SHELL PRIMER LOADING APPARATUS
Howard E. Dicken, 22921 Cedar Point Road, Berea, Ohio
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This invention relates to novel and improved apparatus for priming shells, and more particularly to primer loading apparatus specially designed to load a primer cap within a shotgun cartridge or shell prior to the latter being filled with explosive and shot materials.

A primary object of the present invention is the provision of novel and improved primer loading apparatus especially designed to load primer caps within shotgun shells or cartridges and the like, wherein the primer caps are delivered individually to a loading station and subsequently individually placed within the shell and disposed therein at the priming position.

Another object of the present invention is a provision of new and improved primer loading apparatus specially designed to load priming caps within shotgun shells and the like prior to the latter being filled with explosive powder and shot, and wherein each primer cap is presented to a primer loading station and individually subsequently inserted into the shell casing and secured therein at the priming position.

Additional objects and advantages of the primer loading apparatus of the present invention will be apparent to one skilled in the art to which it pertains and upon reference to the following description of a preferred embodiment and which embodiment is illustrated in the accompanying drawings wherein:

FIG. 1 is a front elevational view of a shotgun shell loading device embodying the primer loading apparatus of the present invention;
FIG. 2 is an enlarged view in vertical section of the primer cap loading apparatus of the present invention designed for use with the shell loading device of FIG. 1;
FIG. 3 is a fragmentary vertical sectional view of the loading apparatus shown in FIG. 2 illustrating the upper inclined tube or channel portion thereof;
FIG. 4 is a transverse sectional view taken along the plane as is indicated approximately by the line 4—4 in FIG. 2;
FIG. 5 is a plan view of the primer cap ejector lever;
FIG. 6 is a vertical sectional view of the primer ejector lever and
FIG. 7 is a vertical sectional view of a shotgun shell casing with a primer cap inserted therein at its priming position.

Referring now to the drawings throughout which like parts are designated by the same reference character, the primer cap loading apparatus of the present invention is herein shown as adapted for use with a shotgun shell loading device identified by the reference numeral 10 and which is intended to be operable to manually fill shotgun shells of the type shown in FIG. 7 which preferably has a metallic base 11 and a paperboard cylinder or casing 9 secured at one end to said base and into which the explosive materials and shot are disposed.

As is well understood, the base 11 of a shotgun shell of the above type is usually centrally provided with an aperture into which the primer cap is extended so as to be in communication with the casing interior and thereby in proximity with the explosive material therein so as to cause the ignition of the same upon being discharged.

The primer cap as indicated in FIG. 7 by the reference character P, is preferably cylindrical in configuration and provided with an enlarged closure on its one end defining an annular rim R. The cap is disposed in said aperture so that the rim portion R thereof lies against the outside surface of said shell base 11, with the primer body lying within the shell casing as aforesaid.

The primer cap loading apparatus of the present invention, as is aforementioned, is intended to dispense a primer cap from a magazine supply and to a loading station whereby said cap may thereafter be inserted into the shell casing.

To accomplish this, the shell loading device 10 is seen to include an upright post 12 attached to a base 13 and extending substantially vertically upwardly therefrom.

A plate 16 is attached to said post 12 upwardly from the aforementioned base, and is seen, in turn, to mount a die or primer cap support 18.

Said shell loading device is also seen to include a plate 20 carried on a slide 22, the latter being mounted over the aforementioned post 12 and of such dimension as to be freely slideable thereon. A lever indicated in its entirety at 24 is seen to be provided with a pair of spaced arms 25 which are connected at 26 to the aforementioned post 12 and at 28 intermediate the ends thereof, to the aforementioned slide 22. A suitable coil spring 30 surrounding the aforementioned post 12 and interposed between the plates 16 and 20 is effective to urge the plate 20, slide 22 and attached lever 24 upwardly along the aforementioned post 12 to a position approximately as is shown in FIG. 1.

With this assembly, a spent cartridge or shell may be placed in an upright position on the upper surface of the plate 16 at the left of the post 12 directly underneath a primer cap ejector die 3 carried on the underside of the movable carrier plate 20.

The handle 24 may then be swung downwardly effective to move the ejector die a into the interior of said cartridge, said ejector die having a pointed end e which strikes the discharged primer cap so as to eject it out of the base aperture to thereby ready said shell for reloading.

The novel and improved primer cap loading apparatus is intended to provide for the disposition of a primer cap onto the aforementioned primer cap support 18 carried on the stationary plate 16, which position may also be hereinafter referred to as the primer cap loading station, after which a shell to be loaded such as is described hereinabove, may be placed base down on said support 18 with the primer cap body directly under the base aperture. Thereafter, the lever 24 may again be swung downwardly to effect the attachment of the primer cap to said shell.

To accomplish this, the primer cap loading apparatus of the present invention is seen to include a primer loading die 42, which as best seen in FIG. 2, is substantially tubular in configuration as to define a chamber 43 extending centrally longitudinally therethrough, said die being secured at its upper end to the carrier plate 20 in such manner as to extend downwardly therefrom.

A magazine, as is indicated in its entirety by the reference numeral 45 has its one end attached to the aforementioned loading die 42 in such manner that it is in communication with the aforesaid die chamber 43.

As seen in FIG. 1, the magazine is attached to said die 42 so as to extend generally upwardly from the carrier plate 20.

As best seen in FIG. 2, the magazine 45 includes a tubular portion 47, the lower end of which is disposed within the upper end of the loading die 42, with the opposite end thereof being formed with an outwardly flared rim 48. A loading chute 49 is seen to have its one end connected to the flared rim 48 of the tubular portion 47, said chute inclining upwardly angularly therefrom and being preferably attached to one end of a similarly shaped channel 52 the latter in turn, being rigidly connected at its opposite end to the underside of a pan 60. The pan 60 is seen to have a central depression
61 which is apertured at 62, said aperture communicating with the aforesaid channel 52.

The primer caps P are disposed loosely within the pan 60 at random such as in the manner shown in FIG. 2, and are thereafter intended to be passed one at a time through the aforesaid aperture 62 down the channel 52 and communicating inclined chute 49 and thence into the tubing magazine portion 47 wherein they are stacked and thus in position to be ejected onto the primer cap support 18. The pan 60 may be lightly agitated so as to cause said primer caps to seek the aforesaid aperture 62.

Each primer cap is intended to fall through the tubing magazine portion 47 rim end first so that they stack one on top of the other in the manner shown in FIG. 2.

To accomplish this, and assuming that each primer cap has its rim end facing upwardly as it falls downwardly through the pan aperture 62 as is shown at position 1 in FIG. 2, it thence continues to fall in said manner until the rim end thereof strikes a flange or finger 65 formed integrally on the back wall 52a of the aforesaid channel 52 which extends inwardly therefrom so as to be in the path of travel of said primer cap, said flange or finger being disposed so as to engage the cap rim, as seen at position 2, and thus tilt it so that said rim is at the upper end and substantially at the same angulation or inclination as are the longitudinal edges 49a of said inclined chute 49, as herein shown at position 3.

As best seen in FIG. 4, the chute 49 is preferably substantially U-shaped in cross sectional configuration so as being of such dimension that the rim of the primer cap rides upon and slides downwardly along said longitudinal edges.

As seen in FIG. 2, the inclined chute 49 of the magazine is provided with a retaining plate 67 preferably at- taching the ends thereof being herein identified at position 4, said plate being in slight pressure engagement with the rim of the cap as it passes thereunder, and hence functioning primarily to cause said cap to decelerate and prevent it from gaining sufficient momentum to fly off the lower end of said chute and out of the magazine.

As the primer cap moves from position 4 to position 5, as shown in FIG. 2, its cylinder portion strikes an upwardly projecting abutment 69 preferably formed on the base wall 49b of the inclined chute 49 which is effective to stop said primer cap and turn over that its rim end faces downwardly at position 6 as it enters into the upper flanged end 48 of the tubing magazine portion 47 and begins its free gravitational descent therethrough, said cap piling on top of the next preceding cap to thereby form a stack in said magazine as is indicated at position 8.

Referring now to FIG. 3, in the event a primer cap falls through the pan aperture 62 rim end first, said rim will strike the flange 65 at position 2a which is effective to turn said cap over so that as it falls downwardly through the inclined chute 49 said rim is on the upper end thereof and lies on the aforementioned longitudinal edges 49a of said chute, as seen at position 4a.

As is aforementioned, the primer caps are intended to be ejected individually from the magazine 45 and onto the support 18 preparatory to being inserted into a shotgun of the loading.

To accomplish this, the primer caps are seen to stack upon an ejector lever identified in its entirety by the reference numeral 68 which, as best seen in FIG. 2, is slidable disposed in diametrically opposed slots 70 formed in the tubular wall of the loading die 42.

The ejector lever 68 is preferably formed of three rectangular lever sections 68a, 68b and 68c placed one over the other and securely fastened together to thereby form and move as a single unit. As seen in FIG. 2, the ejector lever is depicted in solid lines at its normal rest or stacking position and in dotted lines at its ejecting position.

A suitable spring 72 attached to the loading die 42 bears against the lever 68 and is operable to urge said lever to its normal rest position as is shown in full lines in FIG. 2.

The lever section 68a is preferably formed with a stop lug 74 at its left end as viewed in FIG. 2 which is adapted to engage the outside surface of the loading die 42 and thus prevent said lever 68 from being forced out of its accommodating slots 70.

The top and bottom lever sections 68a and 68c are each centrally formed with an elongated keyhole-shaped slot 73, 74 respectively, said lever sections being disposed in said lever assembly such that the enlarged semi-circular end portions of said slots are located at the opposite ends thereof. For example, as seen in FIG. 5, the enlarged portion of slot 73 in the top lever section 68a is located at the left of the aforesaid assembly whereas the enlarged portion of slot 74 on the bottom lever section is located at the right end of said assembly.

The intermediate lever section 68b is also centrally provided with an elongated slot 76 which extends longitudinally thereof, being approximately as wide as the semi-circular end portions of slots 73, 74 respectively, said lever sections being disposed in said lever assembly such that the enlarged semi-circular portion of said slots are located at the opposite end of said slot 74 so as to underlie the semi-circular portion of the slot 73 in the upper lever section 68a and 68c respectively, as seen in FIGS. 5 and 6, a shelf 81 is thus defined between the peripheral edges of the slot 76 in said intermediate lever section and slot 74 in the underlying lever section 68c, said shelf extending from one side of the semi-circular portion of slot 74, longitudinally along said lever section 68c, around the opposite end of said slot 74 so as to underlie the semi-circular portion of the slot 73 in the upper lever section 68a and 68c respectively, as to permit the rim end of the primer caps to pass freely therethrough. Likewise the lever section 68b is preferably thinner than the cap rim S so that the latter will be disposed within the space defined by said lever section 68b or in other words within the spacing between lever sections 68a and 68c.

With the lowermost primer cap thus positioned and lying on the aforesaid shelf 81 or at position 8 as seen in FIG. 2, it will now be realized that by pushing the ejector lever to the left said shelf 81 will slide under said cap, the elongated narrow portion of the slot 73 in the upper lever section 68a and the slot 76 in the intermediate lever section 68b being of such dimension as to freely slidably accommodate the cylindrical portion of said primer cap.

And, as the ejector lever is pushed through said loading die 42 to position the semi-circular portion of the keyhole slot 74 in the lower lever section 68c in substantial alignment with the die chamber 43, the rim of said primer cap will enter said semi-circular portion whereby said cap may fall freely therethrough and thence through the underlying portion of said loading die chamber 43.

During the interval the ejector lever is in its actuated position, the rim of the lowermost primer cap next in said magazine to be ejected rests upon the upper surface of the upper lever section 68a. Thereafter, as said ejector lever is permitted to return to its normal rest position, said primer cap will fall through the semi-circular portion of the keyhole slot 73 in said upper lever section and
the slot 76 in said intermediate lever section 68b so that its rim will lie upon the aforementioned shelf 81 and hence be in its ejecting position.

The loading die 42 is preferably lowered so as to be directly above the primer cap support 18 whereby as said primer cap is ejected from the magazine it is placed upon said support rim end down.

Thereafter, a shell casing is placed over said primer cap with the base aperture thereof directly over the latter, and the lever 24 is again swung downwardly effective to lower the loading die 42 into the interior of said shell casing whereas as it engages the base of said casing it forces the same down over said primer cap to thereby position said cap securely within said aperture. During this movement, the cylindrical portion of said cap projects upwardly into the die chamber 43 to thus permit said cap to be completely and properly secured within the base aperture of said shell casing. Said base aperture is preferably of such dimension as to define a tight fit with said cylindrical portion of said primer cap.

The lever 24 may then be raised so as to remove the loading die from the shell casing whereby the latter is then ready to receive a new charge of explosive and shot materials.

It will now be apparent that in the event a primer cap is improperly stacked in the magazine tubular portion 47 rim end up, or opposite to the position desired, the lever 68 will eject the same onto the primer cap support 18 in exactly the same manner as a primer cap properly disposed therein, i.e. rim end down, so that it will not jam said magazine and ejector lever. And, once disposed on the primer support 18 it may be removed by the operator and the next cap may then be ejected from said magazine and placed thereon.

Having thus described in detail a preferred embodiment of primer cap loading apparatus it will be apparent that the same is susceptible to various modifications, combinations and arrangements of parts without departing from the inventive concepts thereof as are defined in the claims.

What is claimed is:

1. Loading apparatus for priming a shell casing with a primer cap having one end formed with a peripherally projecting rim comprising a shell loading die having a chamber formed therein, an elongated magazine connecting at one end with said die chamber for receiving primer caps rim end down, a receptacle into which primer caps are randomly disposed, a chute connecting said receptacle with the opposite end of said magazine, means in said chute engageable with the rim of each said primer cap effective to tilt said cap and permit its gravitational movement rim end up through said chute, abutment means in said chute engageable with the opposite end of each said cap effective to tilt said cap and enable its gravitational descent rim end down through said magazine, and ejector means in said die for stacking said primer caps rim end down in said die chamber and actuatable to eject a primer cap rim end down singularly from said chamber.

2. In loading apparatus as is defined in claim 1, and wherein the ejector means comprises a lever slidable in said loading die, extending across said chamber so as to intercept and stack said primer caps rim end down, said lever being slidabley actuatable to eject a primer cap rim end down singularly from said chamber.

3. In loading apparatus as is defined in claim 2, and wherein the ejector lever is formed with shelf means for supporting and stacking said primer caps rim end down, and escapement means in said lever communicating with said shelf means being operable in response to the slidable actuation of said lever to dislodge the bottommost primer cap from said shelf means and to transfer the same rim end down from said chamber.

4. In loading apparatus as is defined in claim 2, and wherein the ejector lever comprises three plates stacked one on the other and securely fastened together to form an integral lever, the uppermost and bottommost plates each being formed with a keyhole shaped slot extending longitudinally therethrough, with the enlarged end portions of said slots being disposed at opposite ends of said lever, the intermediate plate being formed with an elongated slot communicating with said keyhole shaped slots and of such width as to define shelf means connecting with said enlarged end portions of said keyhole shaped slots, said shelf means being disposed to intercept and stack said primer caps rim end down in said die chamber, said lever being slidabley actuatable to move said shelf means sufficiently to locate the bottommost primer cap in said stack within one of said enlarged end portions of said slots whereby said cap is then individually released from said lever so as to fall gravitationally through said die chamber.

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