May 29, 1962 G. J. PUTH 3,036,489

CRIMPING DIE ASSEMBLY FOR SHOTGUN SHELL LOADING MACHINE

Filed April 24, 1959

Fig.1

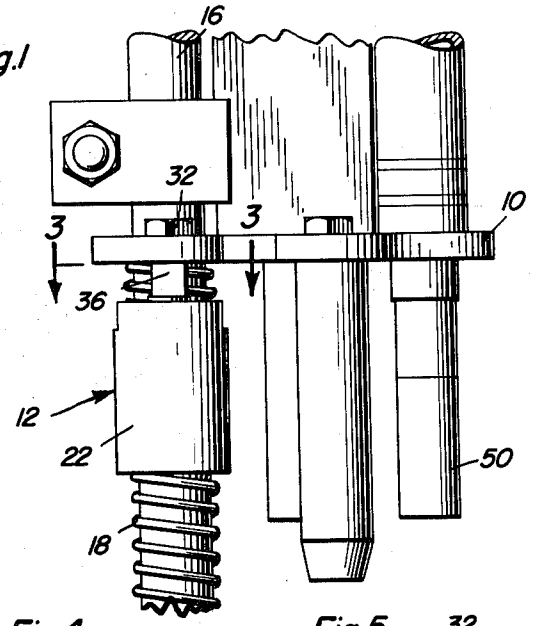


Fig.2

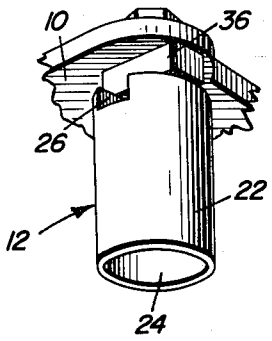


Fig.4

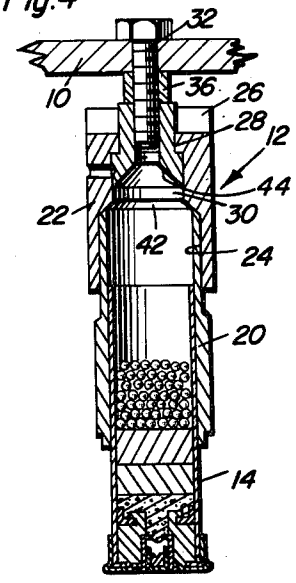


Fig.5

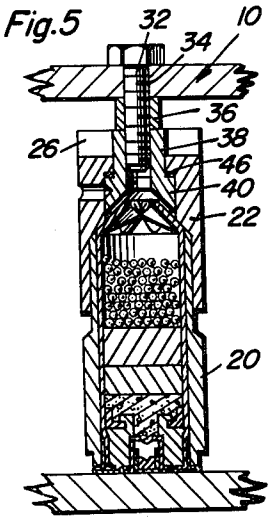


Fig.6

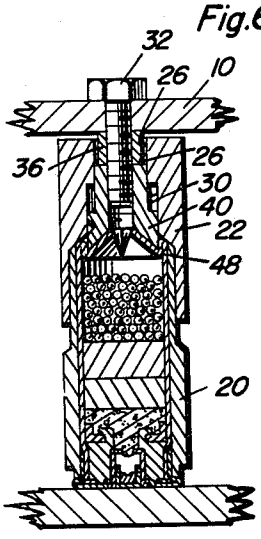
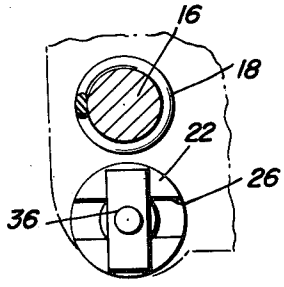


Fig.3



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CRIMPING DIE ASSEMBLY FOR SHOTGUN SHELL LOADING MACHINE

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4 Claims. (Cl. 86—39)

This invention comprises a novel and useful crimping die assembly for shotgun shell loading machines.

This invention comprises a novel and useful crimping die assembly for shotgun shell loading machines and more particularly relates to a die assembly for crimping the end of a reformed and loaded shotgun shell while the latter is held in a sizing die of a shotgun shell reforming and loading apparatus.

A further object of the invention is to provide a crimping die assembly specifically adapted for use in the shotgun shell loading apparatus disclosed and claimed in my prior co-pending application, Serial No. 830,332, filed July 29, 1959 and which is a continuation-in-part of my prior co-pending application, Serial No. 542,606, filed October 25, 1955 and now abandoned; and in my subsequently filed co-pending application, Serial No. 795,720, filed February 26, 1959.

A further object of the invention is to provide a crimping die assembly which shall be of extremely simple construction, and which shall successively form the initial portion of the crimping operation on the open end of a loaded shotgun shell, and then may be quickly adjusted to perform the completion of the crimping operation upon the shotgun shell.

A further very important specific object of this invention is to provide a method and a means for forming a more effective and a stronger crimp on a shotgun shell whether new or reloaded, whereby a full 180° inturned bend will be produced at the top of the shell with the material of the shell forming the floor of the crimp and the retaining wall of the shell being formed under the 180° crimp and directly against the inner wall of the shell to secure the maximum strength and retention of the loading of the shell.

Yet another object of the invention is to provide a means and a method for effecting an improved crimp upon the open end of a loaded shotgun shell while supporting the wall of the shell against distortion during the crimping operation and to straighten the brass base of the shell all in a single operation.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

FIGURE 1 is a side elevational view of a portion of an apparatus in accordance with my above identified prior co-pending applications and showing the manner in which the crimping die assembly of the present invention is incorporated therein;

FIGURE 2 is a perspective view of the crimping die as mounted upon a portion of the vertically reciprocating tool carriage of the apparatus;

FIGURE 3 is a horizontal sectional view taken substantially upon the plane indicated by the section line 3—3 of FIGURE 1; and

FIGURES 4–6 are sequential views showing in vertical transverse section the operation of the crimping die of this invention when forming a crimp upon the end of a loaded shotgun shell.

The present invention relates to similar subject matter to that set forth and claimed in my prior co-pending applications Serial Nos. 542,606, 830,332 and 795,720, and specifically refers to the crimping die assembly shown in

FIGURES 17, 18 and 19 of my last-mentioned co-pending application.

As set forth in my above-identified co-pending applications, sportsmen engaged in trap shooting or other gun club shoots usually fire a large number of shotgun shells which shells are relatively expensive, and therefore it has become desirable from the standpoint of economy for the sportsman to reload his fired shotgun shells and thus use them repeatedly thereby effecting a considerable financial saving. More important, however, for expert marksmen, is the opportunity afforded to the sportsman who loads his own shotgun shells to obtain a much more precise loading of the shot and charge with a resultant much more uniform and predictable operation of the reloaded shell than has been heretofore possible by employing either factory loaded shells or reloaded shells from other sources.

In the apparatus for reforming and reloading a used shotgun shell in accordance with the disclosure of my above identified co-pending applications, there is included a vertically reciprocating carriage upon which various implements and tools are mounted which are successively brought into operation during the process of removing the spent battery cup or ignition primer from a fired shell; reforming the empty shell; inserting a new battery cup or ignition primer in the shell; loading the shell with an accurately measured charge of powder and shot; compressing the load in the shell to a fixed predetermined pressure; then crimping the upper open end of the shell to thereby retain the load of the shell under the above-mentioned predetermined constant pressure. The present invention set forth and claimed herein is concerned with a die assembly specifically adapted to effect the crimping operation upon the open end of the shell whereby to seal or close this open end of the shell and thereby retain the charges of shot and powder therein.

For a disclosure of this specific construction and the operation of the shotgun shell reforming apparatus to which the present invention is particularly adapted for use, attention is directed to my above-identified co-pending applications. However, since the invention claimed herein resides and consists essentially in the construction and operation of the crimping die assembly, only a brief description of the associated parts of the apparatus set forth in my prior applications will be necessary for an understanding of this invention. Briefly, the apparatus includes a flat plate-like member **10** which comprises a carriage mounted for vertical reciprocation under a manual operating means. Secured to the underside of this carriage plate for vertical reciprocation therewith is a crimping die assembly indicated generally by the numeral **12** and by means of which the open upper end of a shotgun shell **14**, when loaded and received within a sizing die **20**, may be crimped to retain the load therein.

The apparatus includes a vertical support post or rod **16** upon which the carriage plate **10** is guidably and slidably mounted for vertical reciprocation, a compression spring **18** serving to retain the carriage in its raised position until the latter is manually depressed by the manual operating means, not shown.

Referring now particularly to FIGURES 4–6 it will be observed that the shotgun shell **14** which has been reformed and has been inserted in a sizing die **20** and which has been loaded is inserted with the sizing die into the open lower end of a two-stage crimping die assembly **12**. The construction of the crimping die and this operation effecting a crimping of the open upper end of the shotgun shell is as follows:

The crimping die assembly **12** consists of a cylindrical outer body **22** having a diametrical bore **24** in its lower end and which receives therein the upper end of the sizing die **20**. Extending diametrically across the top of the body **22** is a slot **26** as will be seen by comparing FIG-

URES 4–6 with FIGURES 2 and 3. A diametrically reduced bore 28 opens from the flat upper surface of the body 22 into the interior 24 thereof from the bottom of the slot 26 and a further or middle bore 30 connects the bore 28 with the diametrical bore 24. A fastener 32 in the form of a bolt extends through an aperture 34 in the plate 10 and receives thereon and supports thereby a spacer bar 36, see in particular FIGURES 2 and 3, and carries at its lower end the stem 38 having a laterally enlarged head 40 which is slidably received within the middle bore 30. The arrangement is such that when the spacer 36 is caused to align with the transverse slot 26, as shown in FIGURE 6, the body 22 may be lifted upwardly so that the spacer rests in this slot as shown in FIGURE 6. However, when the body 22 is rotated so that it lies transverse the spacer bar 36, as shown in FIGURE 3, the spacer bar will retain the outer body 22 in its lowermost position with respect to the enlarged head 40 of the stem 38, so that this enlarged head is retracted into the bore 30 previously mentioned as shown in FIGURE 4.

In this position, when the carriage plate 10 is lowered upon the end of the shotgun shell 14 received in the sizing die 20, the die will be forced downwardly upon the shell and cause the latter to move upwardly its full length into the die so that the lower end of the sizing die 20 will bear against the rim of the shell and thus straighten and reform the base of the shell. At the same time, the upper end of the shell will protrude from the upper end of the sizing die and its upper end of the shell will abut against the conical surface 42, see FIGURE 4, by which the bore 24 is connected to the bore 30, and this conical surface will bend the upper end of the shell inwardly as suggested in FIGURE 5 to impart a conical shape to the upper end of the shell, this being the initial portion or stage of the crimping operation. As the upper end of the shell is initially crimped inward into this conical shape, it will be observed that the lower surface of the enlarged headed portion 40 of the stem 38, as indicated by the numeral 44 constitutes a conical recess which provides clearance to receive the inwardly coned end of the shotgun shell.

It will be further observed that at the junction of the enlarged head 40 with the stem 38 there is provided an annular shoulder 46 which serves to engage the upper end of the bore 30 and thus support the outer body 22 of the crimping die when the latter is in its lowered position as shown in FIGURE 4.

When the initial crimping operation has been completed as just described, the pressure upon the carriage plate is slightly released allowing the latter to rise slightly, the body 22 is grasped and rotated to bring the slot 26 thereof into alinement with the spacer bar 36, whereupon the body 22 is lifted causing the spacer bar to be received in the slot 26 as shown in FIGURE 6. This causes a raising of the conical surface 42 of the outer body 22 above the enlarged head 40 of the stem 38 so that the conical recess 44 of the latter is now projected downwardly into the bore 24.

Thereupon, when the carriage plate 10 is again depressed, the conical recess of head 40 will engage the initially crimped and coned upper end of the shell, and complete the crimping or coning operation. It will be observed that during this operation, as shown in FIGURE 6, the periphery or edge of the enlarged head 40 which bounds the conical recess 44 will engage the conical end of the shell just inwardly of the wall of the shell and will fold the same downwardly to make a re-entrant bend therein as shown clearly in FIGURE 6.

The proportions and dimensions of the outer body and the enlarged head and the stem are such that this crimping operation will produce the above-mentioned inturned fold at the crimped end of the shell as shown by the numeral 48 in FIGURE 6, and also completes the gathering of the nose portion of the shell, folding it in upon itself. At this time, the entire surface of the nose of the shell is now received in the conical recess 44 of the enlarged headed portion 40. The top of the crimp center at this time will be at an upward angle of about 30° as will be apparent from FIGURE 6.

Upon the completion of this crimping operation, the shell is then removed, while still in the sizing die from the two stage crimping die and is then placed under the ejecting punch 50 whereupon when the carriage plate 10 is again lowered this punch will depress the crimped nose of the shell and flatten it inwardly upon the charge of shot therein, thereby completing the sealing of the end of the shell.

At the same time, this last operation is also utilized to drive the loaded shell from the sizing die as set forth in my above-identified co-pending applications.

As the final step of the crimping operation which is performed by the ejecting plunger 50, the lower edge of the coned nose of the shell adjacent the fold 48 is driven thereunder as the conical nose portion is flattened out. There is thus provided a 180° bend of the wall of the shell as the same is folded inwardly as at 48; and the flattened top surface of the shell is then forced under this 180° bend to thereby securely retain the end of the shell in closed position.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly all suitable modifications and equivalents may be resorted to, falling within the scope of the invention as claimed.

What is claimed as new is as follows:

1. A crimping die assembly comprising a sizing die and a pair of concentric outer and inner relatively slidable and relatively rotatable die members, the outer die member comprising a hollow body having opening through its lower end a cylindrical bore of sufficient diameter and length to slidably receive therein the upper end of said sizing die with the latter receiving a shotgun shell loaded with powder and shot and extending thereabove, said bore having at its upper portion a conical upper surface for engaging and turning inwardly the upper end of a loaded shotgun shell and forming a conical nose thereon as the shell is forced into the sizing die and with the latter into the bore, means for forcing the shell into said sizing die and the latter into said bore, said inner die member being slidably disposed in said outer die in the bore thereof above said conical surface and for movement therein below said conical surface, said inner die member having a chamber at its lower end opening into said bore for engaging the conical nose formed upon a shell by said conical surface of said outer die member for further crimping of said conical surface upon relative movement of said inner die member inwardly of said outer die member, a rim on said inner die member surrounding said chamber and engageable with the peripheral portion of said shotgun shell conical nose for folding the periphery of the latter inwardly upon the shell wall with a 180° fold.

2. The combination of claim 1 including means fixedly supporting said inner die member, said outer die member being rotatably and slidably mounted upon and carried by said inner die member.

3. The combination of claim 1 including means fixedly supporting said inner die member, said outer die member being rotatably and slidably mounted upon and carried by said inner die member, said last mentioned means including a stop member, said outer die member having a pair of stop surfaces selectively engageable with said stop member for longitudinally adjusting the position of said inner die member within the bore of said outer die member.

4. The combination of claim 1 including means fixedly

supporting said inner die member, said outer die member being rotatably and slidably mounted upon and carried by said inner die member, said last mentioned means including a stop member, said outer die member having a pair of stop surfaces selectively engageable with said stop member for longitudinally adjusting the position of said inner die member within the bore of said outer die member, said stop member comprising a stationary spacer bar carried by said inner die member, said pair of stop surfaces of said outer die member comprising a flat surface against which said spacer bar is adapted to abut and a

slot in said flat surface in which said spacer bar is receivable to allow upward movement of said outer die member when the latter is rotationally adjusted to cause registration of said spacer bar with said slot.

References Cited in the file of this patent

UNITED STATES PATENTS

2,352,549	Johnson et al.	June 27, 1944
2,749,791	Miller	June 12, 1956
2,854,881	Craft	Oct. 7, 1958