Sept. 18, 1951 R. E. McGAHEY, JR 2,568,078

CARTRIDGE

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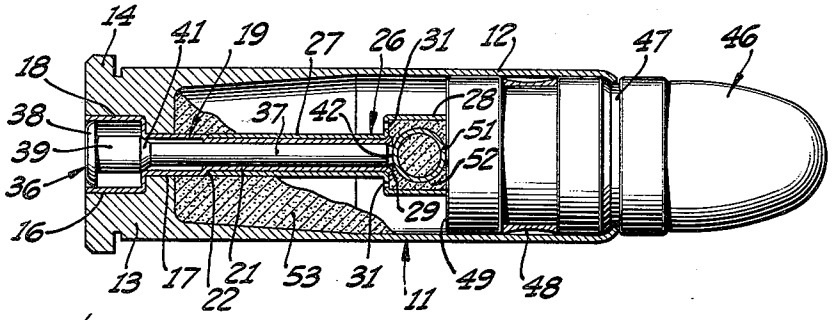


FIG. 1.

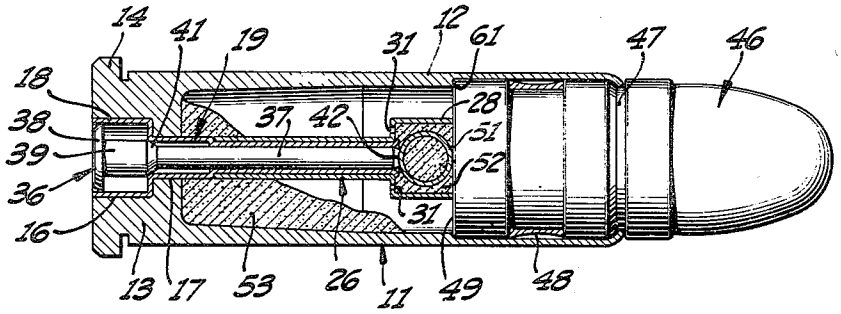


FIG. 2.

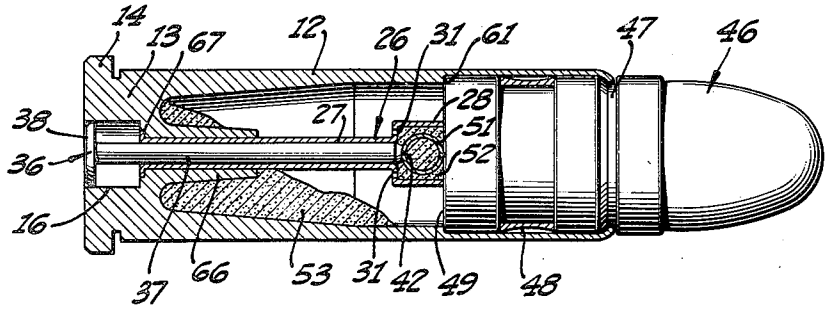


FIG. 3.

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CARTRIDGE

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11 Claims. (Cl. 102—38)

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The present invention relates to new and improved cartridges and to adapters by which standard cartridges can be given the advantages of the new cartridge. More specifically, the invention comprises an improved cartridge adapted for repeated reuse and to adapter means which enable a standard cartridge case to be reused repeatedly.

Upon the discharge of a cartridge, the case which remains can, by properly processing, be reused under present methods. It is standard practice to force out the used primer from its seat in the base of the cartridge case, thoroughly clean that seat and the flash hole leading thereto, and thereafter position a new primer in the seat. The loading of the interior of the case with powder and the seating of a new projectile in the well known manner places the used case in condition for reuse and provides a cartridge which is relatively satisfactory. Such reuse, however, is open to the objection that it is expensive and is not entirely satisfactory in that the primer seat becomes enlarged by pressure action and the construction ceases to be gas tight.

In the cartridge reloaded in accordance with the present invention means are provided which positively prevent the presence of harmful gases in the flash hole or primer pocket. It is so constructed as to make repeated reloading a simple and easy process. One form of the invention is adapted to the reloading of standard cartridges; another preferred form is embodied in a new cartridge. One of the primary advantages of the present invention lies in the fact that use is made of a frontal primer positioned within the cartridge case adjacent the rear of the projectile so that the burning of the charge proceeds from the forward part of the explosion chamber to the rearward part thereof. This method of burning provides more complete combustion and prevents the discharge of unburned powder particles through the forward part of the case with the projectile. Additionally, the use of the frontal primer makes possible the use of ingredients in the primer itself which are less harmful in the gases which they produce upon combustion.

It is an object of the present invention to provide a new and improved adapter for the reloading of cartridges.

A further object of the invention is to provide a new and improved cartridge case which is particularly suited for repeated use.

It is a further object of the invention to provide

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a cartridge in which use is made of a spherical frontal primer.

A still further object of the invention is to provide a cartridge in which a spherical frontal primer is exploded by the displacement of a firing pin which forms a part of the cartridge.

These and other more specific objects will appear upon reading the following specification and claims and upon considering in connection therewith the attached drawings to which they relate.

Referring now to the drawings in which preferred embodiments of the invention are illustrated:

Figure 1 is a longitudinal view through a cartridge constructed in accordance with the present invention using a standard cartridge case;

Figure 2 is a view similar to Figure 1 through a second preferred embodiment of the invention using a slightly modified cartridge case; and

Figure 3 is a longitudinal section through a novel cartridge case particularly designed for use with a spherical frontal primer.

Referring again to the drawings, and to Figure 1 in particular, the first preferred embodiment of the invention is illustrated and is seen to comprise a standard cartridge case indicated generally with the reference character 11 which includes a cylindrical body 12 merging into a thickened base 13 formed with a rim 14 and a primer recess or pocket 16 opening into the interior of cylinder 12 through a flash hole 17. The cartridge has been reloaded as illustrated in Figure 1 and the primer which normally is positioned within pocket 16 has been removed. In its place is positioned the cup 18 formed as an integral part of the rearward adapter tube, indicated generally by the reference character 19, which includes a sleeve 21 extended through the flash hole 17 to be reduced in diameter forwardly thereof by a circumferential shoulder 22. A frontal adapter tube, indicated generally by the reference character 26, is carried by sleeve 21 of tube member 19 and comprises a sleeve 27 and a cup 28, the former enclosing sleeve 21. The rearward end of sleeve 27 abuts the circumferential shoulder 22 on rearward tube member 19 to position the two structures. The forward end of sleeve 21 is swaged at 29 upon the internal base of cup 28 to prevent separation. Attention is particularly directed to the flash holes 31 which are illustrated as being formed in the base of cup 28, although they may be positioned anywhere therein.

A striking pin, indicated generally by the ref-

erence character 36, includes an elongated stem 37 slidably positioned within sleeve 21, and a flat head 38 of a diameter substantially to fill and slide within the cup 18 of rearward tube member 19. The stem is enlarged at 39 immediately adjacent the head, the enlargement merging into the major portion of the stem as by a bevel 41. The forward end of the firing pin comprises the extremity of its stem 37 which normally barely extends beyond the swedged end of sleeve 21 into the pocket 28 when in its ready-to-fire position illustrated in Figure 1. In a preferred form, the end of the stem 37 is provided with a concavity conforming to the surface of a sphere, as indicated at 42.

A projectile, indicated generally by the reference character 46, is retained within the outer end of case 11 by turning the outer end of the latter into a peripheral groove 47. The projectile itself may be provided with a lubricant band 48 for grease as desired. It is important, however, with the projectile seated in the manner disclosed, that its rear face 49 abut the open end of the cup 28. In the event that the projectile is inserted too far into the case, its movement will result in the rearward displacement of the frontal and rearward tube members 26 and 19 respectively. This, of course, can be avoided by the use of reasonable care and should it occur, the parts are replaceable immediately by the exertion of a slight force upon the rear end of cup 13.

Prior to the insertion of the projectile 46 into its seat it is necessary to position the primer and the charge. In accordance with the present invention, the primer comprises a spherical element or pellet 51 of a diameter which enables it to seat within the frontal tube cup 28. It is sufficiently large in the preferred embodiment illustrated that it cannot pass between the side wall of the cup 28 and the surrounding wall 12 of the case and so may be dropped into the case from above to find its place upon the concave end 42 of the firing pin stem. Thereafter, the powder charge is inserted in measured amount, the cup 28 being filled around the primer 51. This portion of the charge within the cup is indicated by the reference character 52 while the main body of the charge is indicated at 53. The primer 51 itself may be constituted of the usual ingredients but because of the efficiency of frontal discharge it is possible to use ingredients which would not function satisfactorily in a rear primer.

The discharge of a cartridge reconstructed as illustrated in Figure 1 is as follows: The cartridge is positioned within the weapon which may be either a rifle or a revolver, any standard weapon being suitable. Pulling the trigger of the gun causes the weapon's firing pin to strike the head 38 of the cartridge striking pin 36 whereupon that element advances its forward end 42 striking the prime 51 and causing it to explode. The powder charge 52 within the frontal cup 28 is immediately ignited and the flame therefrom pours through the flash holes 31 to ignite immediately the main charge 53. Under the tremendous pressure generated by this explosion, projectile 46 is forced from the case 11 and from the muzzle of the unshown gun.

No gases produced by the combustion are permitted to escape rearwardly from the cartridge. The advance of the striking pin 36 caused the beveled edge 41 on its stem 37 to enter the sleeve 21 of rearward adapter tube 19 and to expand it tightly against the walls of base opening 17 which in the original cartridge formed the flash hole. The expansion of sleeve 21 provides a tight seal to prevent the escape of any gas between the aperture 17 and the sleeve. Neither can the gas escape rearwardly between sleeve 21 and the pin stem 37 for the tremendous pressure within the cartridge case compresses the enclosing concentric sleeves 21 and 27 tightly thereon to provide a gas tight seal. Contact of the bevel 41 with sleeve 21 provides a cooperating seal which also prevents leakage of gas around the striking pin. The initial igniting of the charge 52 followed by the ignition of the main charge 53 provides a highly efficient explosion in which complete burning of the powder takes place to produce maximum power. In the usual cartridge with a rear primer, the powder charge is first ignited at the base of the cartridge and as a result, many unburned powder particles are discharged with the projectile. This undesirable result is entirely eliminated in the present construction.

An interesting phenomenon in the discharge of the projectile comprises the fact that after the initial maximum pressure has dissipated slightly to effect a reduction in the clinching pressure exerted by the concentric tubes 21 and 27 upon the pin stem 37, the pin is forced rearwardly from its fired position to its pre-firing position illustrated in Figure 1. The longitudinal pressure exerted upon the end of the pin is sufficiently great with the clinching pressure slightly reduced as to move the pin to its initial position, the rearward travel being limited by contact with the head 36 with a rifle bolt or with the face plate of a revolver, depending upon which weapon is in use.

The discharge of the cartridge leaves the case ready for immediate reloading and without the necessity for any cleaning operation for no gases have escaped into the case pocket 16 or through the original flash hole 17 to effect any injury thereto either by pressure or by chemical action. Reloading is carried on as previously described and upon its completion, the unit is ready for reuse.

Referring now to Figure 2 in particular, a second preferred embodiment of the invention is illustrated in which a slightly modified type of standard cartridge case is used. In details other than those referred to, this construction is identical to that previously described. In the present embodiment, the cartridge case 12 extends forwardly from its base 13 with a wall of greater thickness to an internal circumferential shoulder 61 at which it is abruptly reduced in thickness. Shoulder 61 provides a seat for the inner face 49 of the projectile 46 which in the first embodiment rested against the forward end of frontal cup 28. This contact is present again in the present embodiment, but the cup 28 is relieved of any positioning function. The projectile is again secured in place through having the forward end of the case crimped into the circumferential groove 47.

The method of loading and of discharging this second preferred embodiment is identical to that first described, with the exception that in the loading operation the internal shoulder 61 receives the force of the inserted projectile 46.

Referring now to Figure 3, a third preferred embodiment of the invention is illustrated. The case 12 contains the forward shoulder 61 as in the second embodiment to seat the projectile 46 but is formed at its base 13 with an integral internally projecting externally tapered tube 66. Tube 66 replaces the rearward tube member 19

of the first and second embodiments and serves as a support for the frontal tube member 26, which is formed forwardly as in the first embodiments with a cup 28 having flash holes 31. Here, however, the tube sleeve 27 extends through the base tube 66 to have its rearward end turned over at 67 and seated in the countersunk base of the base pocket 16. This construction is seen, therefore, to eliminate entirely the rearward tube member 19 of the first two embodiments.

A striking pin 36 including a head 38 and a stem 37 is slidingly mounted within the sleeve 27 and is unprovided with the enlarged portion 39 or bevel 41 of the first two embodiments. Its forward end 42 is again recessed to seat the primer pellet 51 but reliance is here placed upon the contraction under pressure of the sleeve 27 on the stem 37 to prevent the rearward expulsion of gases around the pin.

This third embodiment of the invention comprises a cartridge which is designed for the initial incorporation of the firing mechanism as distinguished from the first two embodiments which are primarily standard used cartridge cases embodying the adapter mechanism. The operation of this embodiment of the invention and the method of reloading is similar to that of the embodiments previously described.

While the particular apparatus shown and described in detail is fully capable of attaining the objects and providing the advantages hereinbefore stated, it is to be understood that it is merely illustrative of the presently preferred embodiment of my invention, and that I do not mean to limit myself to the details of construction or design herein shown, other than as defined in the appended claims.

I claim:

1. In a cartridge, a case having a base and an open forward end, a projectile fixed in the forward end of said case, a spherical primer pellet, tubular means including a pellet seat facing the forward end of said case supported by said base and extended to a position adjacent said projectile to support said pellet, and a striking pin extended through said base and means and into position to deliver a striking blow to pellet.

2. In a cartridge, a case having a base and an open forward end, a projectile fixed in the forward end of said case, tubular means carried by said base and including an enlarged cup adjacent said projectile facing said open end and open to said tubular means, a primer pellet positioned in said cup, and a striking pin extended through said base and through said tubular means into position to strike an igniting blow against said pellet, said projectile serving as an anvil.

3. In a cartridge, a case having a base formed exteriorly with a recessed cup opening interiorly to said case, a projectile fixed to the forward end of said case, tubular means extended through said base from said recessed cup and including an enlarged cup adjacent to and facing said projectile, a primer pellet positioned in said cup, and a striking pin with its head positioned in the recessed cup in said base and with its stem extended through said tubular means into position to deliver an igniting blow to said pellet, said projectile serving as an anvil to said pellet.

4. The construction recited by claim 3 characterized in that said pellet is spherical and in that the distance separating said cup from the surrounding case is less than the diameter of said pellet.

5. The construction recited by claim 3 characterized in that said tubular means is formed with a second cup seated within the recessed cup in said base.

6. The construction recited by claim 3 characterized in that said tubular means are sufficiently thin walled as to be compressed in sealing relationship around said pin stem in the presence of the discharge pressure within said case.

7. The construction recited by claim 3 characterized in that powder charges are positioned within said enlarged cup and within said case outside said cup.

8. In a cartridge, a case having a base formed centrally with a recessed cup opening interiorly to said case, a rearward tube member including a cup seated in said recessed cup and a sleeve extended into said case, a frontal tube member including a cup at its forward end and a sleeve telescopically connected to the sleeve of said rearward tube member, a primer pellet positioned in the cup of said frontal tube member, a projectile secured in the forward end of said case and abutting the cup of said frontal tube member to serve as an anvil for said pellet, and a striking pin having a head positioned slidably in the cup of said rearward tube member and a stem extended forwardly through said sleeves into striking position relative to said pellet.

9. An adapter unit for a cartridge case comprising a rearward tube member having an enlarged cup adapted to seat in the recessed primer pocket of a cartridge case base and having a sleeve extended forwardly from said cup and adapted to extend through the flash hole of said case and into the interior thereof, a frontal tube member comprising a primer-receiving cup at its forward end, a primer, the foremost end of said last-named cup being open to receive the primer, and a rearward extending sleeve telescopically and fixedly seating the sleeve of said rearward tube member, and a striking pin having a head adapted to fit within the enlarged cup of said rearward tube member and a stem adapted to extend through said sleeves and into said cup of said frontal tube member and movable thereinto under a force applied to its head.

10. In a cartridge, a case having a base formed with an integral forwardly extending tube, a tube member carried by said tube and formed at its forward end with a primer-receiving cup, a striking pin extended through said base, tube and member into said cup, a primer pellet in said cup in position to receive a blow upon the forward movement of said pin, and a projectile seated in the forward end of said case abutting said cup to serve as an anvil for said pellet.

11. In a cartridge, a case having a base formed with an internal forwardly extending tube, said case having an internal projectile shoulder on its inner surface, a tube member carried by said tube and formed at its forward end with a primer-receiving cup the open side of which extends substantially into the plane of said shoulder, a striking pin extended through said base, tube and member into said cup, a primer pellet in said cup in position to receive a blow upon the forward movement of said pin, and a projectile seated in the forward end of said case abutting said cup to serve as an anvil for said pellet.

ROBERT EDWARD McGAHEY, JR.

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