July 16, 1963 L. E. PONSNESS ETAL 3,097,560

PROGRESSIVE RELOADING MACHINE FOR SHOT SHELL

Filed July 28, 1961

6 Sheets-Sheet 1

FIG. 1

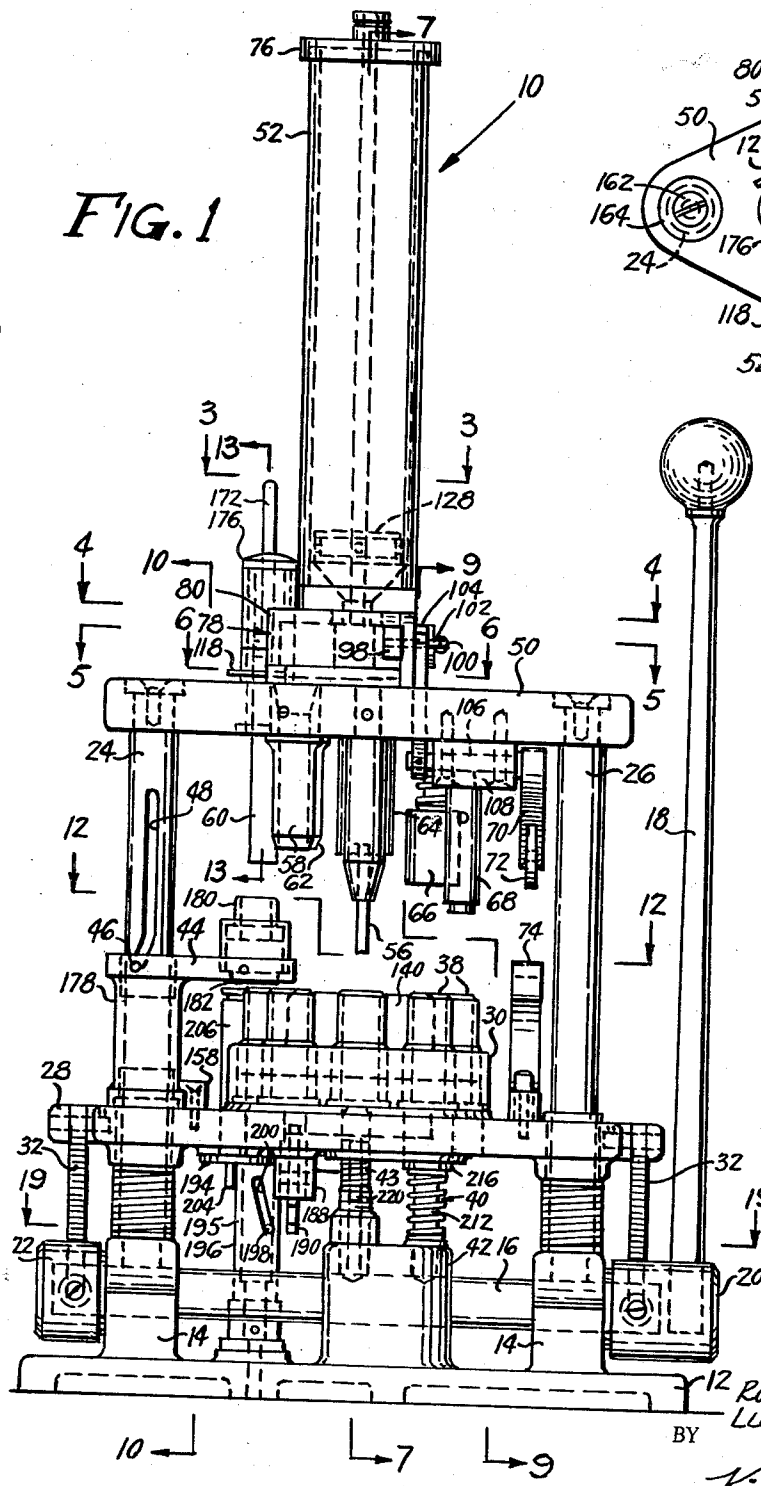


FIG. 2

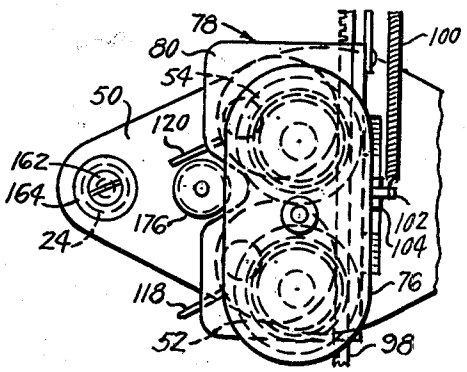
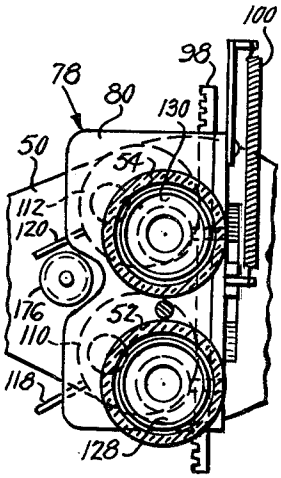


FIG. 3



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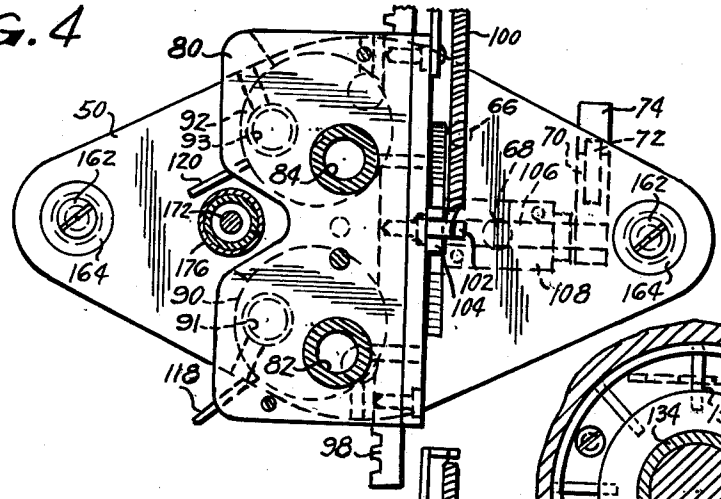
July 16, 1963 L. E. PONSNESS ETAL 3,097,560

PROGRESSIVE RELOADING MACHINE FOR SHOT SHELL

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FIG. 4



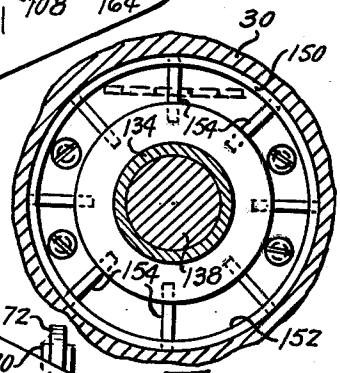


FIG. 22

FIG. 5

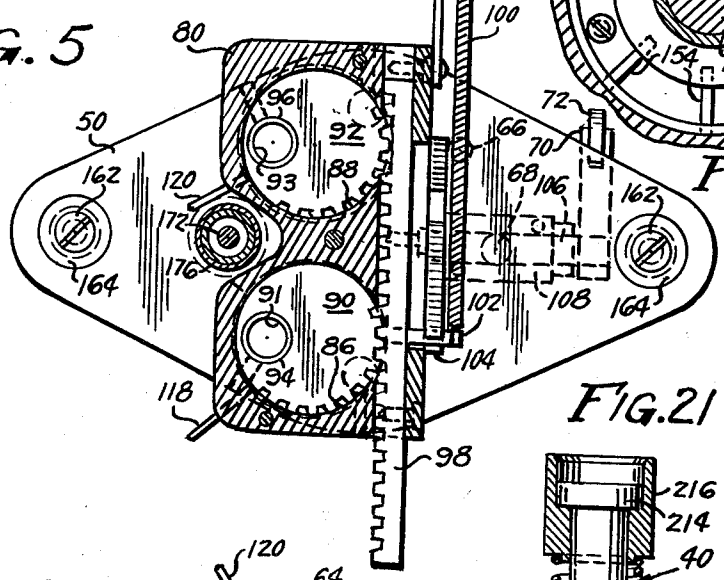


FIG. 21

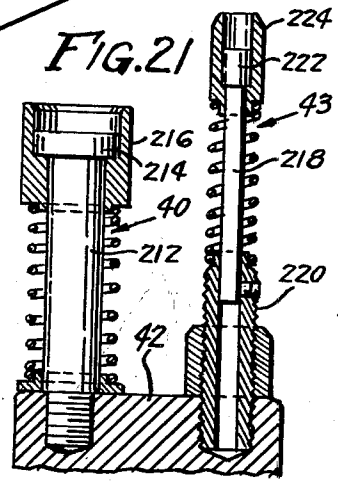
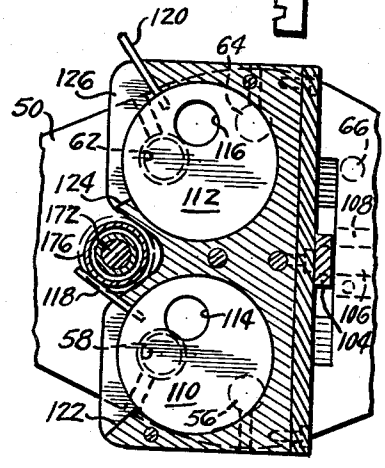


FIG. 6



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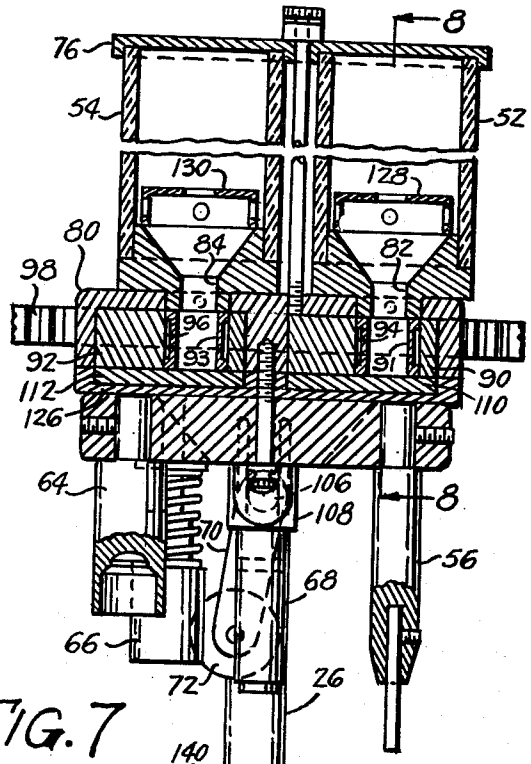


FIG. 7

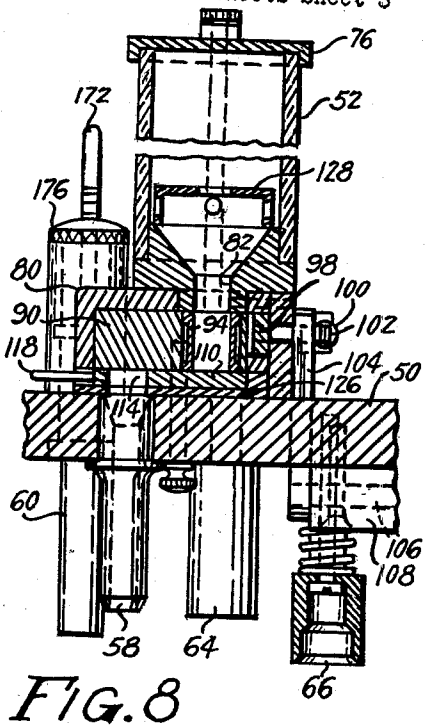
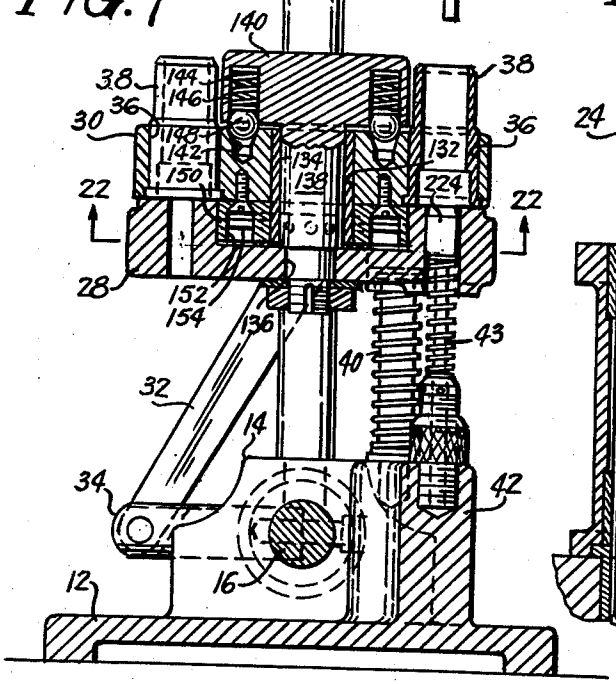


FIG. 8



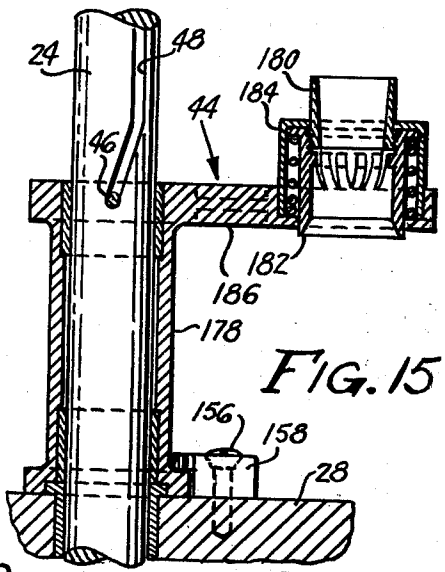


FIG. 15

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PROGRESSIVE RELOADING MACHINE FOR SHOT SHELL

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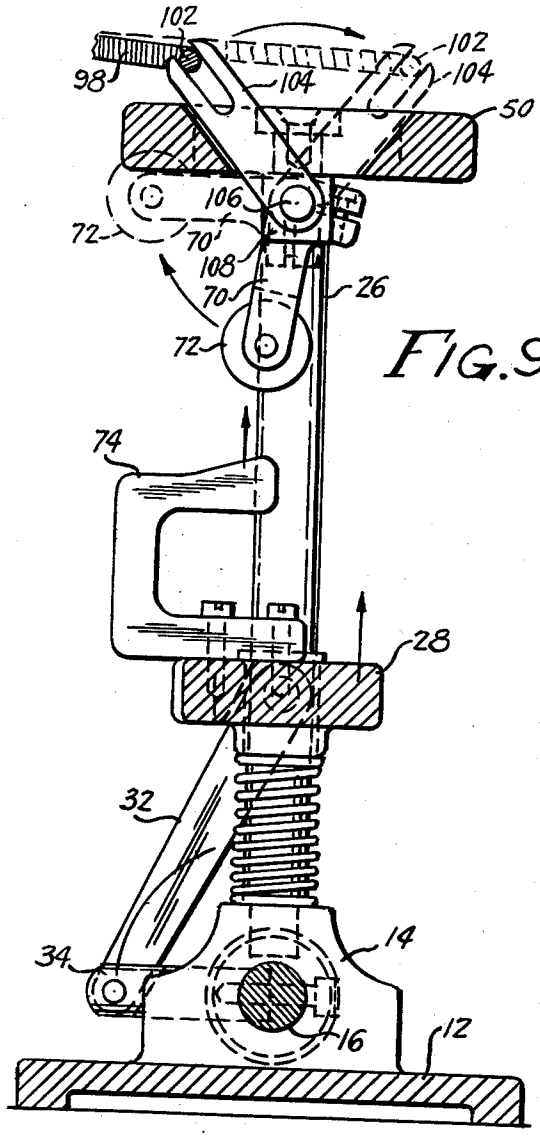


FIG. 9

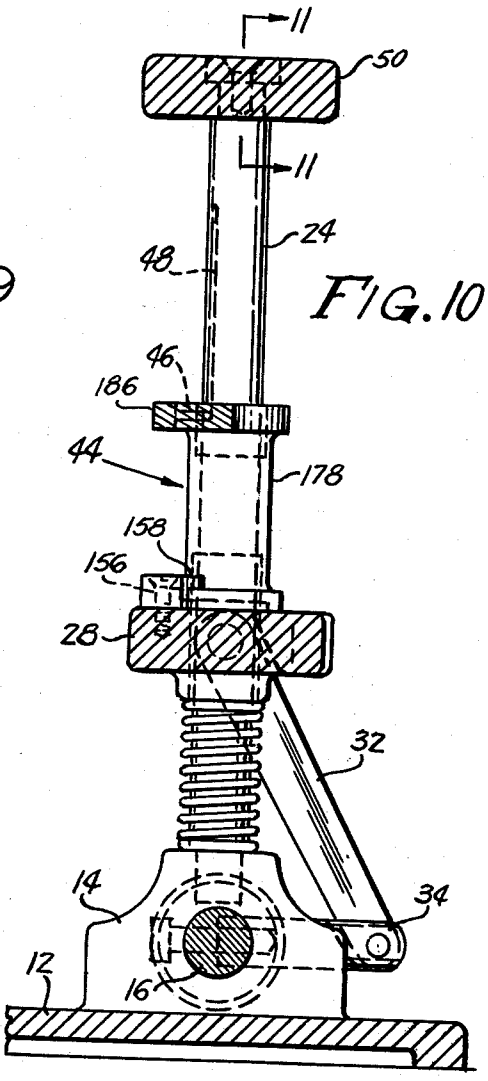


FIG. 10

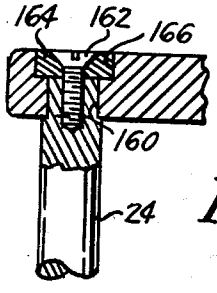


FIG. 11

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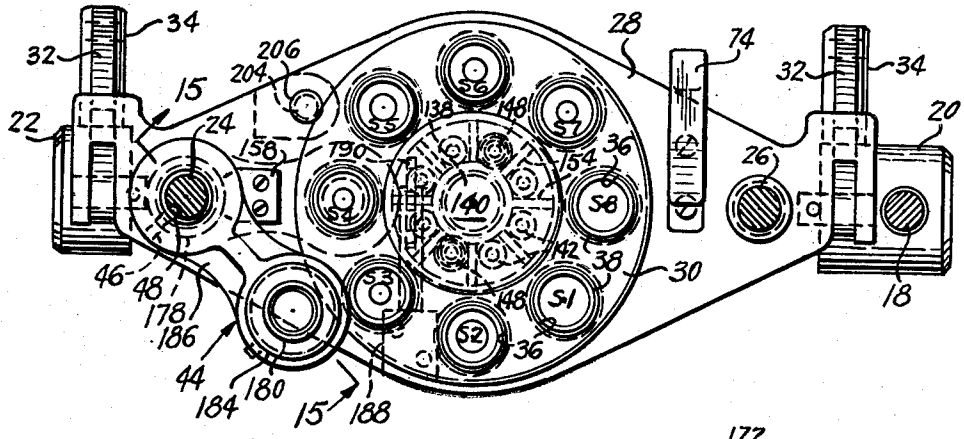
July 16, 1963 L. E. PONSNESS ETAL 3,097,560

PROGRESSIVE RELOADING MACHINE FOR SHOT SHELL

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FIG. 12



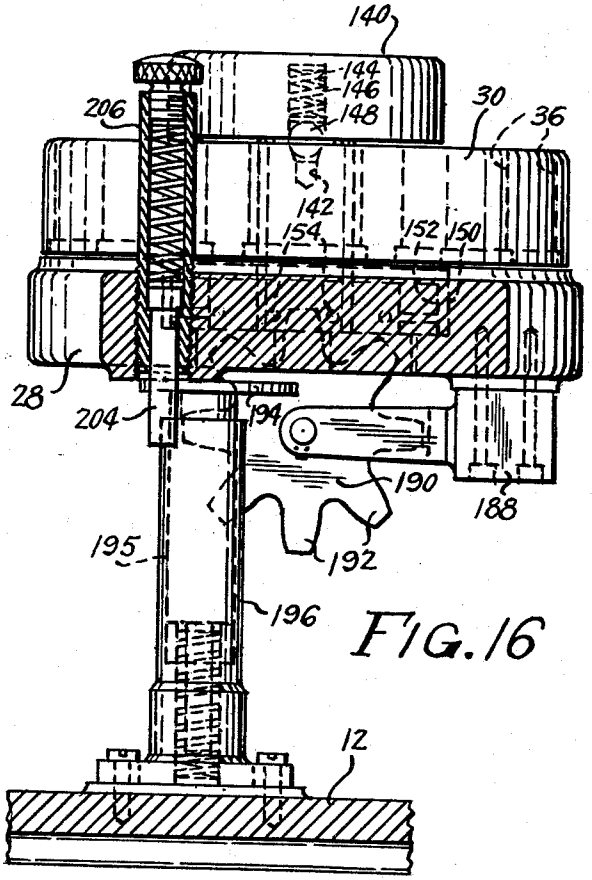


FIG. 16

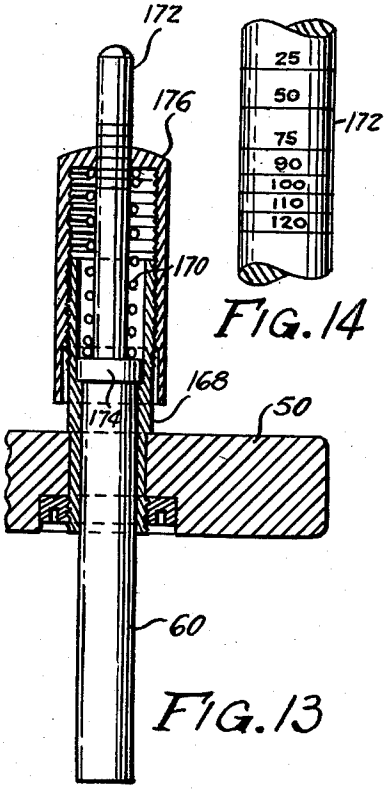


FIG. 13

FIG. 14

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PROGRESSIVE RELOADING MACHINE FOR SHOT SHELL

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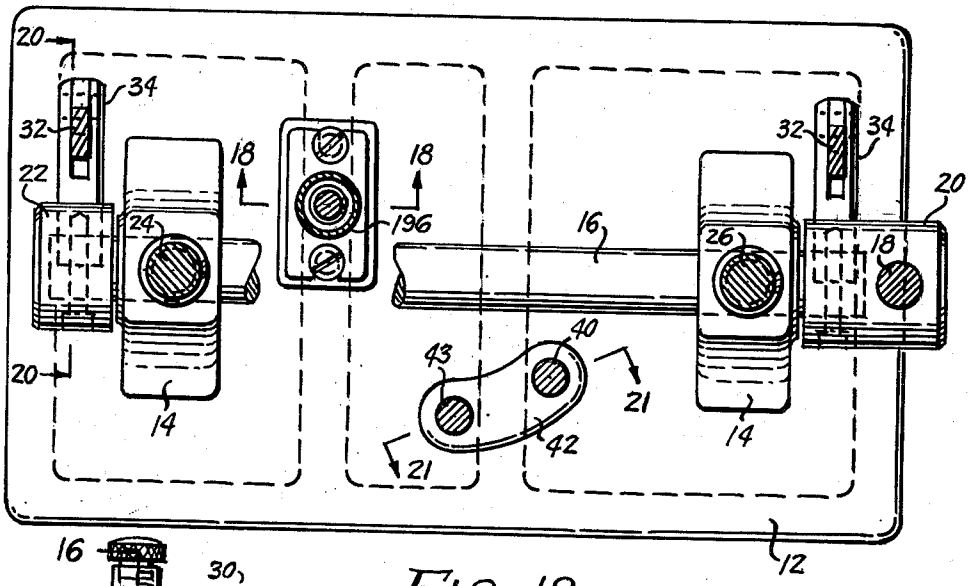


FIG. 19

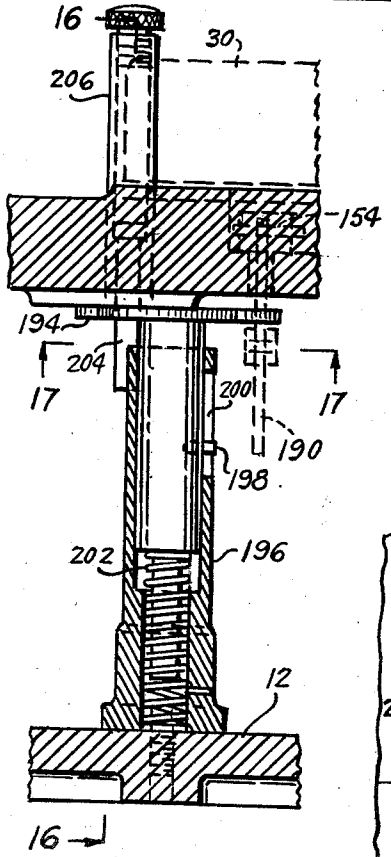


FIG. 18

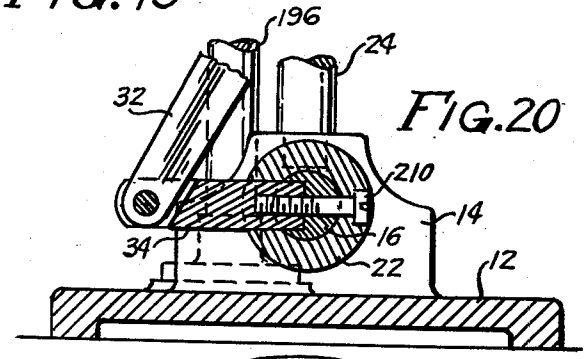


FIG. 20

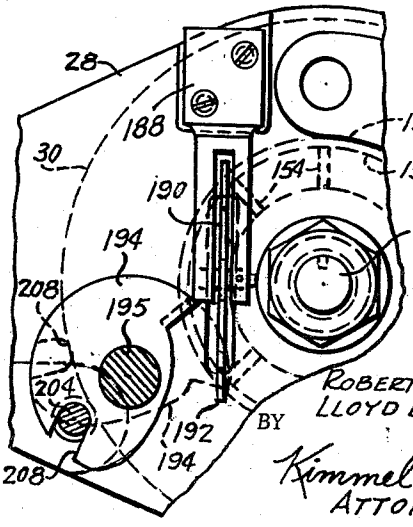


FIG. 17

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United States Patent Office 3,097,560 Patented July 16, 1963

3,097,560

PROGRESSIVE RELOADING MACHINE FOR SHOT SHELL

Lloyd E. Ponsness, Rathdrum, and Robert N. Barker, Hayden Lake, Idaho; said Barker assignor to said Lloyd E. Ponsness and Dorothy P. Ponsness, both of Rathdrum, Idaho

Filed July 28, 1961, Ser. No. 127,524
7 Claims. (Cl. 86—27)

The herein described invention relates to reloading machine, and more particularly to apparatus used in the reloading of shot shells which have been previously expended.

The primary object of the invention is a shot shell reloading machine which performs all of the necessary reloading operations in a series of steps without the necessity of utilizing other or separate tools.

Another object of the invention is a shot shell reloading machine wherein a plurality of shot shells may be progressively reloaded.

Another object of the invention is a shot shell reloading machine wherein a plurality of shot shells are sized, reprimed, charged and closed and ejected from the machine in a rapid and efficient manner.

Another object of the invention is a shot shell reloading machine provided with removable powder and shot containers whereby different type powders, as well as different size shot, may be used in the reloading of shells.

Further objects and advantages of the herein described invention will become readily apparent by referring to the following detailed description, when taken with the accompanying drawings, wherein:

FIGURE 1 is a front elevational view illustrating the machine constructed in accordance with the teachings of the present invention;

FIGURE 2 is a top plan view of the machine illustrated in FIGURE 1 with parts removed and portions cut away for clarity;

FIGURE 3 is a horizontal sectional view taken on the line 3—3 of FIGURE 1;

FIGURE 4 is a horizontal sectional view taken on the line 4—4 of FIGURE 1;

FIGURE 5 is a horizontal sectional view taken on the line 5—5 of FIGURE 1;

FIGURE 6 is a horizontal sectional view taken on the line 6—6 of FIGURE 1;

FIGURE 7 is a transverse vertical sectional side elevational view taken on the line 7—7 of FIGURE 1;

FIGURE 8 is a partial vertical sectional view taken on the line 8—8 of FIGURE 7;

FIGURE 9 is a partial vertical sectional view taken on the line 9—9 of FIGURE 1;

FIGURE 10 is a partial vertical sectional view taken on the line 10—10 of FIGURE 1;

FIGURE 11 is a fragmentary vertical sectional view taken on the line 11—11 of FIGURE 10;

FIGURE 12 is a horizontal sectional view taken on the line 12—12 of FIGURE 1;

FIGURE 13 is a partial sectional view taken on the line 13—13 of FIGURE 1, showing the wad inserting ram;

FIGURE 14 is an enlarged fragmentary elevational view of a portion of the wad inesrting ram, as illustrated in FIGURE 13;

FIGURE 15 is an enlarged partial vertical sectional view taken on the line 15—15 of FIGURE 12;

FIGURE 16 is an enlarged side elevational view partly in section, showing the supporting plate and the shell holding table and the indexing mechanism used in the reloading operation, whereby a plurality of shells are sequentially refilled with a primer, powder and shot;

FIGURE 17 is a fragmentary horizontal sectional view taken on the line 17—17 of FIGURE 18;

FIGURE 18 is a fragmentary vertical sectional view, taken on the line 18—18 of FIGURE 19 and illustrating in more detail portions of the indexing mechanism shown in FIGURE 16;

FIGURE 19 is a horizontal sectional view taken on the line 19—19 of FIGURE 1;

FIGURE 20 is an enlarged partial transverse sectional view taken on the line 20—20 of FIGURE 19;

FIGURE 21 is an enlarged partial diagonal sectional view taken on the line 21—21 of FIGURE 19; and,

FIGURE 22 is an enlarged horizontal sectional view taken on the line 22—22 of FIGURE 7.

Referring to FIGURE 1, the machine 10 of the present invention is supported on a base 12.

The base 12 has extending upwardly from the top surface thereof a pair of spaced bearing blocks 14. An operating shaft 16 is rotatably supported in the bearing blocks 14 and is rotated by movement of an actuating handle 18. The handle 18 is fixed in a collar 20 secured to the shaft 16 at one end. An identical collar 22 is fixed to shaft 16 at its other end whereby longitudinal displacement thereof is prevented.

Mounted in the upper surface of bearing blocks 14 are a pair of elongated vertically extending guide rods 24 and 26 which pass through openings in a support plate 28. The plate 28 serves as a support for a shot shell holding and sizing table 30 rotatably mounted thereon. The plate 28 has pivotally fixed to its opposite ends a pair of links 32 which are pivotally secured to arms 34 fixed to collars 20 and 22 on the ends of shaft 16. It will be apparent that actuation of handle 18 and rotation of shaft 16 through links 32 and 34 will cause vertical movement of the support plate 28 on the guide rods 24 and 26.

The shell holding and sizing table 30 is provided with a plurality of circumferentially spaced bores 36 extending therethrough. A plurality of sleeves 38 corresponding in number to bores 36 are secured to the upper surface of the table 30 and in alignment with the bores 36. The bores 36 and sleeves 38 have a diameter such that when shells to be reloaded are inserted therein they will be properly sized for reuse. The support plate 28 has a hole extending therethrough with which the bores 36 can be aligned to allow insertion of shells into the table 30 from below the plate 28. The shells are held for insertion into the table 30 by a holder 40 mounted on a support block 42 secured to the base 12. The detail of the shell holder 40 is shown in FIGURE 21 and will be later described. Also mounted on block 42 is a primer inserting tool 43 which inserts a new primer in the base of a shell subsequent to the removal of a spent primer therefrom. The detail of the primer inserting tool is also shown in FIGURE 21 and will be later described.

A wad positioning tool 44 is mounted for limited rotation on guide rod 24 and is supported on the upper surface of the support plate 28. The wad positioning tool 44 is provided with a pin 46 residing in a cam groove 48 in guide rod 24 whereby upon upward movement of the support plate 28 the tool 44 will automatically position a wad over the open end of a shell held in table 30 and one of the sleeves 38 for insertion therein. The details of the wad positioning tool are shown in FIGURE 15.

Mounted on the upper ends of guide rods 24 and 26 is a plate 50 upon which is removably mounted powder and shot containers 52 and 54 (one of which is shown) and dispensing means therefor which will be later described. Fixed to the underside of plate 50 is a plurality of reloading tools circumferentially disposed so as to be in alignment with the open ends of shot shells held in bores 36 and sleeves 38. The tools in order

of their operation are, a primer removing punch **56**, a powder drop tube **58**, a wad inserting ram **60**, a shot drop tube **62**, a precrimp tool **64**, a finish crimp tool **66** and a finished shell ejecting plunger **68**. Also fixed to the underside of the plate **50** is movable lever **70** having a cam follower **72** mounted at one end which coacts with a cam **74** secured to the upper surface of support plate **28** to operate the powder and shot dispensing means.

FIGURE 2 illustrates the relative disposition of the powder and shot containers **52** and **54** with respect to the plate **50**, and shows a cap or cover **76** which removably closes their open upper ends.

FIGURE 3 is similar to FIGURE 2 but shows the placement of the powder and shot containers **52** and **54** on the dispensing means **78**.

The details of the dispensing means are shown in FIGURES 4, 5 and 6 and comprise a casing **80** having openings **82** and **84** in the upper surface thereof in alignment with discharge openings in the lower ends of powder and shot containers **52** and **54**, respectively. The casing **80** has wall portions defining circular areas **86** and **88** in which disc valves **90** and **92** reside. The disc valves **90** and **92** are each provided with openings **94** and **96** which, when the valves **90** and **92** are in a non-dispensing position, are in alignment with the openings **82** and **84** in the casing **80**. The openings **94** and **96** can be of any suitable diameter so as to contain the desired charge of powder and shot be dispensed into the shells. It will be apparent that the diameter of the openings **94** and **96** can be made larger or smaller by the insertion of suitable sleeves such as **91** and **93**, to provide various loads for hunting, skeet, trap, etc.

The circumferential edges of the disc valves **90** and **92** have gear teeth cut therein which are in mesh with gear teeth on rack **98**. The rack **98** is positioned adjacent the edge of casing **80** and is biased to maintain the disc valves **90** and **92** in a non-dispensing position by a spring **100**. A pin **102** extends outwardly from the rack from the surface opposite the gear teeth and is in operable engagement with a yoke **104** fixed on rotary shaft **106** mounted in a bearing block **108** secured to the underside of the plate **50**.

The lever **70** is fixed to the opposite end of the shaft **106**, and upon engagement of the cam follower **72** with the cam **74** when the support plate **28** is vertically moved, causes rotation of shaft **106**, movement of yoke **104** and reciprocation of rack **98**. The reciprocation of rack **98** causes valves **90** and **92** to be rotated due to the engagement of their respective gear teeth. The valves **90** and **92** are rotated a sufficient distance to bring the powder and shot containing openings **94** and **96** into alignment with the powder and shot drop tubes **58** and **62** whereby the charges are dropped into the shells being reloaded, as shown in FIGURE 5.

When the support plate is lowered, the cam **74** and cam follower **72** move out of contact with each other and spring **100** moves the rack **98** to cause return of valves **90** and **92** to a non-dispensing position. The openings **94** and **96** in the valves **90** and **92** again become aligned with the openings **82** and **84** in the casing and receive a charge of powder and shot from the containers **52** and **54**.

During the initial loading of empty shells into the holding and sizing table **30**, it is necessary to prevent dispensing of powder and shot through tubes **58** and **62** since no shells will be in position to receive the charges. To prevent powder and shot from being dispensed by valves **90** and **92**, a pair of rotatable baffle plates **110** and **112** are positioned below the same. The baffle plates **110** and **112** each have openings **114** and **116** therethrough which, upon rotation of the plates **110** and **112**, are moved into and out of alignment with the powder and shot drop tubes **58** and **62**. The baffle plates **110** and **112** are rotated by means of handles **118** and **120** which

reside in cut out portions **122** and **124** of bottom plate **126** fixed to casing **80**. The baffle plates **110** and **112** are shown in alignment with the powder and shot drop tubes **58** and **62** in FIGURES 4 and 5 and shown in FIGURE 6 in position to prevent dispensing of powder by valves **90** and **92**.

In order to prevent packing and bridging of powder and shot in the containers **52** and **54**, each is provided with cup-shaped baffles **128** and **130** having openings through the walls thereof to allow a somewhat restricted flow of material therethrough. As shown in FIGURE 7, the baffles reside in the lower ends of the containers **52** and **54**. Also shown in FIGURE 7 is the manner in which the holding and sizing table **30** is rotatably mounted on the support plate **28**. The table **30** has through the center thereof an opening **132** in which a bearing **134** is held. The opening **132** is in alignment with an opening **136** in the support plate **28** and receives an axle **138** which extends through the openings **132** and **136** and is secured to the plate **28**. The axles **138** has an enlarged upper end portion **140** in overlying spaced relation to the top of the holding and sizing table **30** in the area adjacent the opening **132**.

Bores **142**, eight in number, are circumferentially disposed in equally spaced relation adjacent to the opening **132** in the table **30**, and are in alignment with a pair of diametrically opposed bores **144** in the enlarged end portion **140** of the axle **138**. The bores **144** have therein springs **146** and balls **148** which balls partially extend into the bores **142** to releasably hold the table **30** from rotational movement with respect to the support plate **28**. The table is incrementally rotated by an indexing mechanism later described.

Secured to the underside of the holding and sizing table **30** is an annular ring **150** having an annular channel **152** therein. A plurality of circumferentially spaced pins **154** extend through the annular channel **152** and are operatively engaged by the above-mentioned indexing mechanism. The operation of the rotation of holding and sizing table **30** and the function of the pins **154** in the annular channel **152** will be described when the description of the indexing mechanism is given.

The position of the shell holder **40** and the primer inserting tool **43** is illustrated when the tools are performing their respective functions in response to movement of the support plate **28**, i.e., holding a shell inserted into the holding and sizing table **30** and inserting a primer into a shell held in the table.

In FIGURE 8 there is shown in cross section the alignment of the opening **114** through baffle plate **110** with the powder drop tube **58** and the charge receiving position of the opening **94** in disc valve **90**. The disc valve **90** is shown in the non-dispensing position.

Shown in FIGURE 9 is the position of the cam **74** on the support plate **28** and arrows indicating the upward movement of the same whereby cam follower **72** engages the cam, which engagement causes rotation of the shaft **106**, swinging of yoke **104** and reciprocation of the rack **98** to the position shown in dotted lines. As previously disclosed, reciprocation of the rack **98** causes valves **90** and **92** to move from a non-dispensing position to a dispensing position.

FIGURE 10 illustrates the position of the wad positioning tool **44** on the guide rod **24** and on the support plate **28** and the screw **156** and bracket **158** which maintain the lower position of the tool in engagement with the surface of the support plate.

Shown in FIGURE 11 is the manner by which the plate **50** is secured to the guide rods **24** and **26**, one being shown. The plate **50** receives the upper end of the rod **24** in a bore **160** in the bottom thereof. The ends of the guide rods **24** and **26** each have a threaded bore therein to receive a threaded fastener **162** passing through a washer **164** in a bore **166** in the upper surface of the plate **50**.

The shell holding and sizing table **30**, as shown in FIG-

URE 12, is bored to hold and size eight shells. Each of the bores **36** and sleeves **38** hold and size a shell and retain the same during the entire reloading operation. The table **30** moves the shells step-by-step from the station indicated as S–**1** where a shell is inserted into the table and sized to S–**2** where the spent primer is removed and a new primer inserted. S–**3** indicates the powder receiving station, S-**4** the wad inserting station, S-**5** the shot receiving station, S–**6** the partial crimp station, S–**7** the finish crimp station and S-**8** the finished shell eject station. The wad positioning tool **44** is shown in dotted lines in the position assumed when a wad is being inserted into a shell.

The wad inserting ram **60** is constructed to apply various pressures to a wad being inserted into a shell. The details of the wad inserting ram **60** are shown in FIGURE 13 and as disclosed, the ram **60** is reciprocatively mounted in a sleeve **168** fixed to the plate **50**. The ram **60** is biased in the position shown by a compression spring **170** disposed around an extension **172** of the ram **60** and in engagement with a shoulder **174** thereon and the top of a cap **176** threadably engaging the sleeve **168**. The cap **176** is rotated to increase or decrease the compression of the spring **170** whereby the pressure exerted by the ram **60** can be varied.

The extension **172** of the wad inserting ram **60** is provided with indicia, as shown in FIGURE 14, to indicate the pressure which will be applied to the wad being inserted into a shell. The indicia disclose a pressure range of from 25 to 100 pounds, however, other suitable pressures can be used by substituting springs having greater or lesser compression characteristics than the spring **170**.

The wad positioning tool **44**, shown in detail in FIGURE 15, is comprised of a cylindrical body portion **178** through which guide rod **24** passes. The wads are placed in a cylindrical holder **180** threadably secured in a guide sleeve **182** which is spring biased in cylindrical casing **184** secured in arm **186** extending from the body portion **178**. The wad positioning tool **44** is rotated upon upward movement of support plate **28** due to the coaction of the pin **46** traveling in cam groove **48** whereby a wad will be positioned in overlying relation to a shell, and in alignment with the wad inserting ram **60**.

The shell holding and sizing table **30**, as previously stated, is moved in increments during upward movement of support plate **28** by an indexing mechanism, the details of which are illustrated in FIGURE 16. Secured to the underside of the support plate **28** is a support **188** having a wheel **190** rotatably mounted therein. The wheel **190** is provided with a plurality of radially extending lugs **192** which operatively engage pins **154** in the channel **152** of annular ring **150** secured to the underside of the holding and sizing table **30**. The wheel **190** is rotated by a cam **194** fixed to the end of a shaft **195** reciprocatively mounted in a sleeve **196** secured to the base **12**. The cam **194** is reciprocated by engaging the underside of support plate **28** upon downward movement thereof and partially rotated due to the operative engagement of a pin **198** fixed to shaft **195** and extending through a longitudinally extending diagonal slot **200** in sleeve **196**. The cam **194** is so positioned with respect to the lugs **192** on wheel **190** that upon rotation of the cam **194** the lobe thereof passes between the adjacent lugs **192**.

The cam **194** and shaft **195** are biased away from the base **12** by a spring **202**, as shown in FIGURE 18, and when the support plate **28** moves upwardly, the cam **194** would normally move with it until the pin **198** reaches the end of the slot **200**. The rotation thereof could possibly cause the lobe of the cam **194** to miss engagement with one of the lugs **192** on wheel **190** and cause the shells to be improperly reloaded. To prevent simultaneous movement of the cam **194** and support plate **28**, a retaining pin **204**, held in sleeve **206**, extends below the underside of support plate **28**. The retaining pin **204** is biased to a fully extended position, as shown in FIGURE 16. When the support plate **28** moves down towards the base **12**, the pin **204** contacts the upper surface of the cam **194** and is pushed into the sleeve **206**. The cam **194**, when engaged and moved down by the support plate **28**, rotates, and as the cam **194** reaches the limit of its rotation, a slot **208** in the edge thereof is aligned with the pin **204** and receives the same. The cam **194** is thus held from movement until the pin **204** is drawn from the slot **208** by the upward movement of the support plate **28**. The pin **204** is of a length sufficient to hold the cam **194** until the lugs **192** on wheel **190** are in proper relation to be positively engaged by the lobe portion thereof when the cam **194** rotates and assumes the position shown in dotted lines in FIGURE 17. Also shown in FIGURE 17 in solid lines is the cooperation of the pin **204** and slot **208** in cam **194**. Since the table **30** holds and sizes eight shells, and there are eight pins **154** in the annular ring **150** engaged by eight lugs **192** on wheel **190**, it will be apparent that each increment of rotation of the table **30** will be one-eighth of a complete rotation.

In FIGURE 19 there is shown the relative position of the bearing blocks **14** on the base **12**, the shaft **16** rotatably supported therein, the position of the block **42** upon which the shell holder **40** and the primer inserting tool are mounted and the position of the sleeve **196** in which shaft **195** for cam **194** resides.

The manner of fixing one of the arms **34** to the collars **20** and **22** is shown in FIGURE 20. As illustrated, a bolt **210** extends through bores in the collar **22** and shaft **16** and engages a threaded bore in arm **34**.

FIGURE 21 illustrates the details of the shell holder **40** and the primer inserting tool **43**. As shown, the shell holder **40** comprises a vertically extending pin **212** fixed to the block **42**. The pin has an enlarged upper end portion **214** upon which the base of a shell rests. A sleeve **216** is reciprocatively mounted on the pin **212** and extends upwardly beyond the end portion **214** to retain a shell thereon prior to its insertion into the holding and sizing table **30**. The primer inserting tool **43** is similar in structure to the shell holder **40** having a vertically extending pin **218** secured in a sleeve **220** fixed to the block **42**. The pin **218** has an enlarged upper end **222** upon which a primer rests. The primer is held in the tool prior to its insertion into a shell by a sleeve **224** reciprocatively mounted on pin **218** and extending beyond the upper end **222**.

FIGURE 22 illustrates the annular ring **150** secured to the underside of the shell holding and sizing table **30**, and the circumferentially spaced pins **154** in the channel **152**.

It will be apparent from the foregoing that when it is desired to reload spent shot shells a shell is placed in the holder **40** and handle **18** actuated to cause rotation of shaft **16** which, through arms **34** and link **32**, causes the support plate **28** to be moved downwardly toward the base **12**. The shell on holder **40** is inserted into one of the bores **36** and sleeves **38** in and on the holding and sizing table **30** and is properly sized and the table **30** moved one-eighth turn. The support plate is moved upwardly and another shell is placed in holder **40** to be inserted in the same manner. It should be pointed out that the shells are fully inserted in the table **30** when the support plate **28** reaches the limit of its downward travel whereby incremental rotation occurs after an operation has been performed on the shells. The shells are moved from the station S–**1** (see FIG. 12) to the S–**2** position where upon upward movement of the support plate **28** the spent primer is removed by the primer removing punch **56**. Downward movement of the support plate **28** allows a new primer to be inserted by primer inserting tool **43**. The holding and sizing table then moves the shell to S–**3** in alignment with the powder drop tube **58** through which a charge of powder is dispensed into the shell. The shell is next carried to the S–**4** position. A wad is placed in the wad positioning tool **44** and as the support plate **28** moves upward the wad is automatically positioned, as previously described, to be inserted into the shell by the

wad inserting ram **60**. The shell is moved to the S–5 position in alignment with the shot drop tube **62** to receive a charge of shot. After receiving the shot, the shell is moved to position S–6 where the open upper end is partially closed by the partial crimp tool **64**. The shell is then moved to the S–7 position where the end is completely closed by the finish crimp tool **66**. The finished shell is moved to the S–8 position where, upon upward movement of the support plate **28**, it is ejected by the ejecting plunger **68**.

While the reloading operation of one shell has been described, it will be understood that eight shells are contained in the holding and sizing table to be operated on in the same manner.

The invention, while described in its preferred embodiment, will lend itself to modifications and variations that will be apparent to those skilled in the art. However, such modifications and variations are considered to be within the scope and spirit of the appended claims.

We claim:

1. In a shell loading machine, a base, a supporting plate having a shell receiving hole therein mounted for reciprocating movement above the base, linkage for reciprocating said supoprting plate, a shell holding table rotatably mounted on said supporting plate and having bores therein for receiving the shells positioned on a circle around its axis of rotation and selectively alignable with the shell receiving hole in the supporting plate, mechanism connected to the linkage for reciprocating the supporting plate for intermittently rotating the shell holding table to selected positions, detent means for releasably positioning the shell holding table in the selected positions with one of the bores in the latter in alignment with the shell receiving hole in the supporting plate, a shell holder mounted on the base for inserting a shell through the aligned hole in the supporting plate and the bore in the shell holding table in the lowermost position of the supporting plate, a powder container positioned above the supporting plate, a valve in the bottom of the powder container, mechanism connected to the linkage for reciprocating the supporting plate for operating said valve to release a charge of powder into the shell in a selected position of the shell holding table beyond the shell receiving position, a wad positioning tool carried by the supporting plate and operable by the latter for placing a wad over the shell and a wad inserting ram positioned above the supporting plate and shell holding table for inserting a wad from the wad positioning tool into the shell as the supporting plate moves upwardly to advance the shell holding table to a position beyond the powder receiving position, and a shell ejecting plunger positioned above the supporting plate and the shell holding table for ejecting the shell from the bore in the latter in a position beyond the wad receiving position.

2. In a shell loading machine, a base, a supporting plate having a shell receiving hole therein mounted for reciprocating movement above the base, linkage for reciprocating said supporting plate, a shell holding table rotatably mounted on said supporting plate and having bores therein for receiving the shells positioned on a circle around its axis of rotation and selectively alignable with the shell receiving hole in the supporting plate, mechanism connected to the linkage for reciprocating the supporting plate for intermittently rotating the shell holding table to selected positions, detent means for releasably positioning the shell holding table in the selected position with one of the bores in the latter in alignment with the shell receiving hole in the supporting plate, a shell holder mounted on the base for inserting a shell through the aligned holes in the supporting plate and the bore in the shell holding table in the lowermost position of the supporting plate, a powder container positioned above the supporting plate, an automatically operable valve adjacent the bottom of the powder container, a manually operable valve at the bottom of the powder container below the automatically operable valve, mechanism connected to the linkage for reciprocating the supporting plate for operating the automatically operable valve to release a charge of powder with a shell in a selected position of the shell holding table beyond the shell receiving position, a wad positioning tool carried by the supporting plate and operable by the latter for placing a wad over the shell and a wad inserting ram positioned above the supporting plate and shell holding table for inserting a wad from the wad positioning tool into the shell as the supporting plate moves upwardly to advance the shell holding table to a position beyond the powder receiving position, and a shell ejecting plunger positioned above the supporting plate and the shell holding table for ejecting the shell from the bore in the latter in a position beyond the wad receiving station.

3. In a shell loading machine, a base, a supporting plate having a shell receiving hole therein mounted for reciprocating movement above the base, linkage for reciprocating the plate, a shell holding table rotatably mounted on said supporting plate and having bores therein for receiving the shells positioned on a circle around its axis of rotation and selectively alignable with the shell receiving hole in the supporting plate, mechanism connected to the linkage for reciprocating the supporting plate for intermittently rotating the shell holding table to selected positions, detent means for releasably positioning the shell holding table in the selected position with one of the bores in the latter in alignment with the shell receiving hole in the supporting plate, a shell holder mounted on the base for inserting a shell through the aligned hole in the supporting plate and the bore in the shell holding table as the supporting plate moves downwardly, a powder container positioned above the supporting plate, a valve in the bottom of the powder container, mechanism connected to the linkage for reciprocating the supporting plate for operating said valve to release a charge of powder into the shell in a selected position of the shell holding table in advance of the shell receiving position, a wad positioning tool carried by the supporting plate and operable by the latter for placing a wad over the shell and a wad inserting ram positioned above the supporting plate and shell holding table for inserting a wad from the wad positioning tool into the shell as the supporting plate moves upwardly to advance the shell holding table to a selected position in advance of the powder receiving position, a shot container positioned above the supporting plate, a valve in the bottom of the shot container, mechanism connected to the linkage for reciprocating the supporting plate for operating said valve to release a load of shot into the shell in a selected position of the shell holding table in advance of the wad receiving position, a crimping tool mounted above the supporting plate in a selected position in advance of the shot receiving position for folding the open end of the shell inwardly to hold the load of shot in place as the supporting plate moves upwardly, and a shell ejecting plunger positioned above the supporting plate and the shell holding table in a selected position in advance of the crimping position for ejecting the shell from the bore in the shell holding table as the supporting plate moves upwardly.

4. In a shell loading machine, a base, a supporting plate having a shell receiving hole therein mounted for reciprocating movement above the base, linkage for reciprocating said supporting plate, a shell holding table rotatably mounted on said supporting plate and having bores therein for receiving the shells positioned on a circle around its axis of rotation and selectively alignable with the shell receiving hole in the supporting plate, mechanism connected to the linkage for reciprocating the supporting plate for intermittently rotating the shell holding plate to selected positions, detent means for releasably positioning the shell holding table in the selected

positions with one of the bores in the latter in alignment with the shell receiving hole in the supporting plate, a shell holder mounted on the base for inserting a shell through the aligned hole in the supporting plate and the bore in the shell holding table as the supporting plate moves downwardly, an automatically operable valve adjacent the bottom of the powder container, a manually operable valve at the bottom of the powder container below the automatically operable valve, mechanism connected to the linkage for reciprocating the supporting plate for operating the automatically operable valve to release a charge of powder into the shell in a selected position of the shell holding table beyond the shell receiving position, a wad positioning tool carried by the supporting plate and operable by the latter for placing a wad over the shell and a wad inserting ram positioned above the supporting plate and shell holding table for inserting a wad from the wad positioning tool into the shell as the supporting plate moves upwardly to advance the shell holding table to a position beyond the powder receiving position, a shot container positioned above the supporting plate an automatically operable valve adjacent the bottom of the shot container, a manually operable valve at the bottom of the shot container below the automatically operable valve, mechanism connected to the linkage for reciprocating the supporting plate for operating the latter automatically operable valve to release a load of shot into the shell in a selected position of the shell holding table in advance of the wad receiving position, a crimping tool mounted above the supporting plate for folding the open end of the shell inwardly to hold the load of shot in place in a selected position of the shell in advance of the shot receiving position, and a shell ejecting plunger positioned above the supporting plate and the shell holding table for ejecting the shell from the bore in the latter in a selected position in advance of the wad crimping position.

5. In a shell loading machine, a base, a supporting plate having a shell receiving hole therein mounted for reciprocating movement above the base, linkage for reciprocating said supporting plate, a shell loading table rotatably mounted on said supporting plate and having bores therein for receiving the shells positioned on a circle around its axis of rotation, and selectively alignable with the shell receiving hole in the supporting plate, mechanism connected to the linkage for reciprocating the supporting plate for intermittently rotating the shell holding table to selected positions, detent means for releasably positioning the shell holding table in the selected positions with one of the bores of the latter in alignment with the shell receiving hole in the supporting plate, a shell holder mounted on the base for inserting a shell through the aligned hole in the supporting plate and the bore in the shell holding table as the supporting plate moves downwardly, a powder container positioned above the supporting plate, a valve in the bottom of the powder container, mechanism connected to the linkage for reciprocating the supporting plate for operating said valve to release a charge of power into the shell in a selected position of the shell holding table in advance of the shell receiving position, a wad positioning tool carried by the supporting plate and operable by the latter for placing a wad over the shell and a wad inserting ram positioned above the supporting plate and shell holding table for inserting a wad from the wad positioning tool into the shell as the supporting plate moves upwardly to advance the shell holding table to a selected position in advance of the powder receiving position, a shot container positioned above the supporting plate, a valve in the bottom of the shot container, mechanism connected to the linkage for reciprocating the supporting plate for operating said valve to release a load of shot into the shell in a selected position of the shell holding table in advance of the wad receiving position, an initial crimping tool mounted above the supporting plate in a selected position in advance of the shot receiving position for partially folding the open end of the shell inwardly to hold the load of shot in place as the supporting plate moves upwardly, a finish crimping tool mounted above the supporting plate in a selected position in advance of the initial crimping position for completing the inward folding of the open end of the shell as the supporting plate moves upwardly, and a shell ejecting plunger positioned above the supporting plate and the shell holding table in a selected position in advance of the finish crimping position for ejecting the shell from the bore in the shell holding table as the supporting plate moves upwardly.

6. In a shell loading machine, a base, a supporting plate having a shell receiving hole therein mounted for reciprocating movement above the base, linkage for reciprocating said supporting plate, a shell holding table rotatably mounted on said supporting plate and having bores therein for receiving the shells positioned on a circle around its axis of rotation and selectively alignable with the shell receiving hole in the supporting plate, mechanism connected to the linkage for reciprocating the supporting plate for intermittently rotating the shell holding table to selected positions, detent means for releasably positioning the shell holding table in the selected positions with one of the bores in the latter in alignment with the shell receiving hole in the supporting plate, a shell holder mounted on the base for inserting a shell through the aligned hole in the supporting plate and the bore in the shell holding table as the supporting plate moves downwardly, a primer inserting tool mounted on the base and arcuately spaced from the shell holder in the direction of rotation of the shell holding table and by an angle equal to the arcuate spacing of the shell receiving bores in the latter for inserting a primer in the shell as the supporting plate moves downwardly, a powder container positioned above the supporting plate, a valve in the bottom of the powder container, mechanism connected to the linkage for reciprocating the supporting plate for operating said valve to release a charge of powder into the shell in a selected position in advance of the primer inserting position, a wad positioning tool carried by the supporting plate and operable by the latter for placing a wad over the shell and a wad inserting ram positioned above the supporting plate and shell holding table for inserting a wad from the wad positioning tool into the shell as the supporting plate moves upwardly to advance the shell holding table to a selected position in advance of the powder receiving position, a shot container positioned above the supporting plate, a valve in the bottom of the shot container, mechanism connected to the linkage for reciprocating the supporting plate for operating the valve to release a load of shot into the shell in a selected position of the shell holding table in advance of the wad receiving position, a crimping tool mounted above the supporting plate in a selected position in advance of the shot receiving position for folding the open end of the shell inwardly to hold the load of shot in place as the supporting plate moves upwardly, and a shell ejecting plunger positioned above the supporting plate and the shell holding table in a selected position in advance of the crimping position for ejecting the shell from the bore in the shell holding table as the supporting plate moves upwardly.

7. In a shell re-loading machine, a base, a supporting plate having a shell receiving hole therein mounted for reciprocating movement above the base, linkage for reciprocating said supporting plate, a shell loading table rotatably mounted on said supporting plate and having bores therein for receiving the shells positioned on a circle around its axis of rotation and selectively alignable with the shell receiving hole in the supporting plate, mechanism connected to the linkage for reciprocating the supporting plate for intermittently rotating the shell holding table to selected positions, detent means for releasably positioning the shell holding table in the selected positions with one of the bores in the latter in alignment

with the shell receiving hole in the supporting plate, a shell holder mounted on the base for inserting a shell through the aligned hole in the supporting plate and the bore in the shell holding table as the supporting plate moves downwardly, a primer removing punch mounted above the supporting plate and the shell holding table and arcuately spaced from the shell holder in the direction of rotation of the shell holding table and by an angle equal to the arcuate spacing of the shell receiving bores in the latter for removing the spent primer from a shell as the supporting plate moves upwardly after advancing the shell holding table from the shell inserting position to the next adjacent selected position, a primer inserting tool mounted on the base in vertical alignment with the primer removing punch for inserting a new primer in the shell as the supporting plate moves downwardly and the shell holding table is advanced from the primer removing position to a powder receiving position, a powder container positioned above the supporting plate, a valve in the bottom of the powder container, mechanism connected to the linkage for reciprocating the supporting plate for operating said valve to release a charge of powder into the shell in the powder receiving position, a wad positioning tool carried by the supporting plate and operable by the latter for placing a wad over the shell, and a wad inserting ram positioned above the supporting plate and shell holding table for inserting

a wad from the wad positioning tool into the shell as the supporting plate moves upwardly to advance the shell holding table to a selected position in advance of the powder receiving position, a shot container positioned above the supporting plate, a valve in the bottom of the shot container, mechanism connected to the linkage for reciprocating the supporting plate for operating the valve to release a load of shot into the shell in a selected position of the shell holding table in advance of the wad receiving position, a crimping tool mounted above the supporting plate in a selected position in advance of the shot receiving position for folding the open end of the shell inwardly to hold the load of shot in place as the supporting plate moves upwardly, and a shell ejecting plunger positioned above the supporting plate and the shell holding table in a selected position in advance of the crimping position for ejecting the shell from the bore in the shell holding table as the supporting plate moves upwardly.

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