June 6, 1944. H. D. HOTCHKISS 2,350,556

AMMUNITION AND EXPLOSIVE-CHARGE MAKING

Filed April 16, 1941

Fig. 1

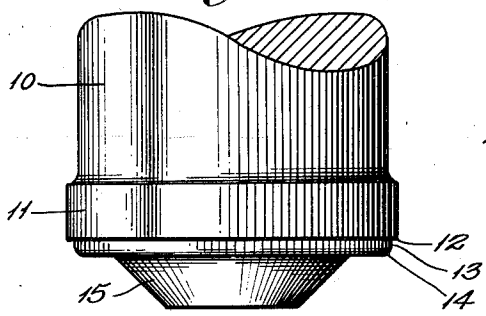
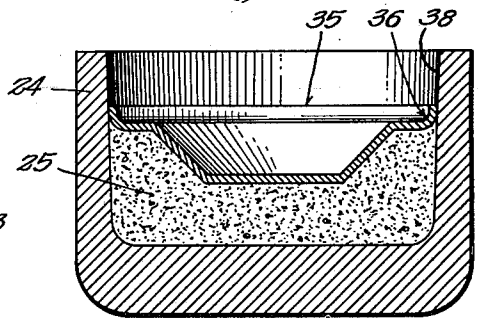


Fig. 6



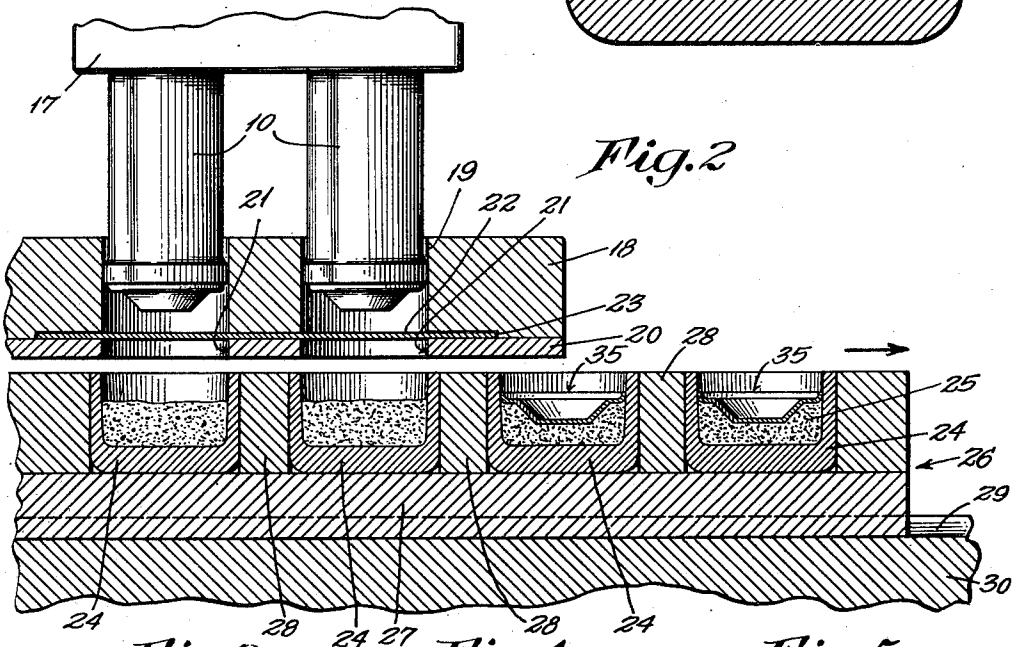


Fig. 2

Fig. 3

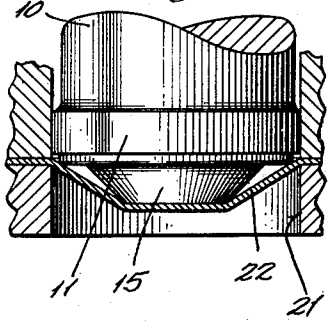


Fig. 4

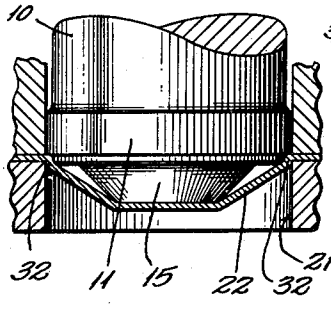
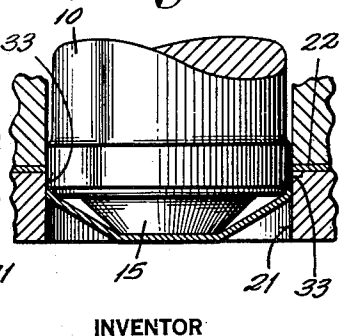


Fig. 5



INVENTOR
Harry D. Hotchkiss
BY Harold L. Gammons
AGENT

Patented June 6, 1944 2,350,556

UNITED STATES PATENT OFFICE

2,350,556

AMMUNITION AND EXPLOSIVE-CHARGE MAKING

Harry D. Hotchkiss, Bridgeport, Conn., assignor to Remington Arms Company, Inc., a corporation of Delaware

Application April 16, 1941, Serial No. 388,767

1 Claim. (Cl. 86—1)

This invention relates to primers for ammunition and more particularly to the art of sealing the detonating composition within the primer cup.

The common practice in the manufacture of ammunition primers is to seal the detonating composition in the cup by discs of paper, lead foil or other heat-fusible or combustible material, the disc being pressed into place over the priming composition by a pressing punch.

The failure to obtain a proper seal between the edges of the disc and the inner walls of the cup is one of the serious disadvantages of using the pressing punches heretofore known to the art.

It is an important object of this invention to provide a punch for cutting out discs for primer cups and pressing said discs into the cups so as to form a tight seal between the edges of the disc and the inner wall of the cup. A further object is to provide a punch which forms a crimp in the rim of the disc and subsequently presses the crimp into the form of a fillet in sealing contact with the inner walls of the cup.

In the drawing:

Fig. 1 shows the cutting, inserting and tamping end of the punch of this invention.

Fig. 2 is a diagrammatic cross sectional view of the means for assembling sealing discs in primer cups.

Fig. 3 shows a single punch and die assembly, partly in section, in the initial step in the formation of a sealing disc.

Fig. 4 shows the formation of a crimp in the disc material by the continued downward movement of a punch through a die.

Fig. 5 shows the formed disc sheared from the strip disc material by a punch.

Fig. 6 is an enlarged cross section of an assembled disc and primer cup.

Referring to Fig. 1, the pressing punch is shown, for the purpose of illustration only, as comprising a shank 10 provided with a substantially circular shoulder 11 having a sharp corner or cutting edge 12. Concentric with the circular cutting edge 12 is a second circular shoulder 13 turned on or otherwise suitably formed or secured to the lower planar face of the shoulder 11. The shoulder 13 is of substantially less diameter than that of the cutting edge 12 and is provided with a smooth rounded edge 14. 15 is the apex of the shank and is shown as comprising a truncated cone whose base is of substantially less diameter than that of the second shoulder 13 and concentric therewith—being integrally turned on or otherwise suitably formed on the lower planar face of the shoulder 13.

While the above description pertains particularly to a pressing punch shown in the disclosure, it will be understood that modifications of the proposed design may be made within the scope of this invention as defined by the appended claim.

Although a single punch has been described, it will be understood that in the commercial discing of primers, a plurality of such punches will be simultaneously reciprocated by a single punch-carrying head, whereby a corresponding number of primed cups will be simultaneously disced.

By way of example only, one method of assembling sealing discs using a punch of this invention is illustrated in Fig. 2, in which a plurality of punches 10 are carried by a single head 17 vertically reciprocated by suitable crank and connecting rod mechanism, not shown. 18 represents a fixed guide block having a plurality of suitable vertical holes 19, the walls of which act as guide surfaces for a corresponding number of punches 10. On the bottom of the block is detachably secured a perforated plate 20, each perforation 21 comprising a cutting die for one of the punches. Interposed between the bottom of the block and the perforated die block is a continuous strip of paper or other suitable disc-forming material 22 adapted to move transversely to the direction of movement of the primer cups in suitable guide grooves 23 formed in the block 18. The cups 24, loaded with the priming composition 25, are fed beneath the punches 10 by suitable intermittent drive means (not shown), temporarily connected to the usual primer supporting unit 26 which, in common practice, comprises a base plate 27 and a superposed perforated plate 28 adapted to be mover intermittently as a single unit in the longitudinal ways 29 of the bed plate 30.

Referring specifically to the function of my improved punch, on the downward movement of the punch 10 the conical apex 15 first engages and depresses a portion of the disc material 22 into the cutting die orifice 21 as shown in Fig. 3. Continued advance of the punch brings the rounded shoulder 14 into contact with the disc material 22 (see Fig. 4), whereby additional material is drawn into the cutting die orifice 21 so as to form an annular crimp or crease 32 in the depressed disc. There is thus formed in the strip, prior to shearing, a cone of materially greater area than the area of the cutting orifice 21 or the primer cup 24. By further downward

movement of the punch, the oversize depressed and crimped disc is sheared from the strip material 22 by engagement of the peripheral cutting edge 12 of the punch with the peripheral cutting edge 33 of the die, carried down through the die, as shown in Fig. 5, and pressed into a charged primer cup 24. The downward movement of the punch is so governed that the apex 15 will apply suitable pressure on the top surface of the disc 35 sufficient to tamp the conical portion thereof into the priming mixture 25 while the arc 14 of the shoulder 13 compresses the annular crimp 32. As shown clearly in Fig. 6, by compressing the annular crimp 32 the excess material of the disc, present by reason of the novel punch as above explained, is squeezed out or caused to flow radially to form a fillet 36 in tight sealing contact with the inner wall 38 of the primer cup. The advantages of such a seal, in addition to superior moisture proofing, are positive securing of the priming composition in place, and the elimination of misfires due to loss of priming mixture as well as the hazards due to the presence of loose priming mixture while the primers are being handled in quantity in cartridge manufacture.

What is claimed is:

Apparatus for sealing primer cups with a sealing disk comprising means for supporting a primer cup; a die mounted over said cup and constructed and arranged to support a sheet of sealing disk material; and a punch reciprocably mounted to enter said die and said primer cup for cutting a sealing disk from the sheet of sealing material and securing the cut disk in the primer cup, said punch comprising a frusto-conical point adapted to gather an area of said sheet in excess of the transverse area of said cutting die, a cutting and feeding shoulder of substantially the diameter of said cutting die, and a relatively thin shoulder adjacent said cutting shoulder having a diameter such as to define with the wall of the cutting die a shallow recess of a width substantially equal to the thickness of said disk, the edge of said thin shoulder being rounded to facilitate gathering the marginal portion of said disk into said recess to form a circumferential crease at the periphery of said disk whereby the edges of said disk are held in sealing engagement with the walls of said cup.

HARRY D. HOTCHKISS.