July 11, 1950 C. E. SIMPSON 2,514,422

CARTRIDGE

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Fig. 7.

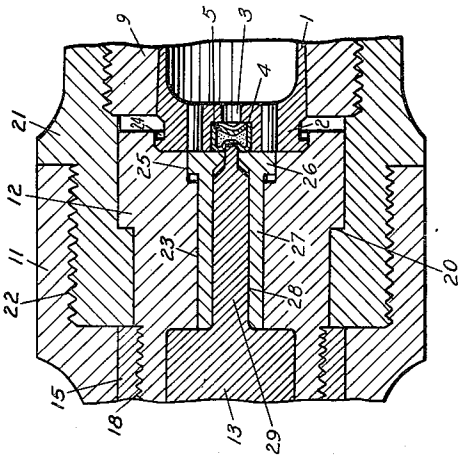


Fig. 8.



Fig. 2.

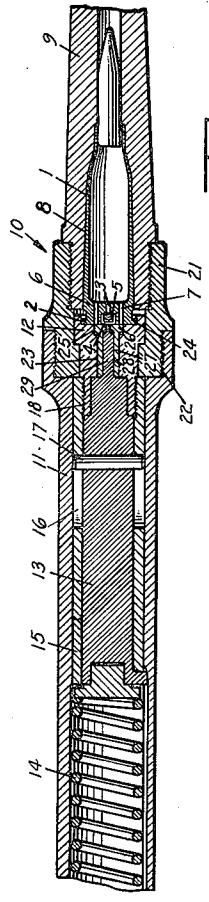


Fig. 1.

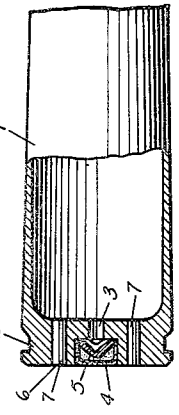
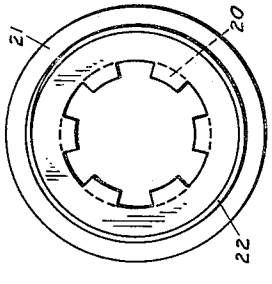


Fig. 6.



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Fig. 3.

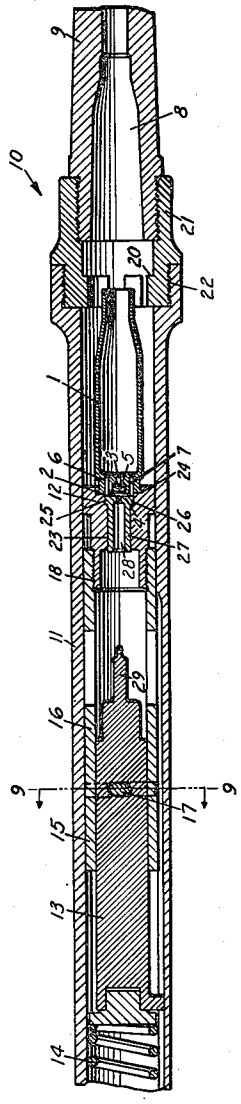


Fig. 5.

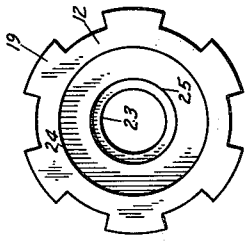


Fig. 4.

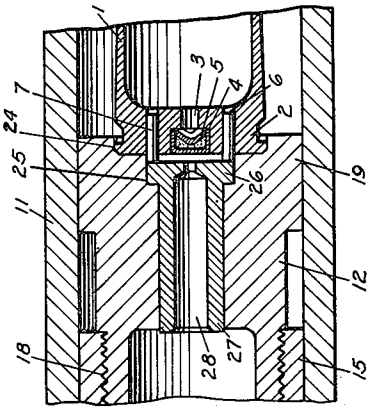
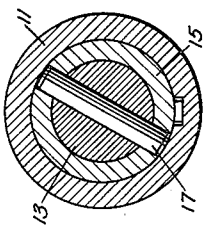


Fig. 6.



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2,514,422

CARTRIDGE

Clarence E. Simpson, Springfield, Mass.

Application November 30, 1945, Serial No. 632,097

4 Claims. (Cl. 102—44)

(Granted under the act of March 3, 1883, as amended April 30, 1928; 370 O. G. 757)

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The invention described herein may be manufactured and used by or for the Government for governmental purposes, without the payment to me of any royalty thereon.

This invention relates to an improved cartridge for a firearm.

Numerous attempts have been made to actuate breech mechanisms of firearms by the set back of the cartridge primer. Some of these attempts have been fairly successful but ammunition prepared in such fashion to permit utilization of the set back of the primer for actuation of the firearm has been difficult to manufacture. Improper seating of the primer, under or oversize primers, and cocked primers added to the difficulty in obtaining reliable ammunition.

Accordingly, it is an object of this invention to provide an improved cartridge for a firearm of the type wherein an element of the cartridge actuates a piston or tappet member which in turn effect operation of the breech mechanism of the firearm.

A particular object of this invention is to provide an improved cartridge for projectiles of .60 caliber or larger.

The specific nature of the invention as well as other objects and advantages thereof will clearly appear from a description of a preferred embodiment as shown in the accompanying drawings in which:

Fig. 1 is a fragmentary view of a cartridge case shown partly in longitudinal section to illustrate the dowel pins contained in the base of such cartridge case.

Fig. 2 is a fragmentary longitudinal sectional view of a firearm showing the cartridge embodying this invention contained in the chamber of the barrel of such firearm, wherein the breech member of such firearm is shown in the battery position.

Fig. 3 is a view similar to Fig. 2 but showing the breech member of the firearm in the recoiled position.

Fig. 4 is a fragmentary view in longitudinal section showing in enlarged detail the firearm actuating members in the recoiled position.

Fig. 5 is an enlarged front end elevational view of the firearm bolt showing the radially disposed locking lugs.

Fig. 6 is a rear end elevational view showing the locking surfaces in the barrel extension which are engaged by the locking lugs of the bolt.

Fig. 7 is a fragmentary view in longitudinal section showing in enlarged detail the firearm actuating members in the battery position.

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Fig. 8 is a top elevational view of the firearm bolt showing the unlocking cam.

Fig. 9 is a cross sectional view taken along the line 9—9 of Fig. 3.

Essentially this invention comprises the provision of two or more vent holes in the base of a cartridge case and forcing in such vent holes hardened dowel pins. The sudden pressure developed within the cartridge case imparts a hammer-like blow to the dowel pins thereby driving such pins rearwardly to act upon a tappet or other actuating member which imparts a sudden momentum to the recoiling member of a firearm to effect unlocking thereof and to provide energy for the recoiling breech member to complete its cycle.

In Fig. 1 there is shown in assembled relation a conventional cartridge embodying this invention. Such cartridge comprises a case 1 which is provided with an integral base portion 2. In the center of such base portion there is provided an axial flash hole 3. The rear of such flash hole is enlarged as shown at 4 to receive a primer 5. Such primer is the conventional percussion type primer commonly utilized in present day firearm cartridges.

In base portion 2 there is provided a plurality of horizontal holes 6 which communicate with the interior high pressure region of the cartridge. In the preferred application of this invention however only two such holes are provided as such number does not unduly reduce the cross-sectional area of such base portion. In each hole 6 there is forcibly inserted a pin 7. The pins 7 are preferably of hardened steel to better withstand the impact forces placed upon such pins, as will be presently described. When assembled to cartridge case 1 the ends of pins 7 are placed flush with the outside of base portion 2.

To better illustrate the function of this improved cartridge, such cartridge is placed in a chamber 8 of a barrel 9 of a firearm 10 shown in Fig. 2. Firearm 10 essentially comprises a receiver 11, a bolt 1 and an inertia member 13. Inertia member 13 is arranged to be driven forwardly on the counter-recoil stroke thereof by a driving spring 14. A cam member 15 surrounds inertia member 13 and a pair of oppositely disposed cam tracks 16 are provided on cam member 15 which are engaged by the opposite ends of a transverse pin 17. Transverse pin 17 is mounted in inertia member 13, as shown in Figs. 2 and 9, to connect cam member 15 to inertia member 13. Bolt 12 is connected to cam member 15 by threads 18.

A plurality of equally spaced lugs 19 are provided on the forward end of bolt 12 about the periphery thereof as shown in Fig. 5. The lugs 19 engage suitable locking surfaces 20 provided in a barrel extension 21 which is secured to receiver 11 by threads 22. The rotation of bolt 12 by cam member 15 effects unlocking of bolt 12 from barrel extension 21.

An axial hole 23 is provided in bolt 12. The face of bolt 12 is counterbored as shown at 24 to accommodate the base of cartridge case 1. A second smaller counterbore 25 is provided adjacent counterbore 24 to accept a head 26 of an actuator 27. Actuator 27 is a piston-like member. An axial hole 28 is provided in actuator 27 having a configuration corresponding to that of a firing pin 29 projecting forwardly from inertia member 13. Firing pin 29 is integrally formed therewith and is axially disposed thereto.

In the firearm above described, a cartridge is discharged when bolt 12 is in the battery position and inertia member 13 has been released so that firing pin 29 can go forwardly to strike primer 5 of cartridge case 1. When a cartridge is discharged the breech pressure instantaneously developed in chamber 8 impinges on the front face of pins 7 and such pins are forced rearwardly to strike actuator 27. The press fit of pins 7 in holes 6 is easily overcome by the force of the powder gases. It is desired to point out here that in the battery position of bolt 12 head 26 of actuator 27 does not lie against the bottom of counterbore 25. Instead a space of about 1/32'' or greater is left between the bottom of such hole and the rear shoulder of the head 26 of actuator 27. Thus when pin 7 strikes head 26 of actuator 27, such actuator is driven rearwardly at extremely high velocity, whereupon such actuator strikes inertia member 13 driving such inertia member rearwardly.

As pin 17 is in engagement with cam tracks 16 provided on cam member 15, the rearward motion of inertia member 13 forces cam member 15 to rotate, thereby effecting rotation of bolt 12 to disengage lugs 19 from barrel extension 21, thus permitting bolt 12 to travel rearwardly assisted by residual gas pressure in the chamber 8 to complete its recoil stroke. Spring 14 then biases inertia member 13 and bolt 12 forwardly to battery position whereupon another cartridge is introduced into chamber 8 of barrel 9.

From the foregoing description it is apparent that the improved cartridge herein described positively actuates the breech mechanism of a firearm adapted to utilize such a cartridge. Further, a cartridge can be securely held in a fixed position as set back of the cartridge is not required, hence the head space of the firearm can be maintained. In addition, this improved cartridge is simple and inexpensive to manufacture.

Finally the use of the piston-like inserts permits a hardened steel to be utilized for the actuating member in contrast to the soft deformable metal required when the primer functions as the actuating member. Furthermore, the effective area of the piston inserts can be exactly proportioned relative to the amount of energy required to function the primer while heretofore the area of the primer was primarily determined by requirements of the cartridge for proper ignition.

I claim:

1. A cartridge for an automatic firearm having a primer and a piston mounted on the base thereof independent of said primer, said piston communicating with the interior high pressure region of such cartridge, said piston being movable rearwardly relative to the cartridge only under the forces developed by discharge of said cartridge.

2. A cartridge for a firearm having a primer and a generally cylindrical member press fitted into the base thereof independent of said primer, said member communicating with the interior high pressure region of said cartridge, said member being movable rearwardly relative to the cartridge only under the forces developed by discharge of said cartridge.

3. In a cartridge adapted to actuate an operating member of a firearm, a primer centrally located in the base of the cartridge, a gas-actuated piston frictionally mounted in the base of the cartridge, independent of said primer, said piston having one end thereof directly adjacent the interior high pressure region of the cartridge and the other end arranged to contact the operating member of the firearm when the cartridge is inserted therein, said piston being movable rearwardly relative to the cartridge only under the forces developed in the high pressure region upon the discharge of the cartridge thereby imparting in turn recoil movement to the firearm operating member.

4. In a cartridge adapted to actuate an operating member of a firearm, a primer centrally located in the base of the cartridge, and a plurality of gas-actuated piston pins radially mounted about said primer and independent thereof, each of said pins having one end thereof in direct communication with the interior high pressure region of the cartridge and the other end adjacent the operating member of the firearm when the cartridge is inserted therein, said pins being movable rearwardly relative to the cartridge only under the forces developed in the high pressure region upon the discharge of the cartridge thereby imparting in turn recoil movement to the firearm operating member.

CLARENCE E. SIMPSON.

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