United States Patent

Bachhuber

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[54] **SHOTGUN SHELL RELOADER WITH SIZING DIE AND EJECTOR**

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[52] **U.S. Cl.** **86/32,** 86/23

[51] **Int. Cl.** **F42b 33/04**

[58] **Field of Search** 86/23, 25, 29, 32, 33, 38

[56] **References Cited**

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[57] **ABSTRACT**

The tool-supporting carriage of a reloader is actuated by a toggle lever system having one of its links provided with an ejector cam. The tools mounted on the carriage include a re-sizing die having a tubular support, and a relatively reciprocable depriming punch and ejector bolt having a U-shaped cam follower portion in the path of the cam, one leg of said portion projecting through the carriage interiorly of said support and another leg thereof being guided and supported by the carriage to resist a lateral component of cam thrust while providing prolonged cam action in the ejection from the sizing die of the re-sized cartridge.

7 Claims, 5 Drawing Figures

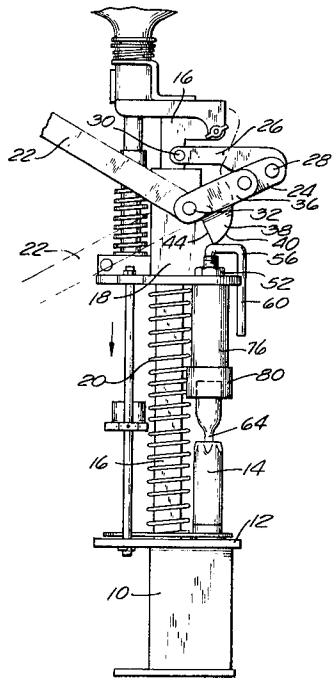


Fig. 1

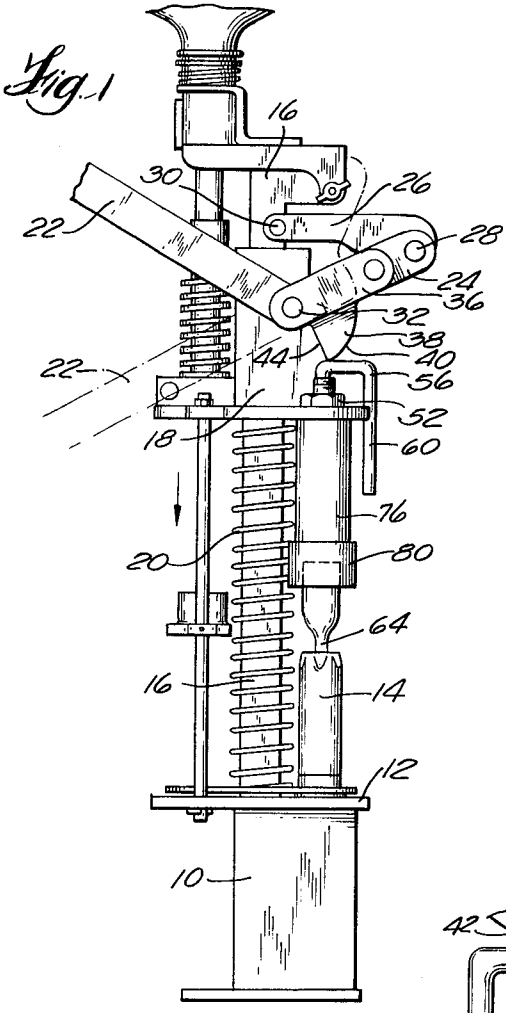


Fig. 2

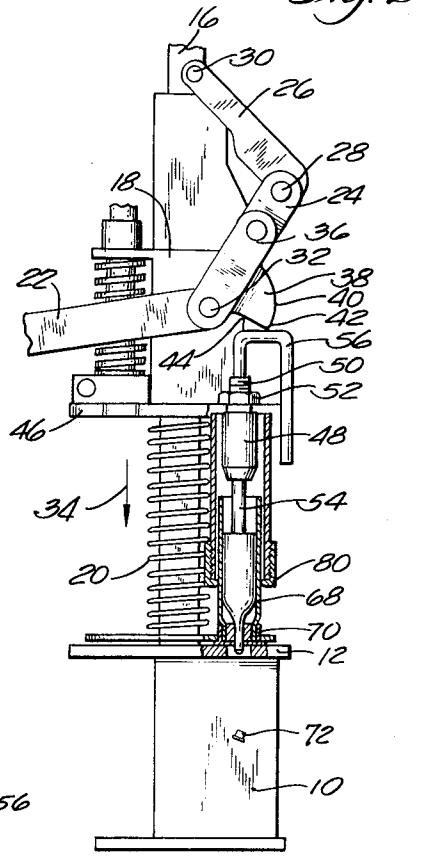


Fig. 3

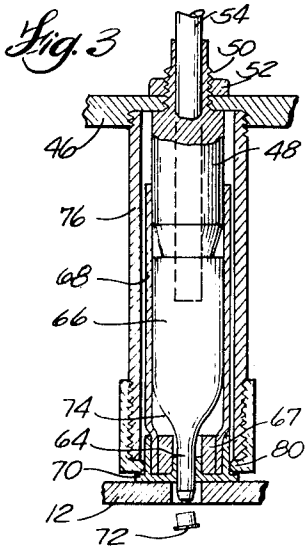


Fig. 4

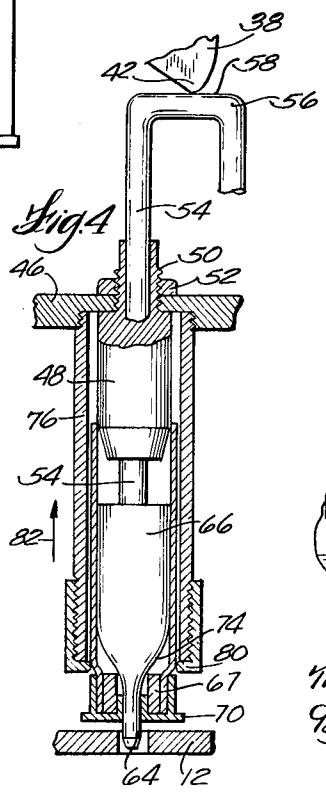
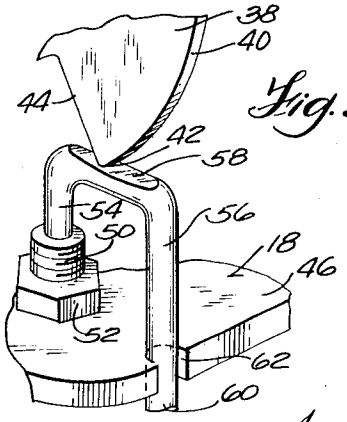


Fig. 5



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SHOTGUN SHELL RELOADER WITH SIZING DIE AND EJECTOR

BACKGROUND OF INVENTION

In order to combine the re-sizing die with the depriming punch for a single step operation in a reloader, it was found necessary to make the die function over a substantial interval of time to eject the re-sized shell from the sizing die. This, in turn, involves a lateral extension of a cam follower means to be operated on by the ejecting cam, while supporting the cam follower against lateral thrust by engaging it with a portion of the carriage.

SUMMARY OF INVENTION

In one single stroke of the operating handle to move the carriage toward and from the shell-supporting table, the used shell is prepared for reloading by ejecting the used primer, re-sizing the shell casing and ferule, and discharging the re-sized shell from the sizing die.

A sleeve attached to the platform of the vertically movable carriage of a shotgun shell reloader has a re-sizing ring at its lower end. The sleeve encircles an ejection bolt reciprocably mounted in a knockout bushing attached to the carriage. The primer ejecting punch is at the lower end of the bolt. Above the carriage a simple and inexpensive cam follower is provided by forming the bolt into a U and flattening the upper surface. From the cam follower surface, one leg of the U extends downwardly through a notch or other guide opening in the carriage, being thereby aligned with the path of the cam and also supported to resist lateral pressure of the ejection cam which, for convenience, and to prolong the camming action, is attached to one of the links of the toggle lever system which operates the carriage.

BRIEF DESCRIPTION OF DRAWINGS

FIG. 1 is a somewhat diagrammatic side elevational view of a shotgun shell reloader equipped with a re-sizing die and ejector in accordance with the present invention, the carriage and die being shown in an elevated position prior to functioning on the shell.

FIG. 2 is a view similar to FIG. 1, but partially in section, showing the parts in a position in which the depriming punch has just operated to eject the primer from the cartridge.

FIG. 3 is a fragmentary detail view in section showing the depriming punch and sizing die in their lowermost positions.

FIG. 4 is a view similar to FIG. 3 showing the same parts partially retracted with the cam-actuated ejection bolt beginning to function to eject the shell from the sizing die.

FIG. 5 is a detail view in perspective fragmentarily illustrating the engagement of the cam and cam follower, parts being shown on a somewhat enlarged scale.

DETAILED DESCRIPTION

As disclosed in U.S. Pats. Nos. 3,157,086 and 3,240,104, the reloader comprises a base **10** which includes a table or platform **12** on which is positioned a used shotgun shell **14** for re-sizing preliminary to reloading. On the column **16**, a carriage **18** is reciprocable, being biased upwardly by compression spring **20**

and lowered by a handle lever **22** which includes one link **24** of a toggle lever system comprising pivotally related links **24** and **26** connected to each other by a pintle **28**. Link **26** is pivotally connected at **30** with the column **16**. Link **24** is pivotally connected at **32** with carriage **18**. When the handle lever **22** is in the position shown in full lines in FIG. **1**, the carriage is in its uppermost position.

When the hand lever **22** is moved downwardly to the position of FIG. **2**, its extension link **24** is moved toward alignment with link **26**, thereby causing downward movement of carriage **18** as indicated by arrow **34**.

A cam plate **36** attached to the side of link **24** of the toggle mechanism has a downwardly projecting cam **38** with a rounded cam surface at **40**, a cam nose portion **42**, and a surface **44** which is approximately at right angles to the link.

The platform portion **46** of the carriage **18** supports the various tools required in the reloading operation. For the purposes hereof, it is necessary to mention only those tools preliminarily used in depriming and re-sizing. A bushing **48** attached to the platform **46** by a sleeve **50** and lock nut **52** guides the ejection bolt **54** which constitutes one leg of a U-shaped cam follower **56** which has a flat cam follower surface **58** engaged by the cam **38**. The bolt **54** is freely reciprocable through the sleeve or bushing **48**. For guidance and support against lateral displacement, the leg **60** of the cam follower **56** has guidance from the carriage platform. In this embodiment it passes therethrough in a notch **62** formed in the side margin of the platform as best shown in FIG. **5**.

At the lower end of the bolt **54**, the deprime punch **64** has an enlarged portion **66** for loose guidance within the shell casing **68**. As best shown in FIG. **3**, the punch ejects from the metal ferule **70** of shell case **68** the used primer **72**. The enlarged follower portion **66** of the punch has a tapered nose **74** for engagement with the end of the shell or the base wad **67** if the shell is provided with such a wad. The arrangement is such that the primer punch and the ejection of the shell from the re-sizing die will function automatically regardless of relative dimensions.

The sleeve **76** attached to the carriage platform **46** supports the re-sizing die **80**. FIG. **2** shows the die en route downwardly about the shell casing **68** to a position of engagement with the metal ferule **70** for the re-sizing thereof. In FIG. **3**, the die **80** is in re-sizing engagement with ferule **70** at the bottom of the stroke of the die. In FIG. **4**, as shown by arrow **82**, the carriage **46** and supporting sleeve **76** and die **80** are in course of upward movement initially carrying with them the shell with which the die **80** became frictionally engaged during the sizing operation illustrated in FIG. **3**.

However, as shown in FIG. **4**, the cam follower **56** has portion **58** engaged with the cam **38**, with the result that the ejection bolt **54** has exerted pressure through the enlarged portion **66** of punch **64** upon the base wad **67** to dislodge the shell from the die **80** and thereby to discharge the shell from the sizing apparatus.

A major factor in enabling the ejecting mechanism to function regardless of the presence of, or the height of, a base wad is the lateral extent of the cam follower surface **58**. The provision of guidance surfaces such as the

sides of the notch **62** in FIG. **5** gives support to the cam follower portion **56** of the ejection bolt thus protecting the bolt against lateral deformation notwithstanding the extent of lateral thrust exerted thereon by the cam **38** over the relatively long cam surface.

To summarize the operation:

A shotgun shell **14** is placed under the depriming punch and re-sizing die as shown in FIG. **1**. Thereupon the handle **22** is depressed to lower the carriage **18**. The cam nose **42** engaged with cam follower surface **58** on the ejection bolt forces the primer from the used shell but allows continued handle-induced motion of the carriage **18** to force the re-sizing die **80** over the ferule of the cartridge.

On the return stroke, the cam is not initially engaged with the cam follower surface **58** at the upper end of ejection bolt **54**. Consequently, the ejection bolt does not interfere with the upward movement of the re-sized shell with the die **80** and carriage **46** until the shell is free of the supporting table **12**.

In the continued upward movement of the carriage, the returning movement of link **36** of the toggle lever mechanism again engages the cam follower surface **58** with nose **42** of the cam **38**, whereby the ejection depriming punch remains relatively stationary during continued upward movement of the re-sizing die, with the result that the re-sized shell is discharged from the die, while the die and its supporting sleeve **76** continue their upward movement with the carriage.

I claim:

1. In a shell reloader having a relatively movable tool carriage and support for a fired shell having replaceable primer, and actuating means for effecting relative approach and retraction of the carriage and support, the combination with said carriage, said support, and said actuating means, of means operable in a single such approach and retraction for completely reconditioning said shell for reloading, said last means including a primer ejector, a shell re-sizing die, and a means for discharging the shell from the die, said re-sizing die being mounted on a supporting sleeve connected with the carriage and the primer ejector comprising a rod reciprocable relative to the carriage and extending through said sleeve and provided above the sleeve with a cam follower, the actuating means including a lever having upon it a cam engageable with said follower in a direction opposite to the direction of relative retraction of the carriage and sleeve.

2. A shell reloader according to claim **1** in which the said rod has a U-shaped portion with a surface constituting said cam follower.

3. A shell reloader according to claim **2** in which the U-shaped portion of said rod includes a depending leg for which said carriage provides guide surfaces.

4. In a shell reloader having a relatively movable tool carriage and support for a fired shell having replaceable primer, and actuating means for effecting relative approach and retraction of the carriage and support, the combination with said carriage, said support, and said actuating means, of means operable in a single such approach and retraction for completely reconditioning said shell for reloading, said last means including a primer ejector, a shell re-sizing die, and a means for discharging the shell from the die, said actuating means comprising pivotally connected links respectively pivoted to said carriage and to a support upon which said carriage is guided, the link pivoted to said carriage having a handle extension and being provided with a cam, the primer ejector being reciprocable with respect to the carriage and having a portion movable through the re-sizing die, and being provided with an exposed cam follower with which said cam is engaged in a predetermined range of handle positions.

5. A shell reloader according to claim **4** in which a U-shaped part of said rod constitutes said cam follower and has a relatively flat cam-engageable portion.

6. A shell reloader according to claim **5** in which said carriage provides a notch having guide surfaces and a U-shaped portion of said rod comprises a depending leg engaged with said surfaces for support and guidance.

7. A shell reloader according to claim **6** in which said rod has an enlarged portion adjacent its lower extremity which is slideable within a shell and constitutes said means for discharging the shell from said sizing die.

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