Nov. 14, 1961 D. A. JOHNSON 3,008,258

FIREARM AND CARTRIDGE THEREFOR

Filed June 15, 1960

Fig. 1.

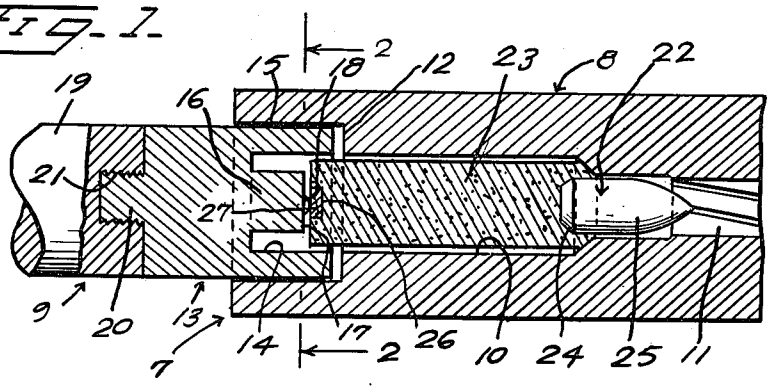


Fig. 5.

Fig. 2.

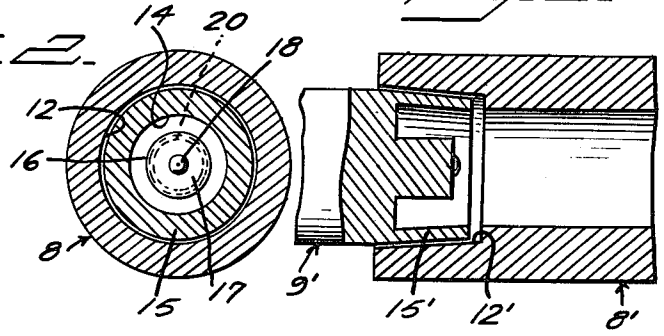


Fig. 3.

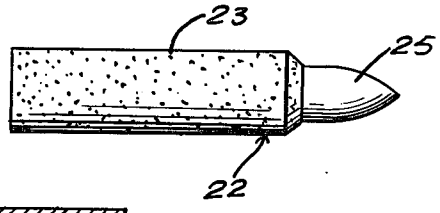
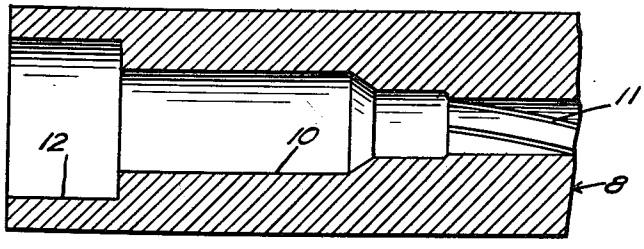


Fig. 4.



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3,008,258
FIREARM AND CARTRIDGE THEREFOR

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2 Claims. (Cl. 42—14)

This invention relates to a novel construction of cartridge chamber and bolt and to a novel construction of cartridge for use therewith, whereby the cartridge chamber is sealed by the forward end of the bolt due to the pressure created by the firing of the cartridge, to prevent escape of the expanding gases rearwardly from the cartridge chamber until pressure in the chamber is released by the projectile of the cartridge leaving the muzzle of the barrel.

Another object of the invention is to provide a novel construction of cartridge wherein no case is provided and the propellant charge and primer are completely consumed by the firing of the cartridge.

Still a further object of the invention is to provide an improved firearm and cartridge therefor whereby the need for an extractor and ejector are eliminated.

Still a further object of the invention is to provide a firearm of greatly simplified construction wherein the likelihood of malfunctioning will be reduced to a minimum by elimination of the extractor and ejector and the need for an ejector opening.

Still a further object of the invention is to provide a firearm having a novel construction of bolt or breechblock including a part which is capable of being expanded by the pressure generated by the exploded propellant charge of the cartridge for sealing the cartridge chamber until the projectile of the cartridge has left the barrel muzzle.

Various other objects and advantages of the invention will hereinafter become more fully apparent from the following description of the drawing, illustrating presently preferred embodiments thereof, and wherein:

FIGURE 1 is a longitudinal, substantially central sectional view, partly in elevation, of a portion of a firearm constructed in accordance with the invention and shown containing the improved cartridge;

FIGURE 2 is a cross sectional view thereof, taken substantially along a plane as indicated by the line 2—2 of FIGURE 1;

FIGURE 3 is a side elevational view of the cartridge;

FIGURE 4 is a longitudinal, substantially central sectional view of the rear end of the barrel, and

FIGURE 5 is a fragmentary substantially central longitudinal sectional view, partly in elevation, of a slightly modified form of the firearm.

Referring more specifically to the drawing and first with reference to the form of the invention as illustrated in FIGURES 1 to 4, a portion of a firearm as shown therein is designated generally 7 and includes the rear portion of a firearm barrel, designated generally 8, and the forward portion of a bolt, designated generally 9.

The barrel 8 is provided with a cartridge chamber 10 the forward end of which opens into a barrel bore 11 and the rear end of which opens into a cavity 12 which is formed in and opens outwardly of the rear end of the barrel 8 and which is of larger diameter than the chamber 10.

The bolt 9 is of the type having reciprocating movement axially thereof and of the barrel 8 and may be of the "blow-back" type as used in submachine guns. The head portion or forward end 13 of the bolt 9 has a forwardly opening cavity 14 therein providing an annular skirt 15, constituting the wall surrounding said cavity 14. The bolt head 13 has a portion 16 extending into the cavity 14 and which is of a diameter substantially less than the diameter of the cavity. The bolt portion

16 has a substantially flat forward face 17 from which extends a tit or projection 18. The forward face 17 is set back with respect to the forward end of the skirt 15 so that the tit 18 is contained within the cavity or socket 14.

If desired and as illustrated in FIGURE 1, the bolt head 13 may be detachable from the forward end of the body 19 of the bolt 9, as by being provided with an extension 20 at its rear end which is threadedly secured in a forwardly opening socket 21 of the bolt body 19.

The improved cartridge, designated generally 22 and illustrated in FIGURES 1 and 3, consists of a formed propellant or explosive charge 23 having a forwardly opening socket 24 in the forward end thereof in which the rear end portion of a conventional projectile 25 is seated and anchored. The rear end of the propellant charge 23 is provided with a small rearwardly opening socket 26 containing a primer 27. The percussion composition, constituting the primer 27, is likewise formed so that no case is required and the propellant body 23 provides the anvil for the primer 27.

Any suitable mechanism, not disclosed, constituting no part of the present invention, may be utilized for seating the cartridge 22 in the chamber 10 and for thereafter releasing the bolt 9 and to effect forward movement of the bolt from left to right of FIGURE 1 and toward its position of FIGURE 1. The external diameter of the bolt head 13, or at least the skirt 15 thereof, is slightly less than the diameter of the cavity 12. The clearance between the skirt 15 and the annular wall of the cavity 12 is exaggerated for clarity in FIGURE 1. The tit 18 is disposed to align with the primer 27 so that as the bolt 9 approaches its forwardmost position and when it has reached its position of FIGURE 1, the tit 18 will strike and detonate the primer 27 to ignite the propellant charge 23 as the forward end of the skirt 15 reaches the inner end or bed of the cavity 12, or slightly beyond its position of FIGURE 1. The pressure from the expanding gases of the ignited propellant body 23 will cause the skirt 15 to expand into tight engagement with the surrounding wall of the cavity 12 to seal the rear end of the cartridge chamber 10, so that the pressure of the expanding gases will propel the projectile 25 forwardly through the bore 11. As the projectile 25 leaves the barrel muzzle, not shown, pressure in the chamber 10 is released and the skirt 15 is sufficiently elastic to enable it to contract to its original size as shown in FIGURE 1, so that the skirt can be readily withdrawn from the cavity 12 as the bolt is retracted. The propellant body 23 and primer 27 will be completely consumed, leaving nothing to be extracted from the chamber 10 or thereafter ejected from the firearm so that the chamber 10 will be ready to receive another cartridge 22.

It will be understood that the size and shape of the propellant body 23 may vary and this likewise applies to the chamber 10. The length of the cartridge 22 may likewise vary, since the length of the bolt head portion 16 may be varied or said portion may be omitted so that the tit 18 projects from the bed of the cavity or socket 14. It will also be apparent that the bolt may be provided with a conventional firing pin, in lieu of the tit 18, and which can be released and advanced to strike the primer 27 after the bolt has reached a battery position.

FIGURE 5 illustrates a slightly modified form of the barrel and bolt and wherein the cavity 12′ of the barrel 8′ is inwardly tapered and the skirt 15′ is similarly tapered toward its extremity. The tapered construction of FIGURE 5 allows for expansion due to heat and which might otherwise interfere with retraction of the bolt 9′ after repeated firing.

Various other modifications and changes are contemplated and may be resorted to, without departing from

the function or scope of the invention as hereinafter defined by the appended claims.

I claim as my invention:

1. In combination with a firearm cartridge comprising a formed propellant charge body having a rear end containing a primer and a projectile secured to and projecting from a forward end of said propellant body; a firearm barrel having a chamber for receiving said cartridge, said barrel having a cavity opening outwardly of a rear end thereof and into which the rear end of the cartridge chamber opens, said cavity being larger in cross section than the cartridge chamber, a bolt having a forward end slidably movable into said cavity, said forward bolt end including an annular skirt sized to slidably engage in said cavity and defining a forwardly opening socket in the bolt, and means carried by said bolt and disposed in said socket to engage and detonate the cartridge primer for igniting said propellant body when said skirt is contained in the barrel cavity, said skirt being expanded by the pressure of the expanding gases within said socket into sealing engagement with the surrounding wall of the cavity for sealing the rear end of the cartridge chamber until the projectile has been propelled from the barrel by the expanding gases generated by the propellant body, said skirt being externally tapered toward its extremity, and said barrel cavity being inwardly tapered to conformably receive the skirt.

2. In combination with a firearm cartridge comprising a formed propellant charge body having a rear end containing a primer and a projectile secured to and projecting from a forward end of said propellant body; a firearm barrel having a chamber for receiving said cartridge, said barrel having a cavity opening outwardly of a rear end thereof and into which the rear end of the cartridge chamber opens, said cavity being larger in cross section than the cartridge chamber, a bolt having a forward end slidably movable into said cavity, said forward bolt end including an annular skirt sized to slidably engage in said cavity and defining a forwardly opening socket in the bolt, and means carried by said bolt and disposed in said socket to engage and detonate the cartridge primer for igniting said propellant body when said skirt is contained in the barrel cavity, said skirt being expanded by the pressure of the expanding gases within said socket into sealing engagement with the surrounding wall of the cavity for sealing the rear end of the cartridge chamber until the projectile has been propelled from the barrel by the expanding gases generated by the propellant body, said bolt having a portion projecting forwardly into said socket, said skirt being disposed around and spaced from said bolt portion, and said primer engaging means comprising a tit disposed on a forward end of said bolt portion and within said socket, said socket being of a cross sectional size to loosely accommodate therein said rear end of the propellant body.

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