

[54] CARTRIDGE EXTRACTING
ARRANGEMENT FOR USE WITH
FIREARMS

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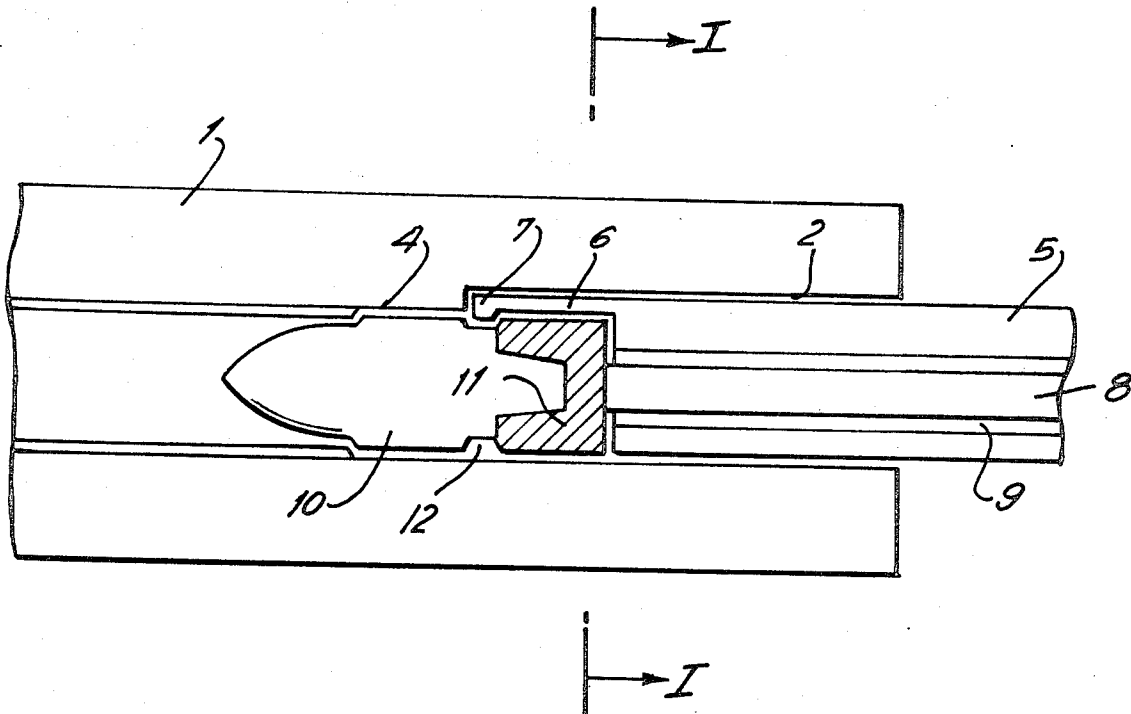
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[57] ABSTRACT

A firearm includes a tubular barrel having at its rear end a substantially cylindrical breech portion. A projectile is arranged within said barrel reaching with its rear end into said breech portion and having a peripheral surface. First engaging means is arranged on the peripheral surface of the projectile. A breech plunger is located behind said projectile in the breech portion of the barrel. Second engaging means is provided on said breech plunger and projects forwardly thereof. The second engaging means is adapted to engage with the first engaging means on the peripheral surface of the projectile. In this way, when the engaging means are engaged the projectile can be extracted in rearward direction from the barrel by rearward movement of the breech plunger.

6 Claims, 7 Drawing Figures



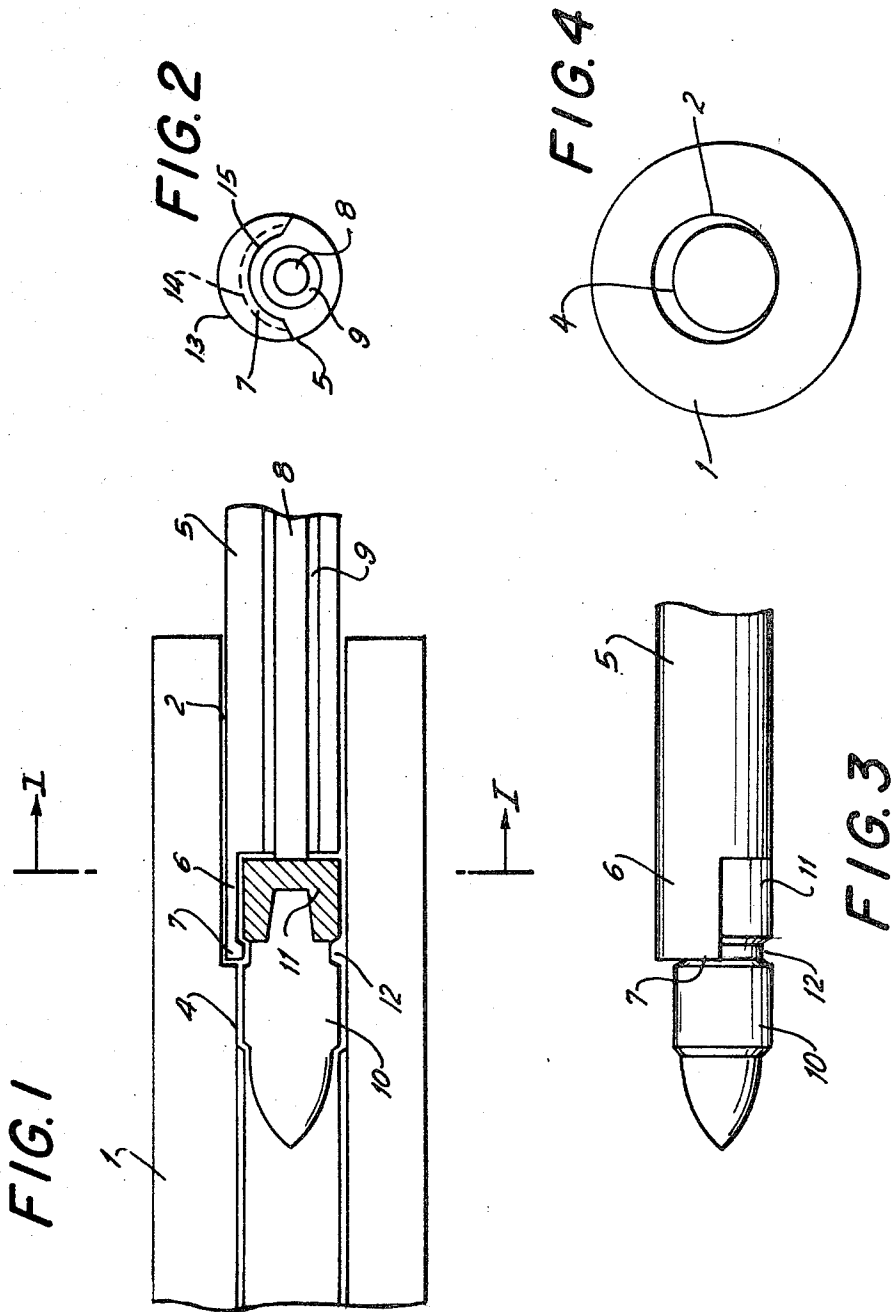


FIG. 5

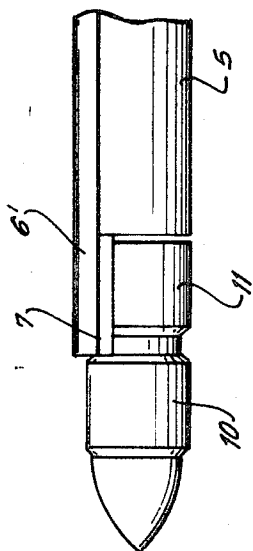


FIG. 6

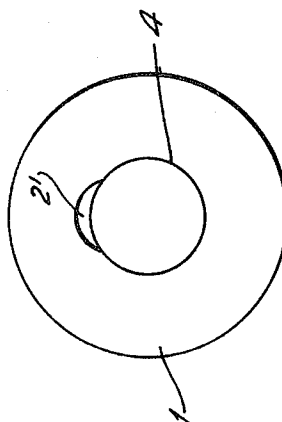
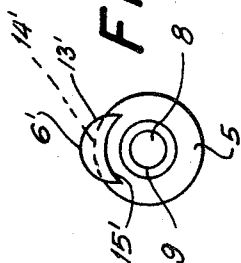


FIG. 7

CARTRIDGE EXTRACTING ARRANGEMENT FOR USE WITH FIREARMS

BACKGROUND OF THE INVENTION

The present invention relates to firearms using ammunition, particularly in the form of cartridges.

Ammunition cartridges are often comprised of a forward projectile portion intended to be shot from the firearm and an explosive charge provided at the rear of the projectile portion. The explosive charge is furthermore often surrounded with a casing which, after firing of the firearm, is left behind in the breech of such firearm to be subsequently removed. Often, however, such explosive charge is not provided with a casing.

With firearms of this type a particular problem arises when it is desired to remove from the cartridge chamber a cartridge which has not been fired or fails to fire. Various methods exist to accomplish this purpose, such methods being more or less unsatisfactory and requiring cartridge extracting arrangements of greater or lesser complexity.

It is an object of the present invention to provide an arrangement for the quick and easy removal of cartridges which have not yet been fired.

It is a particular object of the present invention to provide for such removal of cartridges whose explosive charge is not provided with a casing.

It is a further object of the invention to provide such an arrangement which is reliable in its operation, dependable in its construction and composed of few and simple parts.

It is also an object of the present invention to provide such an arrangement for the withdrawal of cartridges that have not been fired, which moreover accomplishes a very effective sealing of the breech.

SUMMARY OF THE INVENTION

The above objects, and others which will become apparent hereafter, are accomplished by providing a cartridge extracting arrangement connected and movable with the breech plunger of the firearm.

The firearm includes a tubular barrel having at its rear end a substantially cylindrical breech portion. A cartridge is arranged within the barrel and reaches with its rear end into the breech portion thereof. The peripheral surface of the cartridge is provided with first engaging means to facilitate extraction, and the breech plunger located rearwardly of the cartridge is provided with second engaging means. When and if it is desired to withdraw a cartridge which has not been fired, the second engaging means, in engagement with the first engaging means, is used to draw the cartridge rearwardly back from the barrel to a location within the firearm from which it can be conveniently ejected out of the firearm.

According to a preferred embodiment of the invention the second engaging means may be in very simple and expeditious manner configured as a hook-shaped member provided on a forward portion of the breech plunger means and adapted to appropriately engage with the first engaging means.

According to the same embodiment, the first engaging means may be provided in the form of a simple recess in the peripheral surface of the cartridge. Advantageously, the recess extends about the entire circumferential periphery of the cartridge, so that when the cartridge is inserted into the firearm, it is not necessary to

provide special means, and take special care, that the cartridge be so positioned as to place the first and second engaging means in rotational alignment, so that they can be engaged.

Similarly, it is advantageous according to a preferred embodiment of the invention that, if the first engaging means is provided in form of a simple recess in the cartridge periphery, such recess be located forwardly of the explosive charge, so as to enhance the blocking of the breech and to reduce somewhat the recoil forces acting upon the plunger when the cartridge is fired.

According to the preferred embodiment, the second engaging means is provided on the breech plunger forwardly of an intermediate shell section extending forwardly of the plunger. The shell section includes two cylindrical surfaces of different diameter and with different centers. Various combinations of such diameters and centers result in different constructional possibilities, as will be explained more fully below.

If, as in the preferred embodiment, the plunger moves in a bore having the configuration of a right cylinder, it is possible to design the intermediate shell section so that its outer cylindrical surface is of diameter equal to the diameter of the plunger and bore and concentric therewith, so that it appears to constitute a smooth extension thereof.

Alternatively, it is possible to design the intermediate shell section so that it is of different diameter and eccentric from the axis of the bore, especially for accommodating cartridges of particular configuration, as will be explained below.

The novel features which are considered as characteristic for the invention are set forth in particular in the appended claims. The invention itself, however, both as to its construction and its method of operation, together with additional objects and advantages thereof, will be best understood from the following description of specific embodiments, when read in connection with the accompanying drawing.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a longitudinal section through the barrel of the firearm, showing the loaded cartridge in firing position;

FIG. 2 is a view of the plunger alone as seen from the front in axial direction thereof;

FIG. 3 is a view showing the relationship between cartridge and plunger when the first and second engaging means are in engagement;

FIG. 4 is a view of the firearm barrel as seen in aimed direction, with the cartridge and plunger removed;

FIG. 5 is a view similar to FIG. 3, but illustrating a second embodiment of the invention;

FIG. 6 is a view similar to FIG. 2 but illustrating the embodiment of FIG. 5; and

FIG. 7 is a view similar to FIG. 4 but illustrating the embodiment of FIGS. 5 and 6.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Discussing now the drawing in detail, and firstly FIG. 1 thereof, it will be seen that there is illustrated the barrel 1 of a firearm. Loaded in the barrel 1 in firing position is a cartridge which has a forward projectile portion 10 and a rearward explosive charge portion 11. With the particular cartridge illustrated, it can be seen that the forward or conically tapering portion thereof

is positioned within a forward portion of the barrel 1, that an intermediate portion of the cartridge is positioned within a firing chamber portion 4 of the barrel 1, and that the rearward or explosive charge portion 11 of the cartridge is equal in diameter to the cartridge portion accommodated within firing chamber 4.

In the rear or breech portion of the barrel 1 there is provided a breech plunger 5 movable in plunger chamber 2 and provided at its forward portion with a projecting shell section 6. At the forward portion of the shell section 6 there is seen to be provided a hook-shaped member or portion 7. The hook-shaped member 7 is shown in engagement with a corresponding recess portion 12 provided on the peripheral surface of the cartridge, intermediate the projectile and explosive charge portions thereof.

The breech plunger 5 is of substantially cylindrical shape and has provided within it a substantially cylindrical electrode 8. An insulating shell 9 of insulating material prevents electrical communication between plunger 5 and electrode 8. When the cartridge is to be fired, current is caused to pass between the first electrode 8 and a second electrode which is comprised of plunger 5 itself and the walls of the breech, thereby electrically igniting the explosive charge. It should be understood, of course, that the arrangement of the invention is not limited to use with cartridges ignited electrically, and that the electrode 8 and insulation 9 are provided only when necessary and appropriate.

FIG. 2 shows the plunger alone as seen from the front in axial direction. From this Figure, and from FIG. 3, it can be seen that the outer cylindrical surface 13 of the shell section 6 is provided as a continuation of the cylindrical surface of the plunger, i.e., equal in diameter thereto and concentric therewith. The inner cylindrical surface 14 of the shell section 6, however, is seen to have a diameter which is smaller than the diameter of the plunger 5 and eccentric therefrom. It is to be noted from FIG. 1 that the inner cylindrical surface 14, while eccentric from plunger 5, is concentric with firing chamber 4 and the forward portions of barrel 1. It should be clearly understood that this embodiment is accordingly intended for use with cartridges whose projectile and explosive charge portions are of equal diameter. Likewise it should be observed that while plunger chamber 2 and barrel 1 are of different diameters and eccentric, they nevertheless are arranged tangentially in a region diametrically opposite the hook-shaped member 7, in the position thereof illustrated; this is most clearly shown in FIG. 4. Thus, as the cartridge is moved forwardly in chamber 2 and in engagement with member 7, it will do so smoothly and in one direction, being while in chamber 2 already in proper alignment with the axis of barrel 1.

Aside from its simplicity, the construction of FIGS. 1-4 is advantageous in the effective sealing of the breech by member 7, shell section 6, and plunger 5. A consideration of these four Figures will indicate that there does exist a certain amount of dead space about the cartridge, in the region of its explosive charge. This dead space results from the fact that the shell section 6 and member 7 cannot surround the cartridge with an angular span of more than 180°; clearly, the dead space exists in the remaining angular portion around the cartridge, at the bottom region thereof, as illustrated. The dead space has the effect of somewhat reducing the initial pressure developed upon firing. However, this may

in fact be advantageous, such as for example when an explosive charge is employed which causes very high initial speeds of the projectile. Of course, inasmuch as the plunger surface facing the firing chamber exceeds in diameter the charge itself, and thereby provides additional surface against which explosive pressure can be applied, the construction of FIGS. 1-4 will of course result in a certain increase in the force with which the plunger is pushed rearwardly when the cartridge is fired.

With the construction illustrated, if it is desired to withdraw from the barrel a cartridge which has not been fired, or fails to fire, the plunger is simply withdrawn rearwardly, the cartridge being moved with it to a rearward location at which the cartridge can be ejected from the firearm by any of various spring and lever mechanisms known, or any other arrangement desired.

A second embodiment of the invention is illustrated in FIGS. 5-7. Here, FIG. 6 shows clearly that the shell section 6' with member 7 provided thereon extending through the plunger chamber 2' does not have an outer cylindrical surface designed as a smooth continuation of the cylindrical surface of plunger 5. Instead, the outer cylindrical surface 13' of shell section 6' is seen to be of lesser diameter than plunger 5 and eccentric therefrom. The inner cylindrical surface 14' of shell section 6', however, does have a diameter equal to and is concentric with plunger 5. This construction is provided specifically to eliminate the dead space occurring in the first embodiment disclosed. It can be deduced from FIG. 6, and is clearly shown in FIG. 5, that the rear circular surface of the illustrated cartridge and the front circular surface of the plunger 5 are substantially identical, thereby eliminating the somewhat excessive surface presented to explosive forces by the plunger of FIG. 1.

Here, too, when it is desired to remove a cartridge which has not been fired, this can be accomplished easily and expeditiously by simple withdrawal of the breech plunger 5 in rearward direction, the cartridge being carried back therewith to a rearward location where it can be conveniently expelled from the firearm.

It hardly need be said that the exact dimensions and proportions depicted are merely illustrative and may be varied over a wide range, depending on the particular type of firearm and ammunition employed. It is equally clear that even with the cartridge and firearm shown, the various members and elements may be designed with many and considerable variations and still perform substantially the same functions in substantially the same way.

It will be understood that while the invention has been illustrated and described as embodied in an extracting device for use in firearms, it is not intended to be limited to the details shown, since various modifications and structural changes may be made without departing in any way from the scope of the present invention.

Without further analysis, the foregoing will so fully reveal the gist of the present invention that others can by applying current knowledge readily adapt it for various applications without omitting features that, from the standpoint of prior art, fairly constitute essential features of the generic or specific aspects of this invention and, therefore, such adaptations should and are in-

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tended to be comprehended within the meaning and range of equivalence of the following claims.

What is claimed as new and desired to be secured by Letters Patent is set forth in the appended claims:

1. In a firearm, in combination, a tubular barrel having at its rear end a substantially cylindrical breech portion; a caseless cartridge arranged within said barrel reaching with its rear end into said breech portion and having a peripheral surface provided with a recess forming first engaging means; a breech plunger located behind said cartridge in said breech portion and having an axis eccentrically arranged to the axis of said barrel, and a projection of arcuate cross section projecting forwardly from said breech plunger and having at its front end a hook-shaped portion forming second engaging means adapted to engage with said first engaging means during forward movement of said breech plunger and for retracting said cartridge in the rearward direction during rearward movement of said plunger.

2. In a firearm according to claim 1, wherein said projection has an outer cylindrical surface of a diameter equal to the diameter of said breech portion and

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concentric therewith, and an inner cylindrical surface coaxial with the axis of said barrel.

3. In a firearm according to claim 1, wherein said projection has an outer cylindrical surface of a diameter less than the diameter of said breech portion and eccentric therefrom, and an inner cylindrical surface of a diameter less than the breech portion diameter and concentric therewith.

4. In a firearm according to claim 1, said cartridge having an explosive charge mounted at its rear, said explosive charge forming between itself and the remainder of said cartridge said recess serving as said first engaging means.

5. In a firearm according to claim 1, said hook-shaped portion having an arc-shaped cross-section.

6. In a firearm according to claim 1, wherein the tubular space within said tubular barrel and said substantially cylindrical breech portion are eccentric and wherein said space within said barrel has a smaller diameter than said breech portion.

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