Sept. 18, 1951 R. E. McGAHEY, JR 2,568,080

CARTRIDGE

Filed Oct. 25, 1946

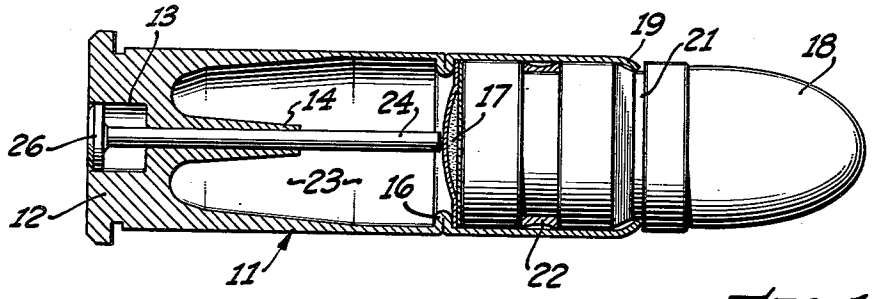


FIG. 1.

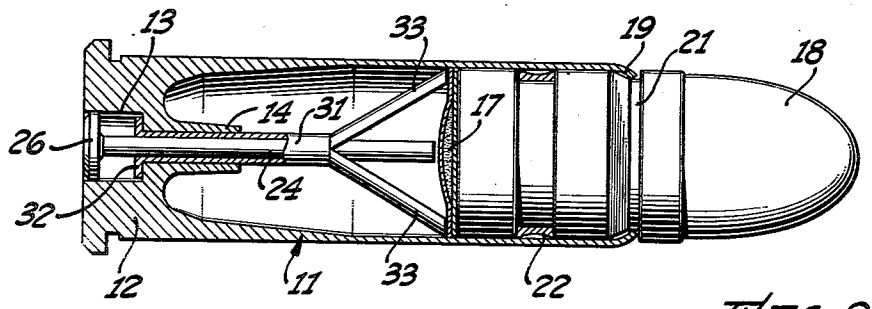


FIG. 2.

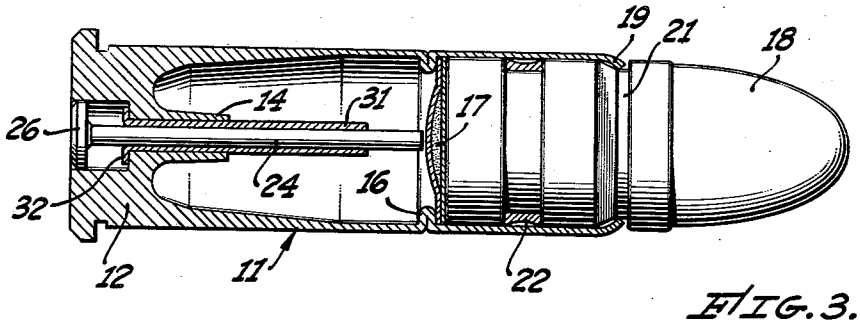


FIG. 3.

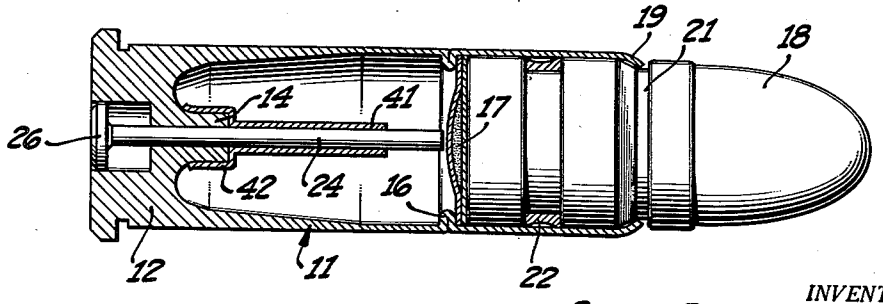


FIG. 4.

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Patented Sept. 18, 1951

2,568,080

UNITED STATES PATENT OFFICE

2,568,080

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Application October 25, 1946, Serial No. 705,760

2 Claims. (Cl. 102—38)

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The present invention relates particularly to cartridges adapted for repeated reuse.

The firing of a standard cartridge and the discharge of the projectile leaves a case which can, if properly cleaned, be reloaded to form a new cartridge having the desirable characteristics of the original cartridge. The practice of reusing cartridge cases is an old one but has heretofore been characterized by certain objectionable weaknesses resulting from the fact that the cartridge case was not initially designed for such reuse. In the usual standard cartridge the explosion burns not only the walls of the enclosing case but also passes through the flash hole and into the primer pocket. Repeated reloadings of the standard cartridge case develop a defective seating of the primer in its pocket because of this burning and produce a dangerous structure in which the burning gases flash outwardly past the replacement primer to do serious damage to the user.

In the cartridge constructed in accordance with the present invention, the cartridge case itself has been especially designed with a view to its reuse and, by the provision of inexpensive means, provides a construction having superior fire characteristics as well as superior reloading capabilities.

In the reloading of the standard cartridge it is the practice to clean the reused primer pocket and flash hole thoroughly and then insert a new primer cap in the pocket; thereafter, to pour in the required amount of powder; press home the projectile; and crimp the end of the case into a peripheral groove or channel present in the projectile. This standard method required the careful cleaning of the primer pocket as well as the careful replacement and seating of the new primer.

In the cartridge constructed in accordance with the present invention, use is made of a frontal primer which is positioned within the cartridge case and the usual primer pocket serves as a seat for the head of a firing pin which extends forwardly in the case into primer-contacting position. A firing pin is a permanent part of the cartridge case, and except in extraordinary circumstances, will not require replacement. There is no need to clean the primer pocket or flash hole in the cartridge constructed in accordance with the present invention, the replacement of the charge, the primer and the projectile comprising the entire reloading operation.

Through the use of frontal ignition in the present invention more effective combustion of the powder is obtained. The forward portion of

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the powder charge is ignited first, the explosion progressing rearwardly to the base of the case. This insures complete ignition and without the loss of unburned powder which, in the standard cartridge with rear ignition, is frequently blown from the muzzle of the weapon with the projectile.

It is an object of the present invention to provide a new and improved cartridge the case of which is particularly suited for repeated reuse.

It is a further object of the invention to provide a cartridge in which the projectile-propelling explosion takes place entirely within the case and in which no leakage takes place through the base.

A further object of the invention is to provide a cartridge provided with a firing pin arranged to contact a frontal primer.

These and other more specific objects will become apparent from a reading of the following specification and claims and a consideration thereof in connection with the attached drawings to which they refer.

In the drawings, in which preferred embodiments of the invention are illustrated:

Figure 1 is a longitudinal section through the first preferred embodiment of the invention;

Figure 2 is a view similar to Figure 1 through a second preferred embodiment of the invention;

Figure 3 is a view similar to Figure 1 through a third preferred form of the invention; and

Figure 4 is a view similar to Figure 1 through a fourth preferred form of the invention.

Referring again to the drawings, and in particular to Figure 1 which discloses the first preferred embodiment thereof, it is seen that the cartridge constructed in accordance with the present invention comprises a cylindrical case 11 in the thickened rimmed base 12 of which is formed a centrally located recess 13 which, in the standard cartridge, would comprise the primer pocket. An inwardly or forwardly projecting integral tapered tube 14 extends from base 12 and connects the interior of the case with the interior of the recess 13. An internal shelf or flange 16 is formed in the case forwardly of the tube 14, as by collapsing the cylindrical wall of the case for a portion of its length, and serves as an abutment for the primer, as will be described.

A frontal primer 17 is positioned within the case 11 and rests against the abutment shelf or flange 16. Primer 17 comprises spaced paper discs between which is positioned an igniting charge, with the whole preferably being protected by a preserving coating. Forwardly of the primer

17 is the projectile 18 which extends from the casing, being retained therein by the outer end of the latter being swedged inwardly at 19 into the peripheral groove 21 formed upon the projectile.

A lube band 22, including grease, is recessed into the periphery of the projectile 18 within the case in the preferred embodiment.

The powder charge is indicated by the reference character 23 and is seen to be positioned between the base 12 of the casing and the primer 17. The latter is held against the shelf 16 by the abutting contact of the end of projectile 18 which functions as an anvil therefor. To provide the necessary blow to ignite the primer a pin 24 is slidably mounted within tube 14 with its enlarged cylindrical head 26 slidingly positioned within the recess 13. The head 26 is adapted to receive a moving force, as from the firing pin of a standard weapon, which would function to move the pin forwardly to strike the primer and compress it against the projectile 18, the resulting explosion igniting the powder charge 23 and the expulsion of the projectile from the case.

There are only two possible escapes for the gases generated by the explosion. One exit is through the forward end of the case upon ejection of the projectile, and the other is rearwardly through the tube 14 and around the firing pin 24. This latter exit is closed, however, by the pressure of the explosion which functions to compress the tapered tube 14 upon the pin 14 to provide a gas-tight seal.

After the cartridge has been discharged, it need not be cleaned for no gases have escaped from the interior of the case and the use of a frontal primer makes possible the use of materials which are no more harmful upon burning than the powder charge itself.

Accordingly, the reloading operation comprises only the filling of the case with the required amount of powder, the positioning of the primer 17 upon its supporting shelf 16, the seating of the projectile 18, and the swedging of the outer end of the case at 19 to retain the projectile in place. It is impossible to force the projectile too far inwardly into the case to effect possible ignition of the powder charge by forcing the primer against the end of the pin for the internal shelf 16 limits the travel of the projectile. It is important in this construction that the tube 14 be so constructed that it closely encloses the pin yet permits it to slide under the force received, as described. It is also important that it be so dimensioned that it is capable of being compressed sufficiently to seal around the pin to provide a gas-tight joint which is released upon the release of the pressure which creates it. It is a characteristic of this embodiment of the invention, as it is of all the disclosed embodiments, that upon the partial dissipation of the initial pressure within the case the compressing force upon the tube 14 is reduced sufficiently as to permit the pin 24 to be forced outwardly to its prefired position. Movement of the pin in this connection is limited by its contact with the face of the gun bolt as the back plate in the case of a revolver.

In the second embodiment of the invention, shown in Figure 2, the internal shelf 16 of the first embodiment is eliminated and the tube 14 is made somewhat shorter in length. The firing pin 24 is mounted as before with its head 26 in the recess 13 but there is interposed between the tube and the pin an extension tube sleeve 31,

the body of which is formed as a stem closely fitting within the tube 14 and having an internal diameter such that it closely encloses the pin 24. The outer or rearward end of sleeve 31 is formed as a flat head or flange 32 which lies against the flat base or wall of the recess 13 while the inner or forward end of the tube or sleeve is bifurcated to form angularly extending struts or braces 33, the ends of which contact the interior surface of the casing 11. The struts 33, which are spread into the position shown after the sleeve has been seated in the case, replace the shelf 16 of the first embodiment and perform the function of positioning the primer 17. The remainder of the construction is identical with that of the first embodiment.

In the discharge of the cartridge comprising the second embodiment of the invention the explosion is again contained entirely within the case. The high pressure therein effects the compression of the somewhat shorter tube 14 onto the stem of extension sleeve 31, which is itself compressed by the same pressure onto the pin 24 positioned therein. The presence of these two sealing contacts prevents the rearward passage of any gases of combustion.

The reloading operation is identical to that of the first embodiment although it should be pointed out that in the absence of the internal shoulder 16, should the projectile 18 be forced inwardly to an excessive depth, the struts 33 effect the rearward displacement of the tube sleeve 31 and with it the pin 24, this movement preventing contact of the primer with the pin. It is to be noted that the struts 33 contact the primer 17 at its peripheral margin so that pressure exerted at that point cannot effect the ignition of the primer.

Referring now to Figure 3, a third preferred embodiment of the invention is illustrated in which certain features of the first two embodiments are combined. The internal shelf 16 of the first embodiment is present, thereby making unnecessary the struts 33 of the second embodiment, but the extension sleeve 31 without struts is again provided about the firing pin 24. This third embodiment of the invention has the firing characteristics of the second embodiment and the reloading characteristics of the first embodiment by virtue of this combination of features.

Referring now to Figure 4, a fourth preferred embodiment of the invention is illustrated and is seen to comprise a case 11 identical to the case of the first embodiment with the exception that the tube 14 is made cylindrical and is of greatly reduced length. The firing pin 24 is again slidingly mounted directly in the tube 14, as in the first embodiment, but there is provided an extension tube or sleeve 41, the enlarged cupped head of which, indicated by the reference character 42, encloses the end of the tube. The remainder of the construction is identical to the first embodiment.

In the explosion of the cartridge constructed in accordance with this fourth embodiment of the invention, the pressure generated by the ignition of the powder functions to compress the sleeve 41 onto both the pin 24 and the tube 14 to provide the necessary gas seal. In both embodiments 2 and 3 it was the tube 14 which was compressed upon the sleeve rather than the sleeve upon the tube.

While the particular apparatus herein 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 embodiments of the invention and that no limitations are intended 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 formed with a central recess and an inwardly extending tube connecting said recess with the interior of the case, a sleeve positioned in said tube and spread at its inner end to form struts, a firing pin slidably positioned in said sleeve and provided with a head positioned in said recess, a projectile mounted in the end of said case, a primer clamped between said struts and said projectile in a position to be contacted by the inner end of said pin, and a charge of powder between said primer and said base.

2. The construction recited by claim 1 characterized in that under the pressure generated by the burning of said powder in said case said tube

is compressible on said sleeve and said sleeve on said pin to provide gas-tight seals.

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