Dec. 23, 1958 R. L. DOYLE 2,865,244

SHELL LOADING APPARATUS

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FIG_1

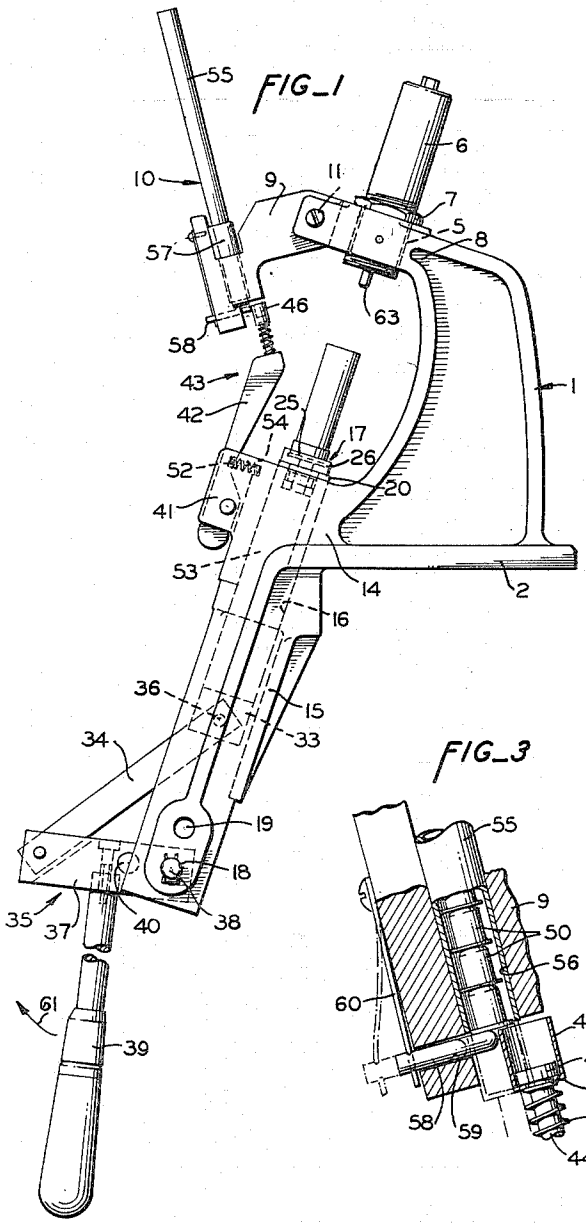
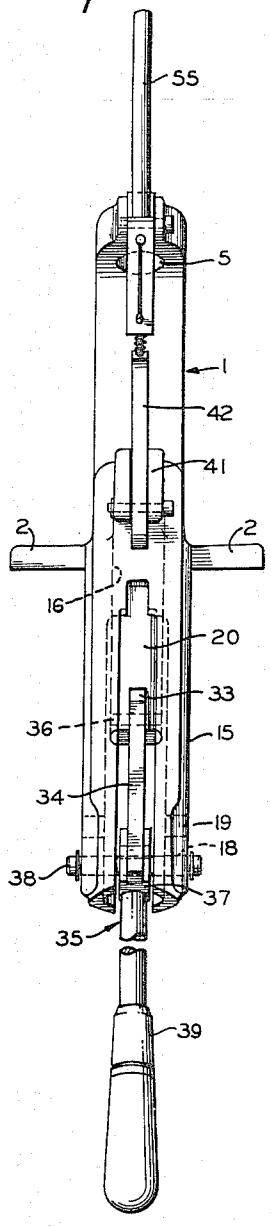


FIG_3

FIG_2



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SHELL LOADING APPARATUS

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FIG_4

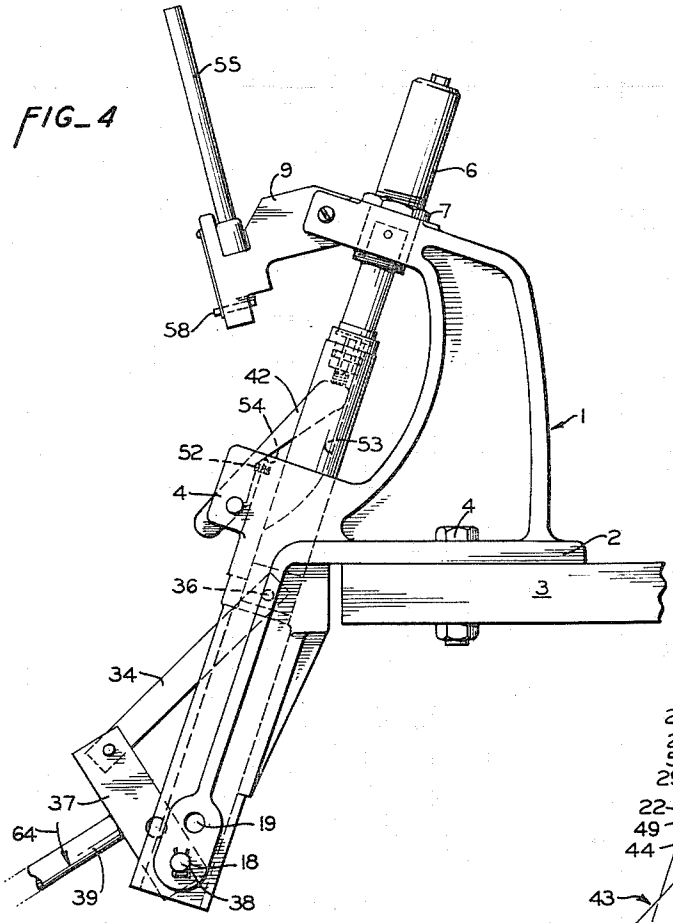
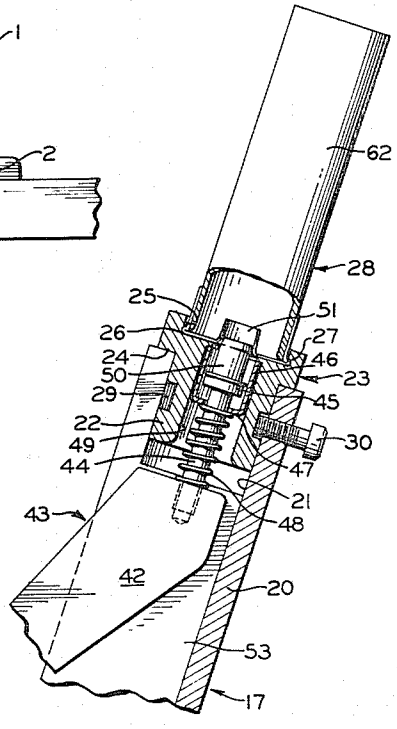


FIG_5



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SHELL LOADING APPARATUS

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FIG_6

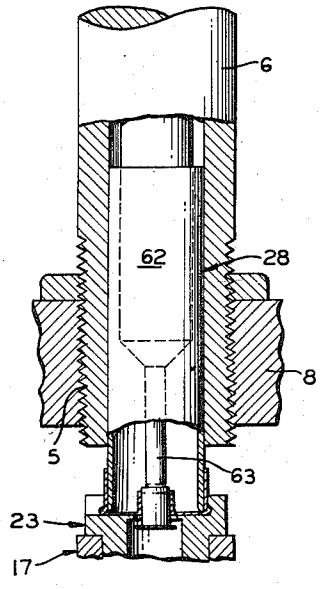


FIG_7

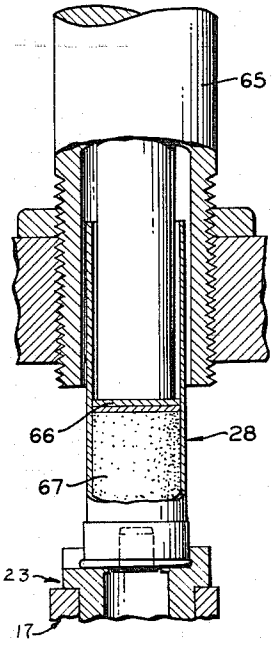


FIG_8

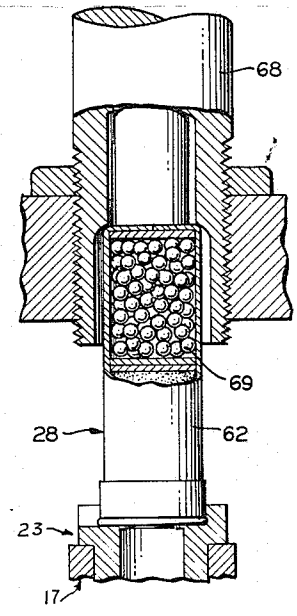


FIG_10

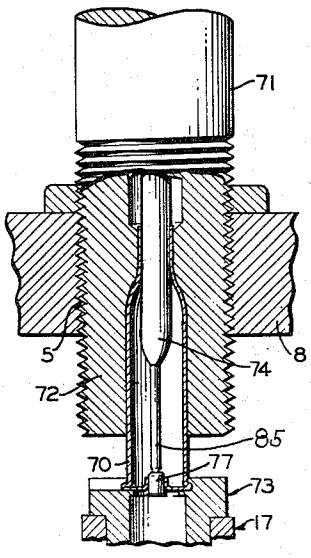
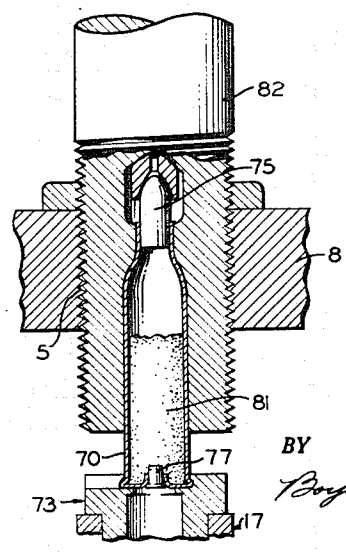


FIG_11



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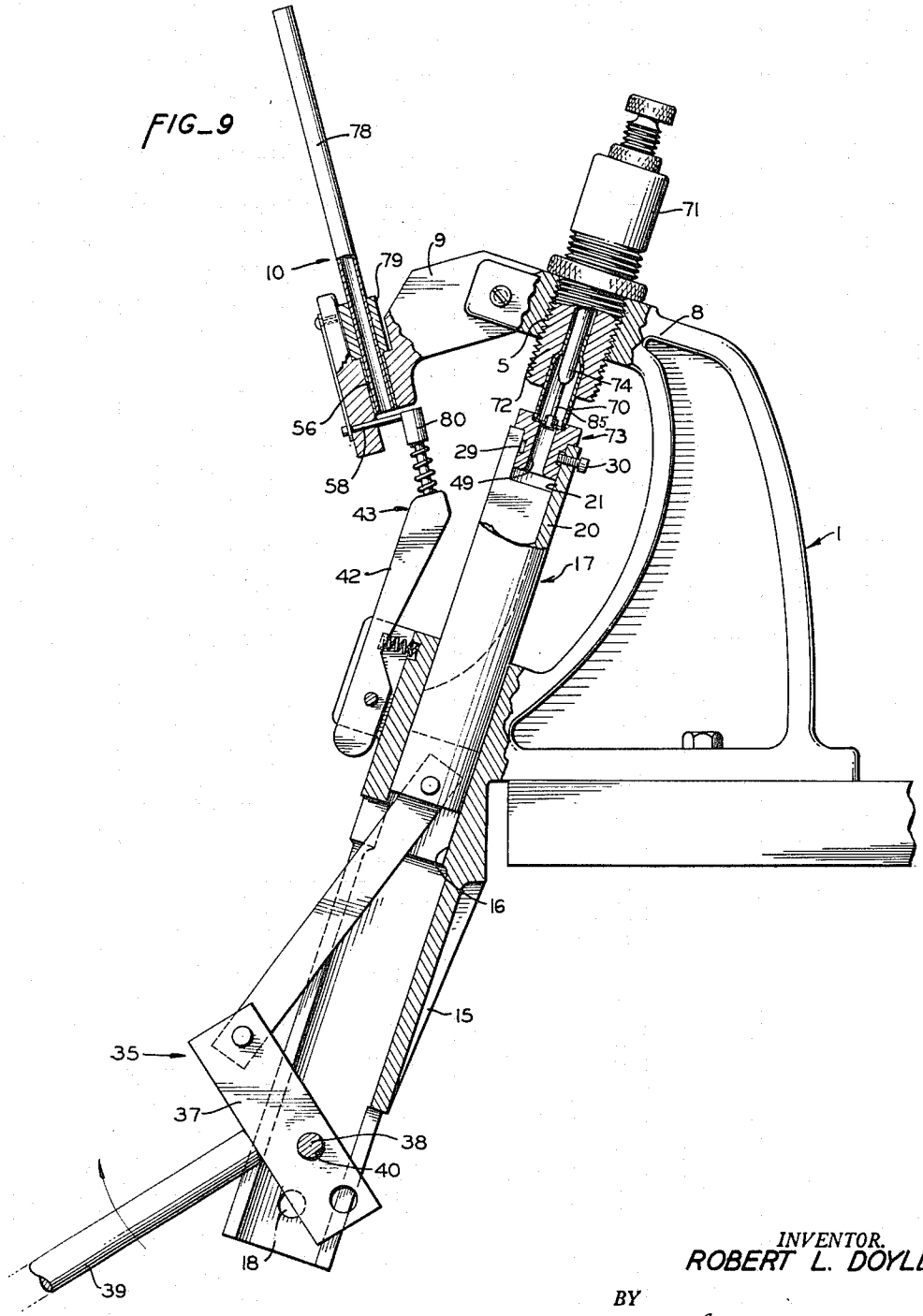
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SHELL LOADING APPARATUS

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FIG_9



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SHELL LOADING APPARATUS

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Application December 23, 1955, Serial No. 554,974

1 Claim. (Cl. 86—38)

This invention relates to shell loading apparatus and more particularly to a tool which performs the tasks of resizing, decapping, recapping and loading pistol, rifle, and shotgun shells.

Complete, ready-to-fire rifle and pistol ammunition is composed of the bullet, the brass case, powder and primer. Of these components the case or shell is the most expensive and is the only one not expended in firing the cartridge. It has therefore been found advantageous for the shooter to save the fired shells and reload them himself. Not only can shells be reloaded at substantially less than the cost of new cartridges, but with a little experience the reloader can tailor his ammunition to his own desires. Shotgun shells may also be reloaded, but usually separate apparatus is provided for this task.

In reloading, the shell, which has expanded in the gun's breech during firing, must be resized to original specifications. In the case of rifle and pistol shells, substantial force is required for this job. A further application of force for decapping (removing the fired primer), recapping (inserting a new one), bullet seating, wad seating, and crimping (in the case of shotgun shells) has dictated the use of some type of hand-operated press.

Prior apparatus for reloading shells has either been fairly complicated and expensive or has been limited to performing only a few of the reloading steps. Furthermore, most of the prior devices have been limited to reloading only one type and often only one caliber of shell.

It is an important object of this invention to provide a shell loading tool which has easily interchangeable parts enabling it to perform most of the necessary reloading functions for different types of shells.

Another object of this invention is the provision of a shell loader having an automatic priming and primer feeding device.

Still another object of this invention is the provision of shell loading apparatus in which the force applied during the loading operation may be varied for accomplishing varied tasks.

Other objects and advantages will become apparent from the following description taken in connection with the accompanying drawings in which:

Fig. 1 is a side elevational view of the shell loading apparatus of this invention, shown with a shotgun shell die and ready for decapping a shell;

Fig. 2 is an end elevational view of the apparatus of Fig. 1;

Fig. 3 is an enlarged view of a portion of the primer magazine and feeding device of the apparatus of Fig. 1, partly broken away and in section to show structure;

Fig. 4 is a side elevational view similar to Fig. 1 showing the operation of recapping a shell;

Fig. 5 is an enlarged view of the shell holder and primer feeding device of the apparatus of Fig. 4, partly broken away and in section to show details;

Figs. 6, 7 and 8 are greatly enlarged, partly elevational, partly sectional views of shotgun dies and shells showing

various representative steps in the process of reloading said shells;

Fig. 9 is an enlarged side elevational view, similar to Fig. 1, but showing the shell loading apparatus of this invention modified to perform the operation of resizing rifle and pistol shells; and

Figs. 10, 11 are greatly enlarged views similar to Figs. 6 through 8, showing representative steps in reloading rifle shells.

In detail, the device of this invention comprises a generally C-shaped frame 1 (Fig. 1) having a horizontal flange 2 for securing to a table top 3 (Fig. 4), or other rigid support, as by bolts 4. The upper leg 8 of frame 1 is provided with an internally threaded bore or socket 5 for receiving the various dies with which the apparatus is adapted to be used. The axis of socket 5 will hereinafter be known as the operative axis of the tool of this invention and is preferably inclined to the vertical as shown in Fig. 1.

The die 6 shown threadedly secured in socket 5 in Fig. 1 by locking nut 7 is a conventional shotgun shell sizing and decapping die. Other conventional dies which may be used in place of die 6 are shotgun wad seating and crimping dies, rifle and piston shell sizing and decapping dies, and bullet seating dies for the latter type of shells. In the event that the threaded portion of the dies varies a threaded bushing may be interposed between the die and socket 5 so that the former may be rigidly in the latter.

Extending from leg 8 opposite socket 5 from the main portion of frame 1 is an extension 9 which is adapted to support the primer magazine, generally designated 10. Said magazine will be later described in further detail. Extension 9 may be removably secured to upper leg 8 of frame 1 as by screw 11.

The lower leg 14 of C-shaped frame 1 is provided with a downwardly extending integral portion 15. Portion 15 is formed with a central through bore 16 formed coaxial with socket 5. Portion 15 with bore 16 thereby acts as a guiding sleeve for the shell loader 17. At the lower end of portion 15 the same is provided with a pair of spaced, transverse holes 18, 19, for a purpose to be described.

Shell loader 17 comprises a shaft 20 reciprocably mounted in bore 16. The upper end of shaft 20 is provided with a cylindrical recess 21 (Fig. 5) which is adapted to receive the reduced end portion 22 of the shell holding head 23. The upper end portion of head 23 is provided with a downwardly directed shoulder 24 for engaging the upper end of shaft 20. The upper face of head 23 is recessed, as at 25, which recess is circular and coaxial with shaft 20 and is wider at the bottom 26 for receiving the projecting annular rim of a shell 28. Recess 25 opens outwardly of one side of head 23 in order that the rim of said shell may be laterally admitted thereto. It will be noted that head 23 holds a shell, such as 28, coaxial with shaft 20 and thereby with a die 6.

The reduced portion 22 of head 23 is further provided with an annular groove 29 into which a screw 30, threaded through the wall of shaft 20, may project for securing said head in recess 21. It is obvious that more than one screw 30 may be provided and that mounting head 23 in this manner allows it to be rotated so that shells 28 may be inserted into recess 25 from any location around frame 1. This enables right or left hand insertion of shells into the tool as may be convenient for the operator.

The lower end of shaft 20 is provided with a cross slot 33 (Figs. 1, 2) for connection thereto with the upper link 34, of a lever operated toggle 35, by pivot pin 36. Pivotally connected to link 34 is the lower link 37 of toggle 35, the other end of which is shown in Fig. 1

connected to portion 15 of frame 1 by pivot pin 38 inserted through holes 18.

Projecting transversely from lower link 37 is an operating lever 39. It will be noted that swinging of lever 39 and thereby link 37 causes shell holder 17 to be reciprocated in bore 16, and as links 34, 37 become colinear, shell holder 17 reaches the top of its stroke and a maximum force is applied by the toggle linkage. Lower link 37 is further provided with a second pivot hole 40 at a location equally distant from the hole for pivot pin 38 as hole 19 is from hole 18 on portion 15 of frame 1. Therefore, pivot pin 38 may be substituted in holes 19, 40 to shorten the effective length of lower link 37, for a purpose to be described.

Projecting from lower leg 14 opposite the main portion of frame 1 from shell holder 17 are a pair of ears 41 (Figs. 1, 2) between which is pivotally connected the arm 42 of a primer feeding device generally designated 43. Arm 42 is mounted for swinging in the plane of the operative axis of the tool and is provided at its upper end with a small pedestal consisting of a small projecting shaft 44 (Fig. 5) having a disc 45 supported on the outer end thereof. Shaft 44 and disc 45 are oriented so that when arm 42 is swung to a position crossing the operative axis of the tool said shaft and disc will be coaxial therewith (Fig. 5). Surrounding disc 45 is a tubular, cup element 46 which has an inwardly directed flange 47 on its lower end projecting under disc 45. A compression spring 48 is mounted on shaft 44 in abutting relation to the upper end of arm 42 and flange 47 so as to urge element 46 to a position projecting upwardly of disc 45 (Fig. 3). This structure provides a cup at the upper end of arm 42, which cup is adapted to be inserted through a central bore 49 in shell holder head 23 as seen in Fig. 5.

Primer feeding device 43 is for the purpose of supporting a primer 50 for insertion into the primer pocket 51 of shell 28. Arm 42 is spring urged away from the operative axis of the shell loader of this invention by a compression spring 52 (Fig. 1) so that it will be held out of the line of action of shell holder 17 except when purposely deflected. As seen in Figs. 1, 4, 5, shaft 20 is provided with a longitudinal slot 53 which opens into recess 21 so that arm 42 can be swung to the primer loading position of Figs. 4, 5 when shell holder 17 is at the upper end of its stroke. Arm 42 is prevented from swinging past the position where primer 50 is coaxial with the shell 28 in holder 17 by arm 42 contacting a shoulder 54 (Figs. 1, 4) on leg 14 of frame 1.

In its outermost position from shell holder 17 primer placing device 43 swings under primer magazine 10 which comprises an elongated, open ended tube 55 supported in extension 9. Extension 9 is provided with a bore 56 (Fig. 3) for receiving the lower end of tube 55 which may be held therein by collar 57 (Fig. 1). Primers 50 are adapted to be stacked in single file in tube 55 and gravity fed out of the lower end thereof. Adjacent said lower end a stop pin 58 is slidably mounted in a hole 59 in extension 9 and is urged to a position extending across a portion of said lower end of tube 55 by leaf spring 60. Pin 58 thereby prevents primers 50 from falling out of the open lower end of tube 55.

In its normal position cup 46 rests against the outer end of pin 59 as shown in Fig. 3, since spring 52 is not sufficient to overcome the force of spring 60. However, positive movement of arm 42 toward pin 58 displaces said pin thereby bringing cup 46 directly under the open end of tube 55 to the dot-lash line position shown in Fig. 3. The depth of cup 46 is such that a single primer 50 will drop into it and be seated against disc 45 upon such movement. Release of arm 42 causes pin 58 to push cup 46 back to the full line position of Fig. 3 and prevent the exit of the next primer 50.

In operation, the device of this invention may be used for sizing, decapping, recapping, and loading any type of shell. In loading shotgun shells, a shell 28 (Fig. 1) is placed in recess 25 and handle 39 swung in the direction of arrow 61 to drive said shell into die 6. Die 6 is provided with conventional internal details for resizing the cardboard barrel 62 of said shell and a decapping pin 63 projects from said die for pushing the used primer from said shell. Both these functions take place on the upstroke of shell holder 17. Since comparatively little force is necessary for these operations the connection of link 37 of toggle 35 to portion 15 of frame 1 may be in hole 18 as shown in Fig. 1.

While shell holder 17 is in the uppermost position a primer 50 is received in cup 46 as previously explained and arm 42 is swung to the position shown in Fig. 5. Upon swinging lever 39 downwardly in the direction of arrow 64 (Fig. 4) shell 28 is urged downwardly against primer placing feeding 43. Shaft 44 and disc 45 support primer 50 during insertion of said primer into pocket 51 while the downward movement of shell 28 urges tubular element 46 downwardly against spring 48. The correct seating of the new primer 50 in primer pocket 51 can be felt by the operator. Upon upward movement of lever 39 and shell holder 17, tubular element 46 is cleared from the lower end of bore 49 and will swing back to the position of Fig. 1 under the urgency of spring 52.

Normally a number of shells 28 are decapped, sized, and recapped at one time. The decapping and sizing step is further illustrated in Fig. 6. Further steps in loading shotgun shell 28 are shown in Figs. 7, 8 which illustrate the use of a die 65 for seating the wads 66 against powder 67, and a crimping die 68 for crimping the end of the barrel 62 over the shot 69, respectively. For all of these functions toggle linkage 35 can be connected as shown in Fig. 1 to provide the most rapid action of which the machine is capable, since the maximum force which this apparatus is adapted to apply is not required for the foregoing operations.

However, the resizing of rifle and pistol shells requires a force of the order of 700 to 2,000 pounds as compared to the approximately 80 pounds used in reloading shotgun shells. Hence for the former operation, the apparatus of this invention is modified as shown in Fig. 9, in which link 37 of toggle 35 is connected through hole 40 by pin 38 to hole 19 in portion 15 of frame 1. This foreshortening of link 37 enables toggle 35 to apply substantially greater force in raising shell holder 17. To aid in the application of force it is noted that the same is applied by swinging lever 39 upwardly rather than downwardly. It is well known that more force can be applied by hand in an upward direction since an individual can apply the maximum force of only his weight in a downward direction.

In resizing rifle and pistol shells an alternate shell holder head 73 (Figs. 9, 10) is substituted for the similarly formed, previously described head 23. Head 73 is secured in the upper recess 21 of shaft 20 in a manner identical with head 23. A rifle shell 70, of the caliber for which head 73 is specially made, is inserted therein for being forced into a resizing die 71. Die 71 is secured in socket 5 of frame 1 in a manner similar to die 6. The conventional resizing die 71 is provided with a rugged die body 72 and a neck expander 74 for sizing cartridge 70 to the correct specifications for reuse. Neck expander 74 usually expands the open end of the shell slightly for entry of the bullet 75 (Fig. 11) thereinto.

Die 71 is also provided with a decapping pin 85 for a purpose similar to that of decapping pin 63. The operation of the tool of this invention in resizing and decapping rifle and pistol shells is similar to that previously explained with regard to shotgun shells except for the greater force applied by toggle linkage 35, as explained.

Since rifle and pistol primers 77 (Figs. 9, 10) are generally smaller in diameter than shotgun primers 50, the

open ended tube magazine 78 used in rifle and pistol shell repriming is of a smaller diameter than the tube 55 used with shotgun primers 50. In order to mount tube 78 in bore 56 in the manner described, a collared bushing 79 is inserted between tube 78 and bore 56 (Fig. 9). It is also necessary to replace the larger cup 46 of primer feeding device 43 with a smaller cup 80, sized to the smaller rifle primers 77. The operation of primer placing device 43 and primer magazine 10 in recapping rifle shells 70 is identical to that described with respect to shotgun shells 28.

Another function performed by the apparatus of this invention is that of seating a bullet 75 in the rifle or pisol shell 70 after the same has been loaded with powder 81. For this operation a bullet seating die 82 (Fig. 11) may be secured in socket 5 in portion 8 of frame 1, bullet 75 placed in the open neck end of shell 70 and shell holder 17 driven upwardly by toggle 35 into die 82. For this operation the longer toggle may be used, as by connecting link 37 to hole 18, since the greater force applied by the short toggle is not necessary.

Although the invention has been described and illustrated in detail such is not to be taken as restrictive thereof since it is obvious that modifications could be made therein without departing from the spirit and scope of the invention.

I claim:

Shell loading apparatus comprising a rigid frame, means on said frame for securing thereto a shell loading die oriented along an operative axis, shell holding means mounted on said frame for reciprocation along said axis, a toggle linkage connected between said shell holding means and said frame for so reciprocating said latter means, an arm swingably mounted on said frame for swinging one end thereof toward and away from said axis, and a cup on said one end of said arm for supporting a primer for insertion into the primer pocket of a shell in said shell holding means, and a primer magazine remote from said axis for feeding individual primers to said cup, said magazine including an open-ended tube adapted to receive a stack of primers in single file, one of the ends of said tube being positioned adjacent the path of swinging of said cup and aligned with said cup when said cup is swung to a position adjacent thereto, and a latch member, at least partially closing said end of said tube and movable by said cup when so aligned for opening said end of said tube to permit transfer of a primer in said tube to said cup.

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