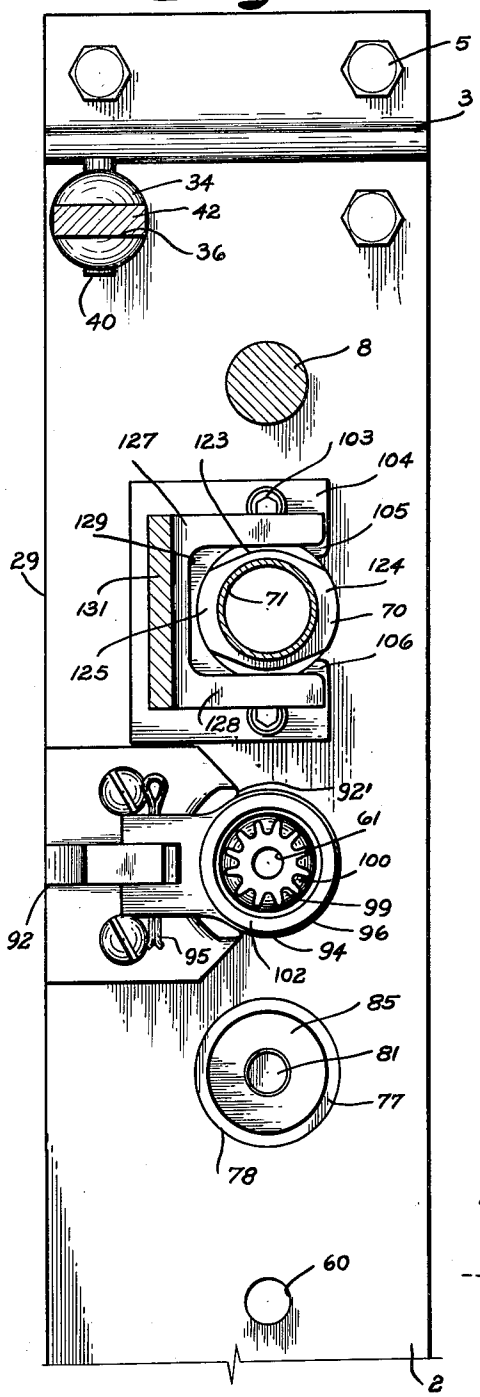


Fig. 9.

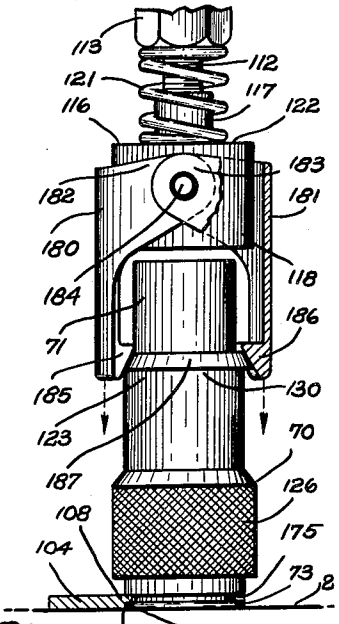
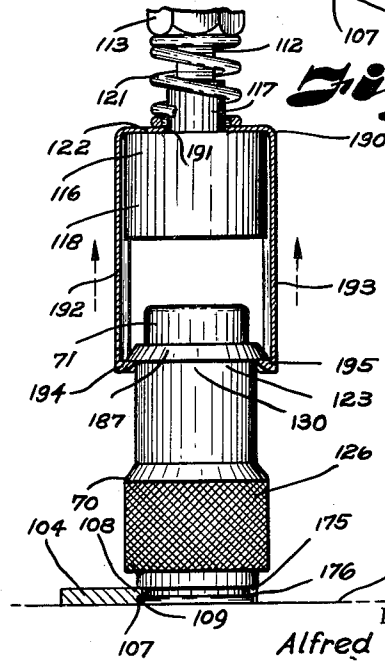


Fig. 10.



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United States Patent Office 3,057,247 Patented Oct. 9, 1962

3,057,247

METHOD OF AND APPARATUS FOR RELOADING SHELLS

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Filed Aug. 13, 1959, Ser. No. 833,471
1 Claim. (Cl. 86—25)

This invention relates to a method of and apparatus for reloading shells, and more particularly to the reloading of shotgun shells having paper casing and a crimped end for retaining the load in the shell.

With present day apparatus for reloading of shells there has been a problem in removal of the primer, repriming of the shell and removal of the shell from the shaper sleeve after the shell has been reloaded and crimped. Various apparatus have been devised for such purpose, but none has proven satisfactory.

It is, therefore, a principal object of the present invention to provide a torsion bar leverage mechanism for operating plungers for the removal of the old primer and inserting a new primer and simultaneously partially removing the shell from the shaper sleeve so that when the shell is finally reloaded and the end crimped the metal rim of the shell may be engaged for removal of the shell from the shaper sleeve or holder.

Other objects of the present invention are to provide a base plate having spaced posts vertically thereof with a sliding head sleeved on the posts and the sliding head having spaced posts to which are pivotally mounted a link and handle mechanism for mounting arms pivoted on the base plate whereby the sliding head may be raised and lowered on the posts on the plate in a straight line; to provide a shaper sleeve or holder for the shell; to provide a plunger depending from the sliding head for engaging in the shell when held by the shaper sleeve or holder to reshape the wall of the shell and simultaneously removing the old primer from the shell; to provide removable means in the base plate cooperating with a sleeve carried by the sliding head for inserting a new primer and partially withdrawing the shell from the shaper sleeve or holder and for loading the powder in the shell; to provide a vertically pivoted sleeve for engaging the shell and packing a wadding in the shell on top of the powder by a plunger carried by the sliding head and placing the shot on top of the wadding; to provide means on the base plate for engaging the metal rim of the shell and holding it in place while the crimped end of the shell is turned over and again crimped for holding the shot in place in the shell, and whereby turning of the shaper sleeve or holder the shell may be withdrawn therefrom by engagement of said shaper sleeve with two pivoted jaws also carried by a rod extending or depending below said sliding head whereby the shaper sleeve is raised from the shell upon raising of the handle and thereby raising of said sliding head; and to provide a device of this character simple and economical to manufacture.

Other objects of this invention are to provide a container assembly and dispensing means for the powder and shot in measured quantities to the shell.

In accomplishing these and other objects of the invention, including the method of reloading shotgun shells, I have provided improved details of structure, the preferred forms of which are shown in the accompanying drawings, wherein:

FIG. 1 is a front view of my apparatus for reloading shells with the sliding head in raised position.

FIG. 2 is an end view with parts broken away to better illustrate the invention.

FIG. 3 is a sectional view of the apparatus taken on a line 3—3, FIG. 1.

FIG. 4 is a cross-sectional view taken on a line 4—4,

FIG. 2, particularly illustrating the withdrawal of the primer from the shell and the subsequent steps of inserting the new primer, tamping the wadding, loading of the shot, and the final step of engagement of the metal rim of the shell for withdrawing the shaper sleeve therefrom.

FIG. 5 is an enlarged cross-sectional view particularly illustrating the insertion of a new primer and the spring means for partially removing the shell from the shaper sleeve.

FIG. 6 is an enlarged sectional view particularly illustrating the pivoted sleeve member for packing the wadding on top of the powder by operation of the plunger carried by the sliding head.

FIG. 7 is an enlarged partly cross-sectional view particularly illustrating the shaper sleeve and the plunger carried by the sliding head for crimping the end of the shell.

FIG. 8 is an enlarged fragmentary cross-sectional view taken on a line 8—8, FIG. 4.

FIG. 9 is an enlarged partly cross-sectional view of a modified form for removing the shaper sleeve illustrating the rim for engagement by jaws mounted on the sliding head.

FIG. 10 is an enlarged partly cross-sectional view of a further modified form for removing the shaper sleeve from the shell.

Referring more in detail to the drawings:

1 designates a shell reloader apparatus embodying the features of my invention comprising, a base plate 2 mounted on brackets 3 and 4 adapted for being secured to a support by bolts or the like 5 for supporting the plate 2 above such support.

Secured to the base plate 2 by stud bolts or the like 6 and 7 are spaced vertical standards 8 and 9 connected by a cross plate 10 and secured thereto by stud bolts 11 and 12. A sliding head 13 is provided with spaced openings 14 and 15 for receiving vertical sleeves 16 and 17 swedged or otherwise suitably secured in said opening. The standards 8 and 9 are engaged in said sleeves 16 and 17 and the sliding head 13 is slidable vertically thereon.

Mounted on the outer ends of the sliding head 13 are posts 18 and 19 having bifurcated ends 20 and 21. The lower ends of the short posts are bored and provided with threads 22 for receiving stud bolts 23 and 24 extending through openings 25 and 26 in the ends of the sliding plate or head for holding the short posts 18 and 19 in vertical alignment with the posts 8 and 9. The bifurcated ends 20 and 21 are provided with transverse aligned openings 27 and 28 for a purpose later described.

The base plate 2 is substantially flat and has a rear edge 29. Located near the respective rear corners of the base plate are openings 30 and 31 for receiving stud bolts 32 and 33 for engaging in threaded bores (as shown in dotted lines) of studs or posts 34 and 35 having bifurcated ends 36 and 37 provided with transverse aligned openings.

Pivotally mounted in the bifurcated ends 36 and 37 of the studs 34 and 35 by pins 40 and 41 are links 42 and 43 provided with openings 44 at their upper ends 45 in which is adapted to rotate a shaft 46. The ends 47 and 48 of the shaft are offset forming shoulders 49 and 50. A short link 51 has one end engaging over the reduced end 48 of the shaft between the link 43 and the shoulder 50 and is welded or otherwise rigidly secured to the shaft as indicated at 52. The other end of the link 51 engages in the bifurcated end 21 of the post 19 and is pivotally connected thereto by a pin 53 extending through the opening 28. A handle or lever 54 is provided for raising and lowering the sliding head 13 and it has one end 55 engaging over the reduced end 47 of the shaft 46 and welded or otherwise rigidly secured

thereto as indicated at 56. Spaced from the end 55 of the handle or lever is an opening 57 and the handle is adapted to engage between the bifurcated end 20 of the post 18, the opening 57 aligning with the opening 27 in the bifurcated end and the lever is held therein by pin 58. While I have here shown the lever or handle 54 to be on the right side of the frame structure, it could also be on the left side by transferring the link 51 to the right side of the structure.

The base plate 2 is provided with spaced longitudinally aligned openings 60, 61, 62 and a larger opening 63 for a purpose later described. Rigidly secured to the underside of the slidable head 13 in vertical alignment with the opening 60 in the base plate is a shaper member 64 including a sleeve 65 surrounding a plunger shaft 66 having a reduced end 67. The sleeve 65 is counterbored forming a space 68 around a portion of the plunger shaft 66. The sleeve 65 is secured to the shaft 66 by a set screw or the like 69.

70 designates a shaper sleeve or shell holder having an inner diameter substantially equal to the outer diameter of a shotgun shell 71. The shell includes a metal end or casing 72 having a rim or flange 73 on its end and a center primer 74. The walls of the shells are paper, cardboard or the like and the shell is adapted to engage in the holder 70, and when in the holder the shell is sleeved over the end 75 of the shaft 66, and when the handle is moved downwardly the sliding head 13 will move the plunger shaft into the shell to reshape the shell by inserting the same in the space 68 between the shaft 66 and the sleeve 65 and the reduced end 67 simultaneously ejecting the old primer 74 from the shell as shown in FIG. 4.

The larger opening 63 in the base plate is counterbored forming a shoulder 76 and a sleeve member 77 having an annular flange 78 is adapted to engage in said opening and the flange engaging against the shoulder 76 to prevent the sleeve from falling through the opening. The sleeve 77 includes a bottom 79 having a center opening 80 in which is mounted an upwardly extending stem 81 having an enlarged portion or collar 82 spaced from the lower end and engaging against the bottom 79. The collar forms a shoulder 83 and surrounding the collar and stem is a coil spring 84 having its upper end engaging against a washer 85 slidable on the stem 81. When the washer is held in normal position by the spring 84, as illustrated in FIG. 5, a socket or chamber 86 is provided for receiving a new primer 87.

The sliding head 13 is provided with a threaded opening 88 in alignment with the opening 63 in the base 2 adapted to receive the threaded end 89 of a sleeve 90 of substantially the same outer diameter as the inner diameter of the shell 71. The sleeve 90 is adjustably held in the sliding head 13 by a nut 91.

Mounted rearwardly of the opening 61 is an upstanding bracket 92 having an opening 93 near its upper end for pivotally mounting a wad guide or sleeve-like member 94 by a pin 95. The forward face of the bracket is substantially semicircular in shape as indicated at 92' to fit the contour of the shell holder 70. The wad guide consists of a sleeve 96 counterbored forming a shoulder 97 for receiving a rim or flange 98 of a guide member 99 having a plurality of inwardly inclined spaced flexible fingers 100, as best illustrated in FIG. 8, for guiding a wad 101 into the shell as will later be shown. A threaded ring 102 engages in the threaded counterbore for holding the guide member 99 in the sleeve 96.

Mounted on the base plate 2 between the bracket 92 and the post 8 by set screws or the like 103 is a U-shaped plate 104 having forwardly extending arms 105 and 106 forming a socket 107 between said arms. The socket is recessed forming a flange 108 entirely around the socket portion which, together with the base plate, forms a groove 109 for receiving the rim 73 of the metal portion of the shell 71. The opening 62 in the base plate 2 is centrally of the socket portion of the plate 104.

The sliding head 13 is provided with an opening 110. Aligning with the opening 62 in the base plate and adapted to engage therein is the threaded end 111 of a rod or plunger 112 depending towards the base plate. The rod is adjustable in the sliding head by a nut 113 on the underside of the sliding head and a nut 114 on the upper side thereof. The rod 112 has a head 115 on its lower end, and a crimping sleeve 116 surrounds said headed end of the rod 112 as best illustrated in FIG. 7. The crimping sleeve includes a neck 117 through which the rod extends and a socketed lower end 118 having a tapered annular inner wall 119 and a cylindrical portion 120 in which the head 115 of the plunger is adapted to move. The socket 118 includes a straight cylindrical portion below the tapered portion having an inner diameter substantially the same as the outer diameter of the paper shell. A coil spring 121 surrounds the neck 117 of the crimping member and has one end engaging against a shoulder 122 thereof and its other end against the nut 113 to hold the crimping member in extended relation with respect to the rod 112 when in normal position.

The shaper sleeve or shell holder 70 is provided on its upper end 123 with outwardly extending ribs or flanges 124 and 125 and a knurled collar 126 for ease of handling and turning of the sleeve. Adapted to engage the flanges or ribs 124 and 125 is a jaw member 127 comprising a fork-like portion 128 providing a U-shaped opening 129 for engaging around the neck portion 130 (FIGS. 7 and 8) of the shaper sleeve 70. The jaw member 127 includes a vertical portion 131 extending upwardly towards the head 13 and is secured to the rear side thereof by bolts 132. Downward movement of the sliding head 13 will slide the jaw member 127 over the neck portion 130 of the shell holder with the flanges 124 and 125 in a position as shown in FIG. 8. A 90° rotation of the shell holder will bring the flanges in an overlapping relation with the fork-like portion 128 for a purpose later described.

Mounted on top of the cross plate 10 is a container 134 for powder 135 and a container 136 for shot 137. The containers 134 and 136 are detachably mounted in plate members 138 and 139 having upwardly extending flanges 140 and 141. The plate members 138 and 139 have threaded openings 142 and 143 for receiving the threaded ends of bolts or the like 144 extending through openings 145 in the cross plate 10. Spacing and measuring members 146 and 147 are provided between the cross plate 10 and the plates 138 and 139 having cylindrical chambers 148 and 149. The spacer members are also provided with longitudinal openings 150 and 151 through which the bolts 144 extend. The plates 138 and 139 are provided with openings 152 and 153 of substantially the same diameter as the chambers 148 and 149 in the spacer members. The spacer members are rotatably mounted on the cross plate 10 and are provided with pins or levers 155 and 156, and mounted in the cross plate 10 adjacent the spacer members are pins 157, 158 and 159 forming stop members for the levers 155 and 156 whereby the chambers 148 and 149 in the spacer members 146 and 147 may be aligned with the openings 152 and 153 in the stationary plates 138 and 139 for receiving the amounts of powder and shot defined by the size of the chambers 148 and 149 for the shells respectively. The amounts of powder and shot for the shells is measured by the height of the spacer and measuring members 146 and 147. When the lever on each measuring member is turned to fill the measuring chamber they are again turned to close the openings 152 and 153 so that when a charge is dispensed only a measured amount of powder or shot will move into the shell as shown in FIG. 4. By changing the spacer members for a longer chamber or a shorter chamber the amount of powder and shot is adjusted for each shell.

The cross plate **10** is provided with an opening **160** aligning with the opening **88** in the sliding head **13**. Swedged or otherwise suitably secured in said opening is a tube or spout **161** having its lower end **162** engaging in the tubular member **90** threaded into the opening **88**, and the lower end **162** of the spout **161** is slidable in the tubular member **90** when the head is raised and lowered.

Aligning with the threaded ring **102** and the wad guide sleeve **96** when in a vertical position (FIG. 4) is a tubular member **165** mounted in the sliding head **13** similar to the tubular member **90**. The tubular member **165** has a threaded portion **166** adapted to engage the threaded opening **167** in the head **13**. A lock nut **168** is provided on top of the sliding head **13** for adjusting the length of the tube **165** having its lower end movable through the ring **102** and wad guide **96** for movement of the wad **101** and tamping the same on top of the powder as indicated in FIG. 4. The cross plate **10** has an opening **169** aligning with the tube **165** in the slidable head **13** and a tube or spout **170** is swedged or otherwise suitably secured in said opening and has its lower end slidably engaging in the upper end of the tubular member **165**. The tubular members **161** and **170** are substantially the same diameter as the chambers **148** and **149** in the measuring spacers **146** and **147**.

Operation of apparatus and practice of the method therewith with such apparatus assembled as described is as follows:

The spent or used shell **71** is placed within the shaper sleeve or holder **70**, the open end extending through the open end **171** of the shaper and the open end of the shell over the shank or rod **66** depending from the sliding head **13**. Operation of the lever **54** in a downward direction will cause the shank or plunger **66** to straighten the paper walls of the shell and continued downward movement will cause the reduced end **67** of the plunger to eject the primer **74** therefrom through the opening **60** in the base plate.

A new primer **87** is then placed in the socket or opening **86** of the washer **85** on top of the stud **81**, as illustrated in FIG. 5. The open end of the shell is then placed over the tubular member **90** depending from the sliding head **13** and the lever again lowered to lower the sliding head so that the tubular member **90** will act on the bottom of the shell to push the same downwardly thereby moving the lower end of the shell **71** and the washer **85** downwardly against the tension of the spring **84** until the primer **87** resting on top of the stud **81** is completely pressed in to the opening **172** of the shell as shown in FIG. 4. During the operation the shoulder **173** on the shell holder **70** will engage the top **174** of the sleeve member **77** shortly before the shell has completed its downward movement, thus pulling the rim **73** slightly away from the lower edge **175** of the shell holder to provide a space **176** between the lower edge **175** and the rim for engagement in the groove **109** of the plate **104** for a purpose later described. The device is adjusted in such manner that the described and each of the following operations is completed (FIG. 4) when the lever **54** is in its down position thereby engaging the edge **177** of the head **13** acting as a stop therefor. Turning of the lever or rod **155** to the left will cause the chamber **148** to align with the spout **161** to allow the powder to drop to the bottom of the shell as best illustrated in FIG. 4. Upward movement of the handle will then remove the tubular member **90** from the shell.

The open upper end **178** of the shell retained in the holder **70** is then inserted in the pivoted sleeve **96** on the bracket **92** with the fingers **100** overlapping the upper edge of the shell (FIG. 6) and the usual wadding **101** manually inserted through the ring member **102** and the pivoted wad guide **96** is then allowed to assume a vertical position which will align with the opening **61** in the base plate. The lever **54** is then again moved downwardly so that the tubular member **166** will press the

wadding **101** past the fingers **100** in the wad guide **96** to guide the wad therethrough and continued downward movement of the handle will exert pressure on the wadding to tamp and press the powder in position in the bottom of the shell. Turning of the lever or rod **156** to the right will then align the chamber **149** of the measuring spacer **147** with the spout **170** and will cause the shot **137** to drop into the shell as illustrated in FIG. 4.

The handle is then raised and the shell is removed from the wad guide. The rim **73** of the metal shell is then inserted in the groove **109** of the plate **104** on the base plate so that the shell will be retained by the plate. The lever **54** is again moved downwardly to move the sliding head toward the shell and the open end of the shell will enter the housing or socket member **118** and continued downward movement will cause the open edge **178** of the shell to contact the tapered portion **119** of the sleeve or housing **118** to turn the edge **178** inwardly until the lower edge **179** of the sleeve **118** contacts the upper end **171** of the shell holder **70** and stops further downward movement. Continued downward movement of the head **13** against the pressure of the spring **120** will move the plunger **112** independently from the sleeve **118** and cause the edge of the shell to be contacted by the head **115** and crimp the same, as best illustrated in FIG. 4, to completely close the end of the shell to retain the shot, wadding and powder therein. As the head **13** moves downwardly the fork-like portion **128** will move past the upper end **171** of the shell holder and after completing the crimping of the shell **71** the sleeve holder is rotated until the flanges **124** and **125** overlay said fork portion. Raising of the handle will then withdraw the shaper sleeve from the shell because the shell is held on the base plate by the plate **104**. The shell is then completely reloaded ready for use.

In FIG. 9 I have illustrated a modified form for disengaging the shell holder **70** from the shell **71**. For this purpose I provide claw members **180** and **181** having semicircular upper ends **182** and **183** which are pivotally connected in overlapping relation to the crimping sleeve **118** by a pin **184**. The lower ends of the members **180** and **181** have claws **185** and **186** adapted to slide over the tapered annular rim **187** of a shell holder **70** as the sleeve **118** moves downwardly for crimping of the shell. As the claws **185** and **186** move past the rim **186** gravity will bring the claws in engagement with the neck **130** of the holder and upward movement of the sleeve **118** will lock the claws underneath the rim **187** and pull the holder off the shell while the shell is kept stationary on the base **2** by the plate **104**.

FIG. 10 illustrates a further modified form of disengaging the holder from the shell wherein I provide a cup-like member **190** having an opening **191** adapted to engage over the neck portion **117** of the sleeve between the spring **121** and the shoulder **122**. Flexible legs **192** and **193** depend downwardly from the cup member **190** and are provided with claws **194** and **195** for engagement underneath the annular rim **187** of the holder **70**. Downward movement of the crimping sleeve **118** will spread the legs apart as they move over the rim **186** and further downward movement will cause the legs to move past said rim and engage the underneath side thereof. Upward pull on the legs **192** and **193** will then remove the holder from the shell as previously described.

It will be obvious from the foregoing that I have provided an improved apparatus and method of reloading used shotgun shells wherein the primer is ejected and the shell reshaped and the shell reprimed and loaded with minimum effort and removal of the shell from the shaper sleeve in a manner not heretofore known.

What I claim and desire to secure by Letters Patent is:

Apparatus for loading a primer into a shell and adding a powder charge and a wad and shot into said shell and crimp-closing said shell, said shell having a base end and an annular rim on said base end and a primer

receiving opening in said base end, said apparatus comprising the combination of a base plate having a vertical passageway therethrough of slightly larger diameter than said shell, said base plate passageway having an offset portion forming an annular shoulder therein, an upwardly opening cup member in said base plate passageway, said cup member having a flange portion engaging said annular shoulder to vertically support said cup member against downward movement in said base plate passageway, a vertically extending stem in said cup member for supporting said primer, a coil spring surrounding said stem and vertically supported by said cup member, a washer slidable on said stem and resting on said spring, a holder for said shell and removably resting on said cup member to prevent downward movement thereof, said shell holder radially engaging said shell base end to prevent radial bulging thereof, said cup member being adapted to vertically receive a lower portion of said shell base end thereinto, spaced upwardly extending sandards fixed to said base plate, a head vertically slidable on said standards and spaced from said base plate, means carried by said base plate and having connection with said head for raising and lowering said head with respect to said base plate, a tubular member fixed to and depending from said head in axial alignment with said base plate passageway, said tubular member being adapted to enter and abut said shell and move said lower portion of said base end downwardly and away from said holder and into said cup member upon lowering of said head, said downward movement simultaneously urging said primer into said primer receiving opening and urging said rim externally of said holder, means

associated with said head for adding a powder charge and a wad and shot into said shell, means depending from said head and cooperating with said base plate for compressing said powder charge and wad and shot in said shell and crimp-closing said shell, means secured to said head and base plate for grasping said rim and said holder for withdrawing said shell from said holder, said means for withdrawing said shell from said holder comprising a grooved member fixed to said base plate for receiving said rim of said shell and preventing upward movement of said shell with respect to said base plate, and jaws carried by said head and gripping said holder to withdraw said holder from said shell upon upward movement of said head.

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