March 30, 1965 J. M. GOODSELL 3,175,456

INTERCHANGABLE RELOADING DIES

Filed Feb. 10, 1964

FIG. 1

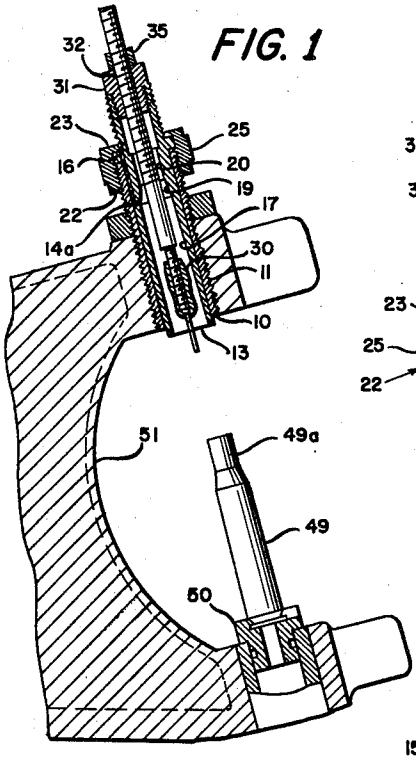


FIG. 2

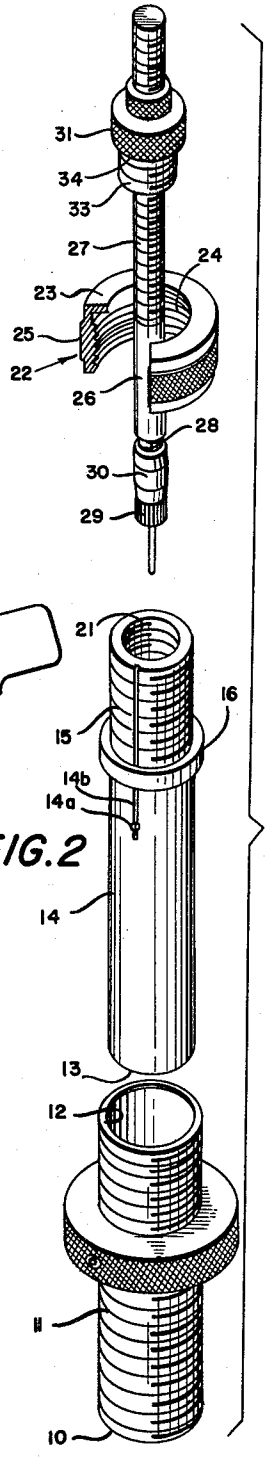


FIG. 3

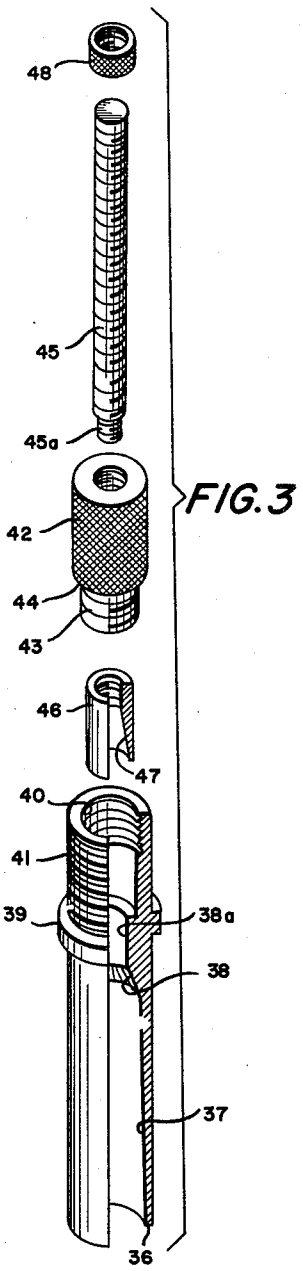
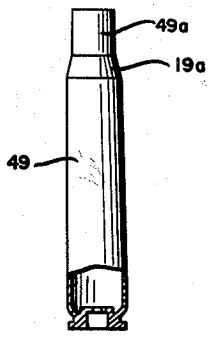


FIG. 4



INVENTOR.
JOHN M. GOODSELL
BY
ATTORNEY

United States Patent Office

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INTERCHANGEABLE RELOADING DIES

John M. Goodsell, Omaha, Nebr., assignor to Micro-Precision Co., Omaha, Nebr.

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4 Claims. (Cl. 86—23)

This invention relates to reloading tools and more particularly to improvements in case resizing and bullet seating die combinations for small arms ammunition such as rifles, revolvers and semi-automatic pistols. Still more particularly, the invention relates to a novel combination of interchangeable resizing dies and bullet seating dies of various calibers embodied in one tool. As presently practiced, such dies for rifle and pistol reloading are made in sets, a different set of complete dies being required for each different rifle and pistol caliber. These dies of the prior art comprise a tool in which the resizing die, for example, is one complete body which is mounted in the press in which such tools are used, and when a change of caliber is desired, it is necessary to remove the complete die from the press and to replace it with another die of the desired caliber. A resizing die is a die which reshapes a fired cartridge case and restores it to its proper dimensions. When a cartridge is fired in a small arm such as a rifle or pistol, the cartridge case, usually of brass, is expanded or otherwise deformed to the size and shape of the chamber in a rifle barrel or that of a semi-automatic hand gun barrel such as a pistol, and it is expanded to the size of the bore of the cylinder in a revolver. It is desirable and sometimes necessary to restore it to its proper or original size and shape before it can be again inserted into the chamber of a barrel or the cylinder of a revolver. Due to the high cost of cartridges today, and for other reasons, many shooters reload their fired cases which makes it necessary to use the dies mentioned above. This is practically an economic necessity for target shooters who may fire a great many rounds at any practice session.

The present invention is directed to improvements in such dies which reduce wear and tear on the tool combination, and considerably reduces the tool cost to those who reload more than one caliber of cartridge.

A principal object of the invention, therefore, is to provide a combination tool in which the reshaping or resizing die and the bullet seating die is separate from the body of the tool and may be readily removed and interchanged with respect to the tool without removing the entire tool from the press, as was heretofore practiced.

Another object of the invention is to provide such a combination in which various calibers of resizing and bullet seating dies may be interchanged in the tool body, the dies comprising inserts which are frictionally fitted into the tool body and locked into place with a locking nut.

Still a further object of the invention is to provide such a tool combination in which the different caliber inserts are simple in construction and therefore are economical to manufacture, thereby reducing the cost of the interchangeable insert dies to the reloader and shooter.

Other objects and advantages will appear as the description proceeds. A practical embodiment of the invention is shown and described for illustrative purposes in the accompanying drawing and specification, in which like

reference characters refer to like parts throughout the several views.

FIGURE 1 is a vertical sectional view through the combination tool as shown fixed in a reloading press, ready for use, the press being shown partly in section.

FIGURE 2 is an exploded view of the combination tool for resizing a cartridge case, the parts being shown in elevation, with one part in section.

FIGURE 3 is an exploded view of the bullet seating mechanism with parts shown in section.

FIGURE 4 is an elevation of a rifle cartridge case, with a part thereof shown in section.

The invention includes a tool body comprising a bushing 10 exteriorly threaded at 11 and having a bore 12 with a carefully machined, smooth surface of uniform diameter throughout its length. A resizing or reshaping die 13, having a smooth, carefully machined exterior surface 14 for a substantial portion of its length is adapted to be removably inserted into the bore 12 of the bushing, the exterior surface 14 of said die having a close sliding frictional fit within the bore 12 of the bushing. The other end of said die is threaded for a short distance at 15 and a collar 16 is screwed down the full length of said threaded portion to seat just above the smooth surface 14, the collar forming a stop shoulder on said die to limit the depth of its insertion into said bushing 10.

The bore of the die insert 13 is machined to provide an internal tapered wall 17, the taper corresponding in shape and size to that of the original dimensions of the shoulder 19*a* and the neck 20*a* of the cartridge case. Above the neck 20 of the bore, the die is internally threaded at 21. After machining, the bore of the die is highly polished by diamond lapping to provide a finely polished surface eliminating all machine tool marks, and it is then heat treated to harden it.

The wall of the die 13 is provided with a vent 14*a* which extends through the wall to the base of the shoulder 19 for the purpose of allowing surplus lubricant which may be present to escape from the die along the channel 14*b* which extends from the vent hole to the atmosphere. Otherwise dents may be formed in the wall of the cartridge case by the surplus lubricant as the case is forced into the die.

The bottom of the die insert projects slightly below the bottom of the bushing so as to form a reference point with respect to the ram of the press, whereby the die may be adjusted so as to just contact the top of the ram when the ram is raised to its highest level.

The tool is assembled for use by inserting the die body 13 into the bore 12 of the bushing to a depth where it is stopped by the shoulder 16. The two parts are then locked together by a flanged locking nut or sleeve 22, the flanged portion 23 engaging the stop collar 16, the internal threaded portion 24 engaging the threads 11 of the bushing, the locking nut being turned down tightly on said bushing, whereby the collar 16 is firmly and immovably seated between the top edge of the bushing and the flange 23 of the nut. The external wall of the nut is knurled as at 25 to provide a good finger gripping surface.

A decapping device is provided to force out the exploded primer which is seated in the cartridge case, so that a new primer may be inserted therein. This device comprises a stem 26 which is threaded as at 27 for a substantial portion of its length. At its lower end, the stem is

reduced in diameter and is threaded as at 26 for a short length. An expanding button 29 is screwed onto the threaded portion 28, and it has an enlarged portion 30 provided for a purpose which will be described. The button 29 serves also as a chuck to support a decapping pin, to punch out the exploded primer as will also later be explained herein.

A knurled nut 31, provided with an internally threaded bore 32 is screwed on the threaded portion 27 of the stem 26, and it forms a support for the stem and decapping pin, permitting adjustment of said stem to its proper depth in the die insert 13. The nut 31 is seated in the die insert 13, the threaded portion 33 of the nut 31 engaging the internal threads 21 thereof, the shoulder 34 of the nut locking against the upper edge of the die insert. Once the stem and decapping pin are properly adjusted in the die, as shown in FIGURE 1, a jam nut 35 is screwed down on the stem 26 and against the nut 31 to lock these parts against relative rotation.

After the cartridge case has been resized by forcing it through the resizing die, a new primer is forced into its primer pocket and the case is supplied with a charge of the proper amount of gunpowder, neither of which operations are material to the present invention, but are mentioned as the sequence of events leading up to the seating of the bullet, which is the next step, and for which apparatus is provided in a novel combination by the present invention.

A bullet seating die insert is provided which is substantially identical with that of the insert 13, except that the bullet seating die insert has a bore 37 which is substantially uniform in diameter for a substantial portion of its length, terminating in a tapered shoulder 38 and in a restricted neck opening 38*a*. Above its external stop shoulder 39 the die is threaded internally and externally as at 40 and 41, respectively, as in the case of the sizing die insert. This seating die is interchangeable with the sizing die 13 and also fits within the bore 12 of the bushing 10, its stop shoulder 39 being adapted to rest on the upper end of said bushing, as in the case of the sizing die. The bushing and seating die are similarly locked together against relative movement by the same flanged locking nut 22 in the same manner, the body of the seating die being received in the bore 12 of the bushing with a close, sliding, frictional fit.

A knurled nut 42, exteriorly threaded at its lower end 43, is provided for seating in the upper end of the seating die 36, the threads 43 engaging the internal threads 40, the shoulder 44 resting on the upper edge of the seating die insert. This nut supports a threaded stem 45, the lower end of which carries a bullet seating member 46 having a socket 47 of a shape and size substantially corresponding to the shape and size of the ogive of the bullet to be seated in the reloaded cartridge case. The stem 45 permits adjustment of the seating member 46 to its proper depth in the insert 36, and when proper adjustment is accomplished, the nut 42 and stem 45 are locked together against relative movement by the jam nut 48.

The parts having thus been described, the operation of the device will now be outlined. An expanded, fired rifle case 49, which is to be resized and reloaded, is seated in the ram 50 of the press 51, the resizing die being mounted in the head of the press as shown. The exterior of the cartridge case must first be lubricated to prevent its sticking in the die. The ram is then forced upward, pushing the case into the die under powerful pressure by means well known, but not shown, whereby the wall portions 17, 19, 20 of the die act on the case to reduce it to its proper dimensions and shape, the walls of the die ironing out any irregularities that may be present in the wall of the case. The button 30 readily enters the case at this time and the decapping pin supported thereby punches out the fired primer as the case nears the end of its upward stroke. As this occurs, the neck 49*a* of the case enters the restricted bore 20 and is reduced in diameter slightly below that required to receive a new bullet. As the case 49 is withdrawn from the die, the neck again passes over the button 30, which thereupon expands the neck to the proper bullet size, so that it may receive and frictionally hold a bullet.

The sizing die insert 13, with the decapping and expanding mechanism is now removed from the bushing 10 by unscrewing the nut 22 and lifting out the die. It is then replaced in the bushing by the bullet seating die and locked thereto by the same nut 22. The bushing 10 need not be removed from the press for any caliber change, or when changing from resizing to bullet seating. Any insert is then easily mounted by sliding it into place and locking it with the flanged nut.

The case 49, which has since been reprimed and supplied with a charge of gunpowder, is now ready to receive the bullet. With the bullet seating member 46 adjusted to the proper depth in the insert, a bullet is manually supported over the mouth of the cartridge case until it reaches the lower edge of the die, whereupon the walls of the die insert guide it into the socket 47 of the seating member. When thus seated in said socket the bullet is centered over the mouth of the case, and continued upward movement of the case forces the bullet into the neck thereof to its proper depth and it is locked in the neck of the case with a tight frictional fit. The case is now a complete cartridge and may be fired.

It should be observed that the sizing die disclosed herein resizes the case for its full length. This is essential when the reloaded cartridge is to be fired from a different weapon than the one in which it was originally fired. Otherwise, only the neck of the case would require resizing. Neck resizing dies are provided according to this invention by making an insert similar to those of 13, but with neck, rather than full length, resizing facility. It will also be noted that in order to change the caliber of the die, or to change from a rifle to a pistol die, or vice versa, it is not necessary, according to this invention, to buy a whole new die set; it is merely necessary to obtain a resizing and bullet seating die insert of the proper caliber which, being simply made, is very economical to purchase as compared to the cost of a complete die set as now commercially available.

Changes in construction, design and arrangement of parts may be made without departing from the spirit of the invention as defined by the appended claims.

I claim:

1. A reloading tool comprising a bushing adapted to support said tool in a reloading press, means for adjusting said bushing in said press, said bushing having a smooth bore of a uniform internal diameter throughout its length, a die insert for said bushing having a uniform diameter throughout the greater portion of its length and being of greater length than said bushing, the greater portion of said length having a smooth exterior surface, said insert having a sliding frictional fit into said bore of said bushing and projecting below it, said insert having means therein for neck and full length resizing of a cartridge case, said insert being locked against relative movement with respect to said bushing.

2. A reloading tool according to claim 1, in which said locking means comprises a collar on said insert above said smooth exterior, said collar adapted to rest on the end of said bushing, and a flanged nut engaging said collar and said bushing to lock them together.

3. A reloading tool comprising a bushing for supporting said tool in a reloading press, said bushing having a smooth bore of a uniform internal diameter throughout its length, a die insert for said bushing having a uniform diameter throughout the greater portion of its length, the greater portion of said length having a smooth exterior surface, said insert having a sliding frictional fit into said bore of said bushing, said insert being locked against relative movement with respect to said bushing and being of a greater length than said bushing, said insert having a collar seated thereon above said smooth portion to limit

its depth into said bushing, said collar forming a means whereby said insert is locked with respect to said bushing, said insert having means therein for performing a function in the reloading of a cartridge case.

4. A reloading tool comprising a bushing adapted to support said tool in a reloading press, said bushing having a smooth bore of a uniform internal diameter throughout its length, a die insert for said bushing, said insert having a uniform diameter throughout the greater portion of its length, the greater portion of said length having a sliding frictional fit in said bore of said bushing, said insert having a stop collar above the smooth portion of its length, said collar adapted to rest on one end of said bushing, a vent in said insert below said collar and a passage in said

insert leading from said vent to the atmosphere, said insert having a bore, and means in said bore for full length and neck sizing of a cartridge case.

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BENJAMIN A. BORCHELT, *Primary Examiner.*