Feb. 9, 1937. D. L. WOODBERRY 2,069,794

SHELL FOR FIREARMS

Filed June 5, 1933

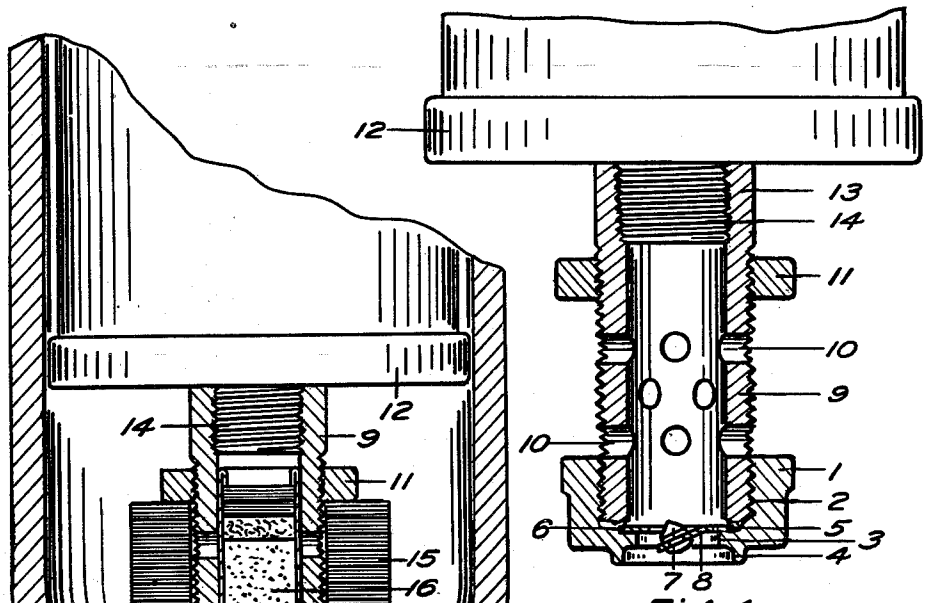


Fig. 1

Fig. 2

INVENTOR.

BY David L. Woodberry

Millard J. Peake, Jr.

ATTORNEY.

Patented Feb. 9, 1937 2,069,794

UNITED STATES PATENT OFFICE

2,069,794

SHELL FOR FIREARMS

David L. Woodberry, Edgewood Arsenal, Md.

Application June 5, 1933, Serial No. 674,267

2 Claims. (Cl. 102—12)

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

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

This invention relates in general to a firearm and shell and more particularly has reference to a combined striker nut assembly and propellant charge securing means for a mortar shell.

In the firing of certain munitions such as chemical mortars, the mortar barrel is placed at a predetermined inclination and the shell is dropped into the open end of the barrel. The shell carries on its lower end a propellant charge and an ignition cartridge which is fired by the impact of the descending shell against a firing anvil in the barrel.

Previous to this invention it has been customary to insert an ignition cartridge in a cartridge container of a shell without positive means of securing the cartridge therein throughout its trajectory. Further, it has been the practice to fire the primer in the cartridge by means of a pointed firing pin fitted in the base of the barrel of the piece aligned to impinge with the primer when the shell is dropped down in the barrel of the weapon. The certainty with which the primer impinged with the point of the pin depended upon the concentricity of the point of the pin with the axis of the bore of the weapon and the concentricity of the cartridge container with the base of the shell and the fit of the shell in the bore. It has been a common occurrence in the past for the point of the pin to impinge on the circumferential edge of the primer, thereby resulting in the primer not functioning. An attempt to alleviate this condition brought about the development and limited use of a clip provided with a firing point. This clip was adapted to fit around the base of the ignition cartridge in a manner to align the firing point of the clip with the primer in the cartridge. In this manner the firing point when struck by a firing anvil would strike the center of the primer and cause it to function. However, it was found that upon firing in many instances the clip, together with the base and other debris from the cartridge would blow out of the cartridge container and remain in the base of the barrel. This collection of debris in the base of the barrel upon repeated firing would cause misfires, as the debris would build up around and on the firing anvil.

In addition, it was found that poor ignition of the propellant charge was obtained in many instances, which resulted in abnormally short ranges. This poor ignition was attributed to the cartridge upon firing in some instances being blown partly out of the cartridge container before the hot gases from the igniting charge in the cartridge could be forced through the radial aperture in the cartridge container and ignite the propellant charge. Instead, some of the hot gases from the ignition charge would blow out at the base of the cartridge container and would tend to ignite the propellant charge from the outside rather than from the inside where the hot gases would be forced to permeate the propellant charge and impart instantaneous ignition.

It will be apparent that mechanisms of this type tend to reduce the efficiency of a weapon with which they are used and lower the morale of the personnel engaged in its firing.

An object of this invention is to provide a striker nut assembly for shell to positively secure the ignition cartridge in the cartridge container thereof, throughout its trajectory when fired.

Another object of this invention is to provide a striker nut assembly for shell fitted with a striker plate provided with a striker point so that when the striker nut is screwed on to the cartridge container the striker point is aligned with the primer in the cartridge.

Still another object of this invention is to provide a striker nut assembly for shell adapted to hold the ignition cartridge in place upon firing and cause the hot gases to build up in the cartridge to such a degree that they will burst through the case of the cartridge opposite the radial aperture in the cartridge container and flow from the ignition cartridge through the radial apertures of the cartridge container and permeate the propellant charge assembled thereabout.

A further object of this invention is to provide a striker nut assembly for shell adapted to prevent any debris from the ignition cartridge when fired from being blown back and collecting in the base of the mortar.

A still further object of this invention is to provide a striker nut assembly for shell to secure the propellant charge in place around the cartridge container.

It will thus be apparent that the objects of this invention are in general to provide a striker nut assembly for shell comprising a combination retaining and striker nut, fitted with a striker plate and a striker pin, the latter adapted to be always in alignment with the primer of the cartridge. It will be still further apparent that upon firing the cartridge the hot gases evolved from the ignition charge in the cartridge will

burst through the casing of the ignition cartridge at the radial apertures in the cartridge container and permeate the propellant charge thereabout, thereby imparting instantaneous and complete ignition of the propellant charge.

With these and other objects in view which may be incident to my improvement, the invention consists in parts and combinations to be hereinafter set forth and claimed, with the understanding that the several necessary elements comprising my invention may be varied in construction, proportions and arrangements, without departing from the spirit and scope of the appended claims.

In order to make my invention more clearly understood, I have shown in the accompanying drawing, means for carrying the same into practical effect, without limiting the improvements in their useful applications to the particular constructions which for the purpose of explanation, have been made the subject of illustration.

In the drawing forming a part of this specification:

Figure 1 is a longitudinal sectional view of the striker nut assembly on the base of the shell without ignition cartridge or propellant charge.

Figure 2 is a longitudinal sectional view of the striker nut assembly on the base of a shell in a barrel with a loaded ignition cartridge assembled in the cartridge container and the propellant charge assembled therearound, showing the striker point in contact with the firing anvil and embedded in the primer in a firing position.

Referring more particularly by numerals to the drawing in which the same and similar elements are designated by like symbols of reference throughout, and more particularly to Figure 1, there is shown an integral striker nut body 1. The striker nut body 1 is provided with a vertical bore 2, threaded to engage with the threads on the cartridge container. The bore 2 is open at the top end and communicating at the bottom end through a constricted bore 3 with a larger bore 4, the bores 3 and 4 being aligned with the vertical bore 2.

The vertical bore 2 is provided with a counterbore 5, fitted with a striker plate 6 secured therein, as by soldering, brazing, welding or the like. The striker plate 6 is provided with a striker point 7 secured thereon adapted to be held in the armed position by a lever 8 which is an integral part of the striker plate 6 bent out of alignment therewith. The striker point 7 may conveniently be secured to bent-out lever 8 by riveting for example.

The striker nut assembly is adapted to screw on to the cartridge container 9 which is provided with 12—$\frac{7}{32}$-inch radial holes 10 and equipped with a compression nut 11. The nut 11 is adapted to be secured up or down on the cartridge container 9 in order to provide the desired compression on the propellant charge when assembled around the cartridge container. The entire striker nut assembly together with the cartridge container is secured to the base of a shell 12 by engagement of the threads 13 of the cartridge container with the threads of the stud 14 on the base of the shell.

The operation of the invention will be readily understood by first having reference to Figure 2. When it is desired to prepare for firing a projectile having the striker nut assembly forming the subject matter of this invention assembled thereon, as shown in Figure 1, it is only necessary to unscrew the striker nut 1 from the cartridge container 9, then (reference Figure 2) assemble the propellant charge 15 around the cartridge container for the propellant charge, insert the loaded ignition cartridge 16 in the cartridge container, screw the striker nut 1 on to the cartridge container as shown, thereby securing the loaded cartridge in the cartridge container and retaining the propellant charge, then adjust the nut 11 to compress the propellant charge 15 the desired amount.

When it is desired to fire a projectile having the striker nut assembly forming the subject matter of this invention assembled therewith, together with the loaded ignition cartridge and propellant charge, it is only necessary to drop the projectile down into the barrel 18 of the weapon. This being done, the projectile will slide down the barrel until the striker point in the striker nut assembly engages with the firing anvil 19 in the base of the barrel, whereupon the striker point being aligned with the primer in the cartridge will be driven down to indent the primer as shown in Figure 2 thereby setting off the primer and ignition charge in the cartridge and creating ignition and combustion of the propellant charge.

It will be apparent that with the ignition cartridge securely held in the cartridge container by the striker nut assembly, that, upon setting off the ignition charge in the cartridge by the primer, the gases evolved therefrom are confined in the cartridge until a sufficient amount of pressure is developed therein to shear the casing of the cartridge in alignment with each radial aperture in the cartridge container, thereby emitting the hot gases from the ignition charge through the radial apertures of the cartridge container and causing same to permeate the propellant charge and create instantaneous ignition and combustion thereof.

Due to the fact that the striker point 7 and its lever 8 are secured to striker plate 6 which in turn is inset in the nut 1 and secured thereto, no loose parts are present which may become separated from the shell. Thus the barrel 18 can not become fouled with loose firing pins or other parts after firing of several shells. Concentricity of the firing pin with respect to the ignition cartridge is insured at all times, thus eliminating misfires. Furthermore, the plate 6 acts to reinforce the bottom of the cartridge container, so that rupture of the container takes place at the holes 10 and burning of the propellant charge 15 from its interior.

While I have shown and described the preferred embodiment of my invention, I wish it to be understood that I do not confine myself to the precise details of construction herein set forth by way of illustration, as it is apparent that many changes and variations may be made therein by those skilled in the art, without departing from the spirit of the invention, or exceeding the scope of the appended claims.

I claim:

1. A shell for muzzle loading weapons comprising a shell body having a hollow extension on the base thereof, said extension having radial apertures and an open bottom for the insertion of an ignition cartridge therethrough, a propellant charge positioned around said extension adjacent the radial apertures, a striker nut threaded to the lower end of said extension overlying and holding said cartridge within said extension and said propellant charge in position, a striker plate permanently secured to said nut and substantially closing the lower end of said extension, and

striker pin resiliently mounted on said plate and ɔncentrically positioned with respect to said nition cartridge whereby all parts are retained ı the shell when fired and the hot gases of the nition cartridge are prevented from passing out ' the lower end of said extension.

2. A shell for mortars comprising a shell body aving a hollow extension on the base thereof, ıid extension having radial apertures and an ɔen bottom through which a self-contained ;nition cartridge including an explosive charge nd a primer may be longitudinally insertable, a ropellant charge positioned around said extension overlying the radial apertures thereof, a striker nut threaded on the lower end of said extension having an inwardly extending flange, a striker plate permanently secured to said flange and substantially closing the open end of said extension, and a striker pin resiliently mounted on said plate and concentrically positioned with respect to said ignition cartridge, whereby misfires are avoided and the hot gases of the ignition cartridge are prevented from passing out of the lower end of said extension.

DAVID L. WOODBERRY.