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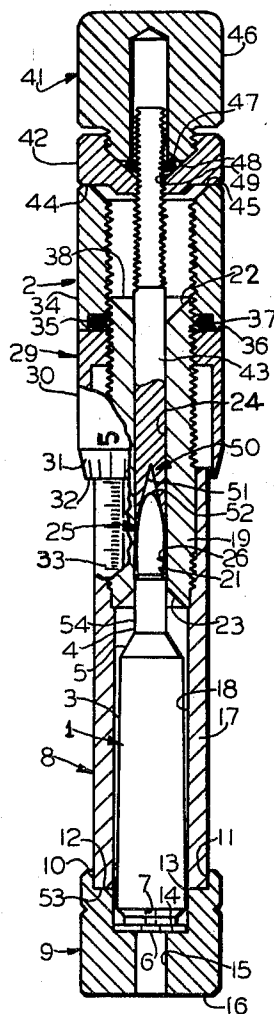
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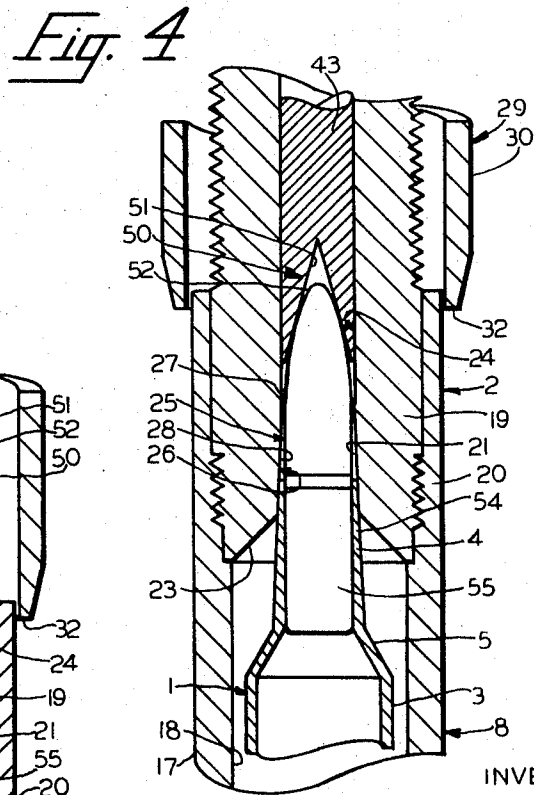
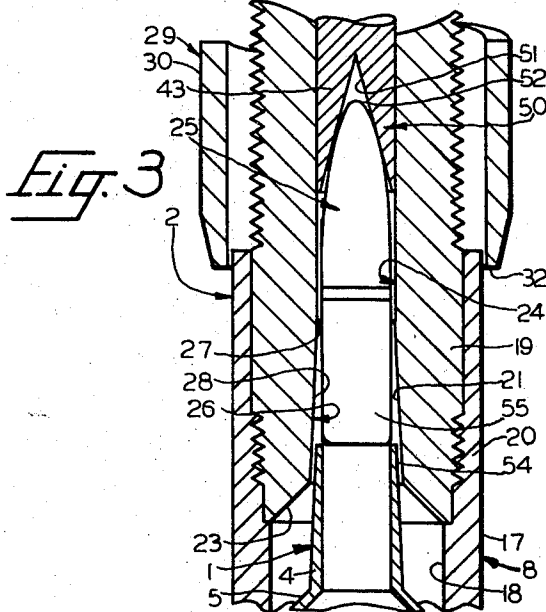
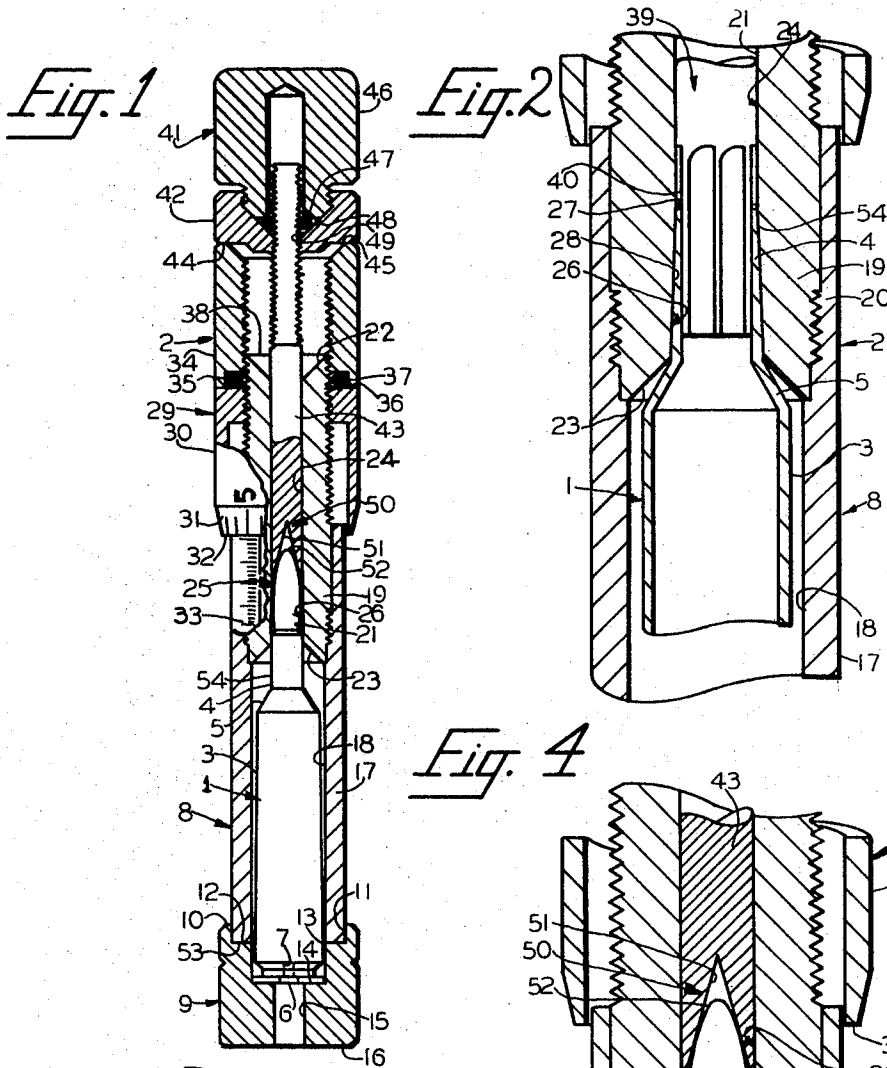
[54] **CARTRIDGE CASE RELOADING**  
**8 Claims, 4 Drawing Figs.**

[52] **U.S. Cl.**..... **86/24, 86/43**  
 [51] **Int. Cl.**..... **F42b 33/10, F42b 35/02**  
 [50] **Field of Search**..... **86/23, 24, 43**

[56] **References Cited**  
**UNITED STATES PATENTS**  
 2,600,488 6/1952 Crump ..... 86/43  
 2,741,148 4/1956 Thompson, Jr. .... 86/24X

**ABSTRACT:** In apparatus for reloading used center-firing cartridge cases, a resizing sleeve having a bore therein of which the upper portion is cylindrical and the lower portion is tapered to wedgingly receive the neck of a cartridge case driven upwardly therein to resize and reform the neck and to hold the neck in a reaming position therein; a reamer adapted for reaming the interior of the neck to obtain uniform neck wall thickness; a bullet-seating gauge threadably mounted on the projecting above the resizing sleeve and micrometrically alignable on the shell guide to reveal the distance which the bullet-seating gauge projects above the resizing sleeve; an elongated bullet seater adapted to engage and force a bullet downwardly a predetermined distance into a seated position within the neck while the neck is partially within the tapered lowered portion of the bore in a bullet-seating position; and means for positioning the neck in the bullet-seating position.





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CARTRIDGE CASE RELOADING

Reloading apparatus for used center-firing rifle and hand gun cartridges are known in the art. One type of apparatus, which is shown in U.S. Pat. No. 3,134,293, issued May 16, 1964, to the inventor and entitled "Shell Reloaders," includes a cylindrical shell guide having a bore therethrough adapted to receive a used cartridge case. The shell guide has a resizing sleeve on its upper end adapted to receive, within a bore therethrough, the neck of the cartridge case when the cartridge case is driven upwardly therein by mechanical force until the base end of the cartridge case is flush with the lower end of the shell guide. A bullet-seating stop combination is provided, which is comprised of a knurled locking ring vertically adjustably threaded onto the upper end of the resizing sleeve, and a knurled stop collar also removably threaded onto the sleeve so that it may be turned downwardly until it abuts the locking ring, in which position it projects a predetermined distance above the resizing sleeve, determined from experience depending upon the length of the used cartridge case and the bullet to be seated therein. A generally cylindrical priming chamber is provided, which includes internal mechanism for mounting a new primer or detonator cap in the cartridge case. The priming chamber has projecting transversely therefrom an elongated bullet seater handle, which has formed in the outer end thereof an inwardly tapered longitudinal bore which is of a size and shape to fit snugly on the nose of a bullet.

Briefly, the foregoing elements of the reloading apparatus shown in the U.S. Pat. No. 3,134,293 are used in the following manner to resize and reload a used cartridge case: When the cartridge case is driven upwardly into the shell guide and resizing sleeve assembly, the neck of the cartridge case, which had been expanded and deformed in the prior firing of the cartridge, thereby is forcibly driven into and tightly wedged in the bore of the resizing sleeve to resize and reform the exterior of the neck to its original specifications. The cartridge case then is seated in the priming chamber and a new primer or detonator cap is mounted therein. The cartridge case neck then must be completely removed from the bore of the resizing sleeve, before a bullet can be seated within the cartridge case neck. A measured amount of powder then is poured into the top end of the resizing sleeve and, therefore, into the empty cartridge case; a bullet is dropped through the top end of the bore of the resizing sleeve to a position on the top of the neck; and the bullet-seating stop combination is turned to a position relative to the resizing sleeve, determined by the reloader's experience, in which the stop collar projects a desired distance above the top of the resizing sleeve. The bullet seater handle on the priming chamber then is inserted into the top of the resizing sleeve bore until the lower end thereof engages the nose of the bullet. A few hammer blows on the side of the priming chamber will drive the bullet downwardly into the cartridge neck, and the upper edge of the stop collar forms a stop for the downward movement of the priming chamber and thereby prevents the bullet from being driven too far into the cartridge case neck. When the reloading operation has been completed, the reloaded cartridge may be removed from the shell guide.

Several problems arise in connection with the reloading of used cartridge cases, which are not overcome by the use of the apparatus shown and described in U.S. Pat. No. 3,134,293. Accurate shooting requires that the thickness of the wall of the neck be uniform throughout its circumference in order that the bullet, when seated in the neck, will be concentric with the neck and uniformly frictionally held therein; but no means are provided in such apparatus for overcoming the variations in wall thickness which arise during the course of the manufacture of cartridge cases. The neck must be completely removed from the resizing sleeve bore for bullet seating, because during seating the neck must expand when the bullet is forced downwardly therein in order to provide a tight fit for the bullet in the neck. However, when the cartridge case neck is free from the restrictions of the resizing sleeve bore, the cartridge case and neck may move laterally

within the shell guide during bullet seating, and the seated bullet and the neck may not be concentric. The apparatus' bullet-seating stop combination is not infallible and may become loose and turn on the resizing sleeve, or the reloader may desire to seat a bullet having a different weight to a different depth within the neck. In either event, the reloader must again experiment with various settings of the stop collar and locking ring in order to obtain desired firing results. Finally, the generally cylindrical shape of the priming chamber provides only a relatively small surface-to-surface contact between the exterior of the priming chamber and the top edge of the stop collar during bullet seating, resulting in a loss of the desired uniformity of bullet seating depth and concentricity.

The present invention provides improvements for reloading apparatus, including a resizing sleeve having a bore therethrough including a tapered lower portion for wedgingly receiving and holding the neck of a used cartridge case driven upwardly therein, and a reamer for slidable insertion into the cylindrical upper portion of the bore and into the neck for reaming the interior surface of the neck. A vertically adjustable bullet-seating gauge is threadably mounted on the resizing sleeve and has indicia on the lower edge thereof alignable with an index on the exterior of the shell guide. The gauge also has a bore therethrough for receiving an elongated bullet seater extending downwardly from a bullet seater head. The bullet seater head has a generally flat bottom surface adapted to engage the entire circumference of the upper surface of the gauge when the bullet seater is slidably inserted in the upper portion of the resizing sleeve bore and the bullet seater head is driven downwardly to seat a bullet in the neck of the cartridge case while the neck is partially within the tapered bore.

Improved reloading apparatus thereby is provided in which the tapered lower portion of the bore of the resizing sleeve is adapted to receive the deformed neck of a used cartridge in order to resize and reform the exterior thereof, and to hold the neck firmly in a reaming position to permit reaming of its interior. Such reaming enables the reloader to remove sufficient metal from the interior to make the interior of the neck round, to make the thickness of the wall of the neck uniform throughout its circumference to ensure concentricity of a seated bullet and the neck and the case, and to increase the diameter of the neck to a dimension slightly smaller than the outside diameter of the bullet to be seated therein in order to insure a light press frictional fit of the seated bullet within the neck. The neck of each used cartridge case of the same caliber may be driven upwardly into the tapered portion of the bore the same distance to the same reaming position, notwithstanding variations in deformed wall thicknesses. After reaming, the frictional tightness with which a seated bullet will be held by the neck will be virtually uniform, from reloaded cartridge to reloaded cartridge, ensuring virtually uniform firing results. The micrometer-type bullet-seating gauge enable a reloader, who has experimented with a multiplicity of micrometer settings during reloading and has determined what particular setting provides the depth of bullet seating required for optimum firing results, to record that setting for future reference and, at a future time, reestablish the micrometer setting of the bullet-seating gauge on the resizing sleeve to obtain the same firing results. The tapered lower portion of the bore permits the relatively easy partial retraction of the resized neck to a predetermined bullet-seating position within the tapered portion of the bore. In that position, the exterior of the neck is in close proximity to but spaced from the wall of the tapered portion so that, when a bullet is driven downwardly into the interior of the neck by the bullet seater (which is centered within the bore by virtue of its slidable relationship with the upper cylindrical portion thereof), the wall of the neck may expand until it abuts the wall of the tapered portion. Thereby, the tightness of frictional fit of bullets within the necks of cartridge cases of the same caliber will be uniform, and each bullet, neck and case will be concentric, with the axes of the bullet, neck and case coincidental. The inaccuracies which previously resulted from the use of the generally cylindrical priming

chamber as a bullet-seater head have been eliminated by the abutting relationship between the bottom surface of the bullet-seater head and the upper surface of the bullet-seating gauge throughout the entire circumference.

The best mode presently contemplated of carrying out the invention is illustrated in the accompanying drawings, in which

FIG. 1 is an elevation view of reloading apparatus embodying the improvements of the present invention, with parts broken away and in section to illustrate details of construction, and showing the neck of a cartridge case in its bullet-seating position and the relationship of the elements immediately after completion of the bullet-seating operation.

FIG. 2 is a fragmentary sectional view through the resizing sleeve shown in FIG. 1, with the taper of the bore shown in exaggerated form, showing the neck of a cartridge case inserted in the tapered bore in its reaming position for reforming and resizing, and with the reamer inserted in the bore and into the interior of the neck for reaming.

FIG. 3 is a fragmentary sectional view through the resizing sleeve shown in FIG. 2, showing the neck partially retracted from the bore to its bullet-seating position therein, with a bullet about to be seated in the neck.

FIG. 4 is a fragmentary sectional view through the resizing sleeve shown in FIG. 2, showing a bullet seated in the neck, and the neck expanded to abut against the tapered lower portion of the bore of the resizing sleeve.

A cartridge 1 of the type to be reloaded by means of the improved reloading apparatus 2 described herein ordinarily consists of an elongated, cylindrical brass case 3 having a narrower upper portion or neck 4 and an inclined shoulder 5 at the junction between the neck 4 and the case 3; and formed in the base end 6 of the cartridge case 3 is a bore 7 in which a detonator cap or primer (not shown) may be fitted.

The improvements are adapted for interconnection with the lower portion 8 of the reloading apparatus shown and described in the inventor's U.S. Pat. No. 3,134,293. The lower portion 8 includes a cylindrical cartridge case holder 9, having a top face 10 with a depressed circular chamber 11 and shell guide seat 12 formed therein, which is designed to function both as a shell-retracting anvil, during the reloading operation hereinafter described, and as a decapper or deprimer anvil during the removal of the spent primer from the used cartridge 1 by the method described in the inventor's patent. Opening downwardly in the center of the shell guide seat 12 is a cartridge case bore 13 which extends downwardly to form a second or cartridge case seat 14 therebelow, and communicating with the cartridge case bore 13 is a smaller, concentric primer bore 15 extending through the cartridge case holder 9 to the bottom surface 16 thereof. The cartridge case seat 14 is of a diameter to receive the base end 6 of an upright cartridge case 3, and the primer bore 15 is of sufficient size to permit a cartridge primer to fall therethrough.

The lower portion 8 also includes a cylindrical shell guide 17 designed to be removably mounted on the shell guide seat 12 of the cartridge case holder 9. The shell guide 17 has a longitudinal cartridge-receiving bore 18 therethrough within which a cartridge 1 may be inserted, as shown.

### RESIZING SLEEVE

Although it is contemplated that the invention also encompass a construction whereby the resizing sleeve 19 is integral with the shell guide 17 or removably mounted thereon by other means, it is preferred that, as shown, the cartridge-receiving bore 18 of the shell guide 17 be provided with an enlarged, threaded upper end portion 20, and that a cylindrical, externally threaded resizing sleeve 19 be removably threaded therein. The resizing sleeve 19 includes a longitudinal bore 21 therethrough, which is adapted to register with the larger cartridge-receiving bore 18 and which has flared upper and lower ends 22 and 23. The upper portion 24 of the bore is cylindrical and has a diameter slightly larger than the outside diameter of

the bullet 25 to be seated, in order to permit the bullet 25 to be dropped through the upper portion 24 for seating. The lower portion 26 of the bore 21 is tapered above the flared lower end 23, and the height of length of the tapered lower portion 26 is at least equal to the length of the neck 4 (measured from the top of the shoulder 5), as specified by the cartridge manufacturer for the particular make and caliber of cartridge 1 to be reloaded, in order to ensure that the neck 4 will be supported within the tapered lower portion 26, and not within the cylindrical upper portion 24, during the reaming operation hereinafter described. For example, the length of the neck 4 of a 30/30 Winchester cartridge is 0.450 inches and, therefore, the height of the tapered lower portion 26 of the bore 21 of a resizing sleeve 19 to reload such a cartridge 1 would be at least equal to 0.450 inches. The lower portion 26 of the bore 21 is tapered, from the bottom end 27 of the cylindrical upper portion 24, 0.001 inches for each 0.020 to 0.050 inches of height of the tapered lower portion 26, depending on the neck length specified by the manufacturer and the average wall thickness of the necks of that particular make and caliber of cartridge 1. In the event the specified neck length is extremely long, a smaller rate of taper may be required and, conversely, an extremely short neck length will require the use of a greater rate of taper, all in order to adequately laterally position the neck 4 for accurate reaming and concentric bullet seating. A tapered lower portion 26 of the bore 21 thereby is provided which, it has been found, will accommodate all diameters of deformed necks of the same or average length of cartridge of the same make caliber, will firmly hold the neck 4 of a used cartridge 1 in its reaming position during the reaming operation hereinafter described, will permit the neck 4 to be readily, partially retracted from the tapered portion 26 of the bore 21 to its bullet-seating position after the reaming operation has been completed and preparatory to the bullet-seating operation hereinafter described, and will have a bore wall 26 which will be in close proximity to be spaced from the exterior of the neck 4 in its bullet-seating position to allow for a predetermined amount of expanding of the neck 4 during bullet seating.

### BULLET-SEATING GAUGE

Vertically adjustably threaded onto the resizing sleeve 19 is a bullet-seating gauge 29 which (although it is contemplated that the invention encompass integral bullet-seating gauges) as illustrated is comprised of a narrow locking ring 30 having indicia 31 on the lower edge 32 thereof alignable with an index 33 on the exterior of the shell guide 17, and a knurled stop collar 34 which also is removably threaded onto the resizing sleeve 19 and is designed to be turned downwardly until it abuts the locking ring 30 and a resilient O-ring 35 therebetween, which surrounds the resizing sleeve 19. The stop collar 34, locking ring 30 and O-ring 35 combination is preferred in order to provide inhibiting means (the resilient intermediate O-ring 35) which will maintain frictional engagement between the elements of the bullet-seating gauge 29 and the resizing sleeve 19 to inhibit rotation of the gauge 29 from its preselected relationship with the resizing sleeve 19. When the stop collar 34 is turned down into abutting engagement with the locking ring 30, the O-ring 35 is vertically compressed and expands laterally into the adjacent threads on the exterior of the resizing sleeve 19, inhibiting rotational movement of the bullet-seating gauge 29 and holding the bullet-seating gauge 29 in preselected position on the resizing sleeve 19. The compressed O-ring 35 also frictionally engages the upper surface 36 of the locking ring 30 and the lower surface 37 of the stop collar 34 to prevent rotation of either the stop collar 34 or locking ring 30 relative to the other. By turning the bullet-seating gauge 29 downwardly until a predetermined alignment between the gauge indicia 31 and the shell guide index 33 is accomplished, a desired relative threaded engagement of the gauge 29 on the shell guide 17 may be obtained and the stop collar 34 will project a desired predetermined distance above the top edge 38 of the resizing sleeve 19.

An elongated rod (not shown), which is described in the inventor's U.S. Pat. No. 3,134,293, functions both as a priming rod and as a tool for partially retracting the neck 4 from the tapered lower portion 26 of the resizing sleeve bore 21 for the bullet-seating operation. The rod is adapted to be removably inserted into the registering resizing sleeve bore 21 and cartridge-receiving bore 18 and to extend downwardly therethrough.

#### REAMER

A reamer 39 is provided which is dimensioned to have an outside diameter slightly smaller than the inside diameter of the cylindrical upper portion 24 of the resizing sleeve bore 21 and thereby to be slidably inserted into the upper cylindrical portion 24 of the resizing sleeve bore 21 and to extend downwardly thereinto and, as the reamer 39 is rotated to remove metal from the interior surface of the neck 4, into the interior of the neck 4. The cutting teeth 40 of the reamer 39 are dimensioned to remove, when the reamer 39 is rotated, sufficient metal from the interior surface of the neck 4 to increase the inside diameter of the neck 4 to a dimension which is slightly less than the outside diameter of the bullet 25 to be seated in the neck 4, in order to insure that, when so seated, the bullet 25 will be in tight frictional engagement with the interior of the neck 4.

#### BULLET-SEATER HEAD

A bullet-seater head 41, designed to function as a tool for seating the bullet 25 in the neck 4, also is provided. As illustrated, the bullet-seater head 41 is comprised of a knurled cylindrical adjusting nut 42, which is vertically adjustably threaded onto an elongated bullet-seater 43 in order to permit the reloader to adjustably lengthen the projection of the bullet seater 43 to accommodate bullets of different lengths or shapes, and which has generally flat bottom surface 44 engageable with the upper surface 45; of the stop collar 34 throughout the entire circumference of the upper surface 45; and an anvil 46 which is removably threaded into the adjusting nut 42 in the complete assemblage shown in FIG. 1 and which is designed to be turned downwardly until it abuts and partially compresses a resilient O-ring 47. The O-ring 47 provides inhibiting means to frictionally engage the lower surface 48 of the anvil 46 and the upper surface 49 of the adjusting nut 42 and to expand laterally into the threads of the bullet-seater 43, and thereby inhibit rotation of either the anvil 46, the adjusting nut 42 or the bullet seater 43 relative to the others and thereby maintain the preselected relationship of the bullet-seater head 41 with the bullet-seater 43. However, it is contemplated (but not preferred) that the invention encompass integral bullet-seating heads threaded onto the bullet-seater 43.

The elongated bullet-seater 43 is dimensioned to have a diameter slightly smaller than the diameter of the cylindrical upper portion 24 of the resizing sleeve bore 21 in order that the bullet seater 43 may be slidably inserted thereinto, and has formed in its lower end 50 an inwardly tapered longitudinal bore 51 which is of a size and shape to fit snugly on the nose end 52 of a bullet 25 and to center the nose end 52 within the resizing sleeve bore 21.

#### OPERATION OF APPARATUS

The following is a brief summary of the use and operation of the improved cartridge reloading apparatus 2. After the spent primer or detonator cap has been removed from the cartridge case 3, the first step is to resize, reform and ream the expanded and deformed neck 4 of the cartridge 1 to its original specifications so that it will properly receive a new bullet 25. The cartridge 1 is inserted into the lower end of the cartridge-receiving bore 18 of the interconnected shell guide 17 and resizing sleeve 19 and, using a common hammer or the like, the cartridge 1 is driven into the cartridge-receiving bore 18 of the shell guide 17 until the base end 6 of the cartridge 1 is flush with the lower end 53 of the shell guide 17. As will be

seen in FIG. 2, when the cartridge 1 is thus fully inserted within the shell guide 17, the neck 4 of the cartridge 1 has been forcibly driven into the tapered lower portion 26 of the bore 21 of the resizing sleeve 19 and is in its reaming position.

The flared lower end 23 of the resizing sleeve bore 21 facilitates the entry of the neck 4 into the bore 21; and the taper of the lower portion 26 of the bore 21 effectively reforms the exterior of the deformed neck 4 to a circular shape. By virtue of the taper of the lower portion 26 of the bore 21, the neck 4 is firmly held within the resizing sleeve 19 in its reaming position, and the reamer 39 may be slidably inserted into the bore 21 until the cutting teeth 40 thereof are within the interior of the neck 4. By rotating the reamer 39, sufficient metal may be reamed from the interior of the neck 4 to make the interior of the neck 4 round, to make the thickness of the wall 54 of the neck 4 uniform throughout its circumference, and to cause the inside diameter of the neck 4 to be slightly less than the outside diameter of the new bullet 25 to be seated therein.

After a new primer or detonator cap has been mounted in the cartridge 1 which may be accomplished in the manner described in the inventor's U.S. Pat. No. 3,134,293, by the employment of the priming chamber described therein, all without removing the cartridge 1 from the interconnected shell guide 17 and resizing sleeve 19, the next step is the partial retraction of the neck 4 of the cartridge 1 from the bore 21 of the resizing sleeve 19 to the bullet-seating position thereof shown in FIG. 3. The shell guide 17 is positioned on the cartridge case holder 9 with the lower end 53 of the shell guide 17 seated on the shell guide seat 12 of the cartridge case holder 9. The rod then is inserted into the top of the resizing sleeve 19 and projected downwardly into the cartridge case 3 until it bears against the bottom thereof. Using a common hammer or the like to strike the upper end of the rod, the cartridge 1 is forced downwardly to a position in which the base end 6 of the cartridge 1 rests upon the cartridge case seat 14. The depth of the cartridge case bore 13 is dimensioned so that, when the base end 6 of the cartridge 1 rests on the cartridge case seat 14, the neck 4 of the cartridge 1 is free of the wall 28 of the tapered portion 26 of the bore 21 of the resizing sleeve 19 but remains partially within it, in a bullet-seating position a predetermined distance above the flared lower end 23 of the bore 21, with the wall 54 of the neck 4 in close proximity to but spaced from the wall 28 of the tapered portion 26 of the bore 21. Means thereby are provided for positioning the neck 4 within the tapered lower portion 26 of the bore 21 in its bullet-seating position.

After a measured amount of powder has been poured into the top end of the resizing sleeve 19 and into the empty cartridge 1 (during which operation the flared upper end 22 of the bore 21 of the resizing sleeve 19 functions as a funnel to facilitate the pouring operation), a bullet 25 may be dropped through the bore 21 to a position on top of the neck 4 of the cartridge 1. The locking-ring 30 of the bullet-seating gauge 29 then is turned to a position in which the indices 31 and 33 on the lower edge 32 of the locking ring 30 and on the exterior of the shell guide 17 are in desired alignment (based upon alignment settings previously recorded by the reloader); and the stop collar 34 of the bullet-seating gauge 29 is threaded downwardly on the resizing sleeve 19 until it abuts the locking ring 30 and compresses the O-ring 35, in which position the stop collar 34 projects upwardly beyond the top edge 38 of the resizing sleeve 19 a desired predetermined distance as determined by the setting of the gauge 29.

Although it is contemplated that it is within the scope of the present invention to combine the anvil 46, adjusting nut 42 and bullet-seater 43 into one integral unit, it is preferred that they be threadably connected to each other as hereinbefore described, in order to permit the reloader, if the need therefor ever should arise because of a peculiarity of the length or shape of the bullet 25 to be seated, to reset the length of projection of the bullet seater 43 below the bottom surface 44 of the adjusting nut 42 and to in effect lock the bullet-seater head

41 to the bullet-seater 43 in such reset relation by turning the anvil 46 downwardly until it abuts the adjusting nut 42 and compresses the O-ring 47. Assuming that the setting of the adjusting nut 42 and the anvil 46 with relation to the length of projection of the bullet-seater 43 is correct, the bullet-seater 43 is inserted into the top of the resizing sleeve bore 21 until the lower end 50 thereof encounters the nose end 52 of the bullet 25 seated on the upper end of the neck 4, with the tapered bore 51 of the bullet-seater 43 fitting snugly on the nose end 52 of the bullet 25. Again using the hammer, a few blows on the bullet-seater head 41 will cause the bullet seater 43 and the bullet 25 to be driven downwardly and the bullet 25 to be driven into firm frictional engagement with the interior of the neck 4 of the cartridge 1. As the bullet 25 enters the interior of the neck 4, the neck 4 expands until the wall 54 thereof encounters the wall 28 of the tapered portion 26 of the resizing sleeve bore 21; and further expansion, which could result in loose engagement or misalignment between the bullet 25 and the neck 4, is prevented. The upper surface 45 of the stop-collar 34 of the bullet-seating gauge 29 forms a stop to prevent the bullet-seater head 41 from being driven too far downwardly and thereby to prevent the bullet 25 from being driven too far into the cartridge neck 4. The diameter of the bullet-seater 43 being slightly less than the diameter of the cylindrical upper portion 24 of the resizing sleeve bore 21, the nose end 52 of the bullet 25 is kept centered within the bore 21 during the entire bullet-seating operation. As a consequence thereof and of the base 55 of the bullet 25 being kept centered by the cartridge neck 4 expanding to the wall 28 of the tapered bore 26, the bullet 25 is seated perfectly straight in the cartridge neck 4.

The reloading operation having been completed, the interconnected shell guide 17 and resizing sleeve 19 may be removed from the cartridge case holder 9, and the reloaded cartridge 1 removed from the shell guide 17 by grasping the projecting base end 6 of the cartridge 1.

A cartridge 1 reloaded by the use of reloading apparatus 2 embodying the improvements described herein has the following attributes: The neck 4 of the cartridge 1 has been resized, reformed and reamed to be round and to have uniform wall thickness and provide uniform frictional engagement with the seated bullet 25 throughout the entire circumference of the neck 4. The seated bullet 25, the neck 4 and the cartridge case 3 are concentric, with their axis coincidental; the bullet 25 has been driven into the interior of the neck 4 and exact predetermined distance, to obtain optimum firing results; and the dimensions of the resulting reloaded cartridge 1 conform in all respects to the dimensions of all other cartridges of the same caliber reloaded by means of the apparatus 2 and employing the same settings of the bullet-seater head 41 and the bullet-seating gauge 29.

Various modes for carrying out the invention are contemplated as being within the scope of the following claims, particularly pointing out and distinctly claiming the subject matter which is regarded as the invention.

I claim:

1. In apparatus for reloading a cartridge having a base, a narrower neck and shoulder means joining said base and neck:

- a. a resizing sleeve having a bore extending therethrough,
- b. said bore including:

- 1. an upper end portion of constant diameter,
- 2. a lower end portion which is flared,

- 3. and a tapered intermediate portion joining said upper and lower end portions,
- c. the tapered intermediate portion of said bore being adapted to receive the neck of said cartridge during the reloading operation,
- d. and the tapered intermediate portion of said bore being at least equal in length to the length of a cartridge neck inserted therein.

2. In the apparatus of claim 1: means extendible through said bore for reaming the interior of a cartridge neck when the latter is supportingly received by the tapered intermediate portion of said bore.

3. In the apparatus of claim 1:

- a. means for holding a cartridge in bullet-seating position so that the cartridge neck is in close proximity to but spaced from the tapered intermediate portion of said bore,
- b. and means extendible through said bore for forcing a bullet downwardly into the cartridge neck so that the neck wall expands to abut the tapered intermediate portion of said bore.

4. The apparatus of claim 3 in which said last-named means (b) comprises:

- a. a bullet-seater head,
- b. and a bullet-seater member extending downwardly from said head through said bore for engaging a bullet,
- c. said member being adjustably joined to said head for varying the permissible downward extent of the member through said bore.

5. The apparatus of claim 4:

- a. in which said bullet-seater member is slideable within said bore,
- b. in which said resizing sleeve has an index thereon,
- c. and which includes a vertically adjustable bullet-seating gauge threaded onto and extending upwardly from said resizing sleeve and with said gauge having indicia thereon which register with said index.

6. Apparatus as described in claim 4 in which the bullet-seater head comprises

- an adjusting nut member threaded onto the bullet-seater member,
- an anvil threaded onto one of the members and adapted to be turned downwardly until it abuts the adjusting nut member, and means for inhibiting the rotation of the adjusting nut member, the anvil and the bullet-seater member relative to each other after the anvil has been turned downwardly until it abuts the adjusting nut member.

7. Apparatus as described in claim 5 in which the bullet-seating gauge comprises

- a locking ring threaded onto the resizing sleeve,
- a stop collar threaded onto the resizing sleeve and adapted to be turned downwardly until it abuts the locking ring, and means for inhibiting the rotation of the locking ring, the stop collar and the resizing sleeve relative to each other after the stop collar has been turned downwardly until it abuts the locking ring.

8. The apparatus of claim 7 in which the inhibiting means comprises a resilient compressible O-ring disposed between the locking ring and stop collar and surrounding the resizing sleeve and adapted to frictionally engage the locking ring, the stop collar and the resizing sleeve when compressed.

**UNITED STATES PATENT OFFICE  
CERTIFICATE OF CORRECTION**

Patent No. 3,580,127 Dated May 25, 1971

Inventor(s) Richard J. Lee

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 4, line 4, after "height and before "length"  
cancel "of" and insert  
---or---

Column 4, line 37, "be" second occurrence should be  
---but---

Column 7, line 6, after "21" insert  
---and slidably projected downwardly  
into the sleeve bore 21---

Signed and sealed this 28th day of December 1971.

(SEAL)

Attest:

EDWARD M. FLETCHER, JR.  
Attesting Officer

ROBERT GOTTSCHALK  
Acting Commissioner of Patents