

May 6, 1969

H. STADLER ET AL
AMMUNITION

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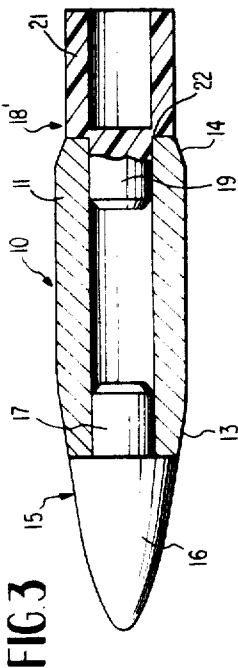


FIG. 3

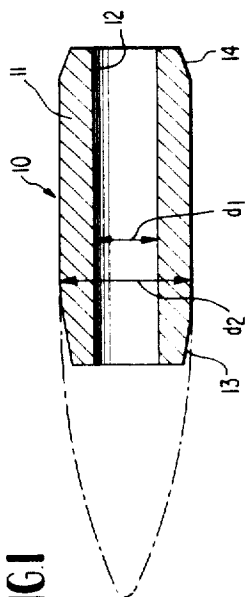


FIG. 1

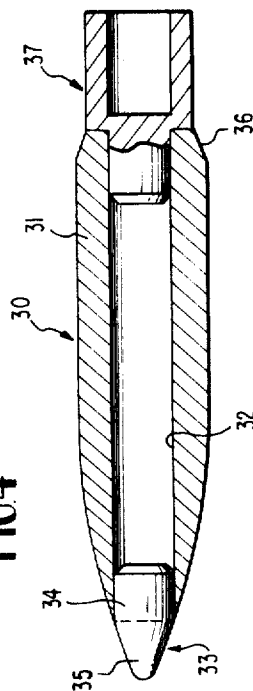


FIG. 4

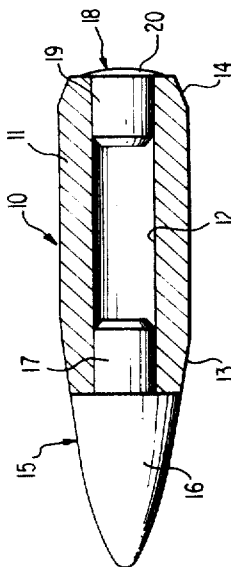


FIG. 2

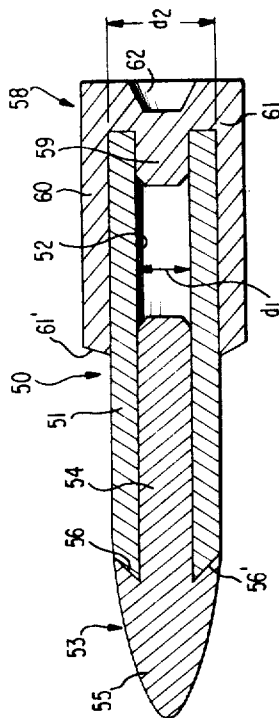


FIG. 5

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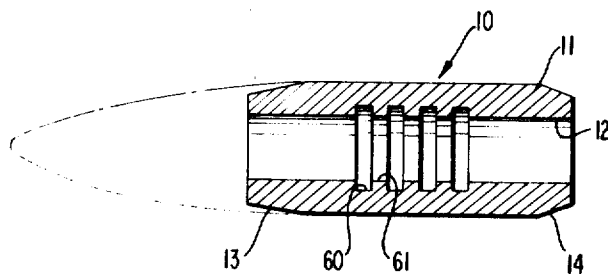


FIG. 6

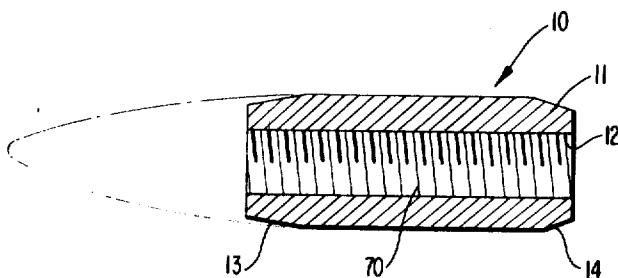


FIG. 7

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15 Claims

ABSTRACT OF THE DISCLOSURE

A practice projectile having a central plastic cylindrical tubular body with a through axial bore, a rear closure plug of readily destructible material to block the passage of propellant gases through the axial bore during the initial period of firing for actuation of automatic mechanisms and to be driven forwardly through and out of the axial bore during the latter period of firing to reduce the range of the projectile body, and a front closure member resembling the tip of a live projectile to be driven forwardly away from the projectile body by the forwardly moving rear closure.

Background of the invention

It is desirable for practice purposes to dispose of ammunition which as regards its properties comes as close as possible to the corresponding live ammunition but in connection with which the range of the bullet or shell is reduced to such an extent and the danger area is correspondingly so small that the practice ammunition can also be utilized without danger in a practice terrain of relatively small spatial dimensions.

It has already been proposed in the prior art to utilize bullets which are made of synthetic plastic material. In fact, a considerable reduction of the shell energy and of the flight distance of the bullet was achieved thereby; however, cartridges provided with such prior art plastic bullets differ quite considerably in their properties from those of a corresponding live ammunition. Particularly with the use in automatic weapons, it is necessary for purposes of assuring the automatic functioning of the gun to manufacture special breech mechanism or to mount devices at the barrel orifice which effect a sufficiently large damming up of the propellant-charge gases and therewith produce a sufficiently high gas pressure for the recoil of the weapon.

Summary of the invention

According to the present invention, a practice ammunition provided with a bullet having a short range, which does not exhibit the aforementioned disadvantages, is achieved in that the bullet constructed similar to the corresponding live ammunition is provided with a continuous central axial bore.

One is in a position to vary within relatively wide limits both the weight of the bullet as also the flight distance thereof by means of the diameter or the inner cross section of the bore which may amount up to one-third or even up to one-half of the caliber cross section. In every case, only a portion of the propellant powder energy corresponding to the cross-sectional area of the bore remains unused.

In order to prevent that propellant-charge powders are lost through the bullet bore, the bullet bore is appropriately provided at the rear end thereof with an easily destructible cover or closure member, for example, with a disk inserted at the rear end of the bullet into a recess pro-

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vided therefor and made of cardboard, synthetic plastic material or metal or also by means of closure disk of plastic material which is adapted to be securely clamped in the bore by means of a pin-shaped extension which may then be made by molding in one piece or in any other suitable manner.

For purposes of avoiding sharp edges at the bullet tip, which might be of disadvantage during the feed into the magazine, a cover or closure member may also be provided at the forward end of the bullet bore. This cover or closure member is then appropriately so constructed that it completes the outer shape of the bullet back into its original configuration, i.e., into the configuration corresponding to the shell or bullet of the live ammunition. Also for this cover or closure member, a molded, for example, an injection molded part of synthetic plastic material may be provided which is adapted to be pressed into and securely clamped in the forward end of the bullet bore by means of a pin-shaped extension.

Both the rear as also possibly the forward closure member of the bullet bore are, of course, so constructed and arranged that they are destroyed with certainty by the propellant gases upon firing of the bullet and/or are easily expelled out of the bullet and leave the barrel of the firing weapon ahead of the bullet flying with reduced velocity.

An additional braking of the bullet flight and therewith a further reduction of the bullet range can additionally be achieved in that the wall of the bullet bore is not smooth but is constructed instead in a rough manner. The braking of the flight of the bullet can be rendered particularly effective in that the roughening of the bore wall is constructed in the form of ring-shaped lamellae-like ribs or also in the form of a thread with a pitch extending in a direction opposite the bullet twist or gun rifle.

Accordingly, it is an object of the present invention to provide an ammunition of the type described above which eliminates by simple means the aforementioned shortcomings and drawbacks encountered with the prior art constructions.

Another project of the present invention resides in a practice ammunition which can be utilized in relatively small practice areas yet minimizes the danger to the involved personnel.

A further object of the present invention resides in a practice ammunition which can be readily utilized with existing automatic guns without requiring special measures to assure proper operation of the automatic feed and/or recoil mechanisms.

Still another object of the present invention resides in an ammunition which can be varied within wide limits as regards the weight as well as the flight range thereof, yet possesses very great penetrating power upon impact on the target.

Still a further object of the present invention resides in a practice ammunition which is not only safe in operation but makes possible the use of shells or bullets corresponding to a far greater extent in shape and configuration to the live ammunition than was realizable heretofore.

Brief description of the drawing

These and other objects, features, and advantages of the present invention will become more obvious from the following description when taken in connection with the accompanying drawing which shows, for purposes of illustration only, several embodiments in accordance with the present invention, and wherein:

FIGURE 1 is an axial cross-sectional view through a first embodiment of a bullet in accordance with the present invention;

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FIGURE 2 is an axial cross-sectional view through a bullet, similar to FIGURE 1 and provided with end closure plugs;

FIGURE 3 is an axial cross-sectional view through a modified embodiment of a bullet in accordance with the present invention;

FIGURE 4 is an axial cross-sectional view through another modified construction of a bullet in accordance with the present invention of the type illustrated in FIGURE 1;

FIGURE 5 is an axial cross-sectional view through still a further modified embodiment of a bullet in accordance with the present invention.

FIGURE 6 is an axial cross-sectional view through a modification of the FIGURE 1 device; and

FIGURE 7 is an axial cross-sectional view through a modification of the FIGURE 1 device.

Detailed description of the drawing

Referring now to the drawing wherein like reference numerals are used throughout the various views to designate like parts, and more particularly to FIGURE 1, reference numeral 10 generally designates therein the bullet in accordance with the present invention which may be used in particular as practice ammunition. The bullet 10 comprises a hollow cylindrical bullet body 11 which is provided with a continuous axial central bore 12. The diameter d_1 of bore 12 may amount up to one-half the diametric dimension d_2 of the bullet, i.e., up to one half the caliber thereof; preferably, however, the diameter d_1 of the bore 12 may amount up to one third of the caliber d_2 of the bullet body. The essentially hollow, cylindrical body 11 of the bullet is provided with end surfaces of truncated conical configuration as indicated by reference numerals 13 and 14. The original ogival shape of the bullet tip of the corresponding live ammunition is indicated in this figure in dash and dot lines.

FIGURE 2 illustrates a bullet 10 constructed, in principle, similar to that of FIGURE 1 but provided with a forward closure insert generally designated by reference numeral 15 and a rear closure insert generally designated by reference numeral 18. The forward closure insert 15 consists of a plug-like pin portion 17 extending into and clamped within the bore 12 and of an ogival tip portion 16 formed integral with pin portion 17 and completing the external ogival configuration of the bullet tip to that of the corresponding live ammunition. The rear closure insert 18 consists of a plug-like pin portion 19 and of a collar portion 20 extending over the rear end face of the bullet body 11. The flange-like collar portion 20 is thereby readily sheared off during firing by the pressure of the propellant gases. The plug-like pin portion 19 is thereupon driven through the bore 12 and impinges against the plug-like pin portion 17 of the forward insert 15 thereby ejecting the same in the forward direction out of the bore 12.

FIGURE 3 illustrates a modified embodiment which differs from FIGURE 2 by its rear closure insert generally designated by reference numeral 18' which, in this embodiment, includes a hollow cylindrical extension 21 formed integral with the pin portion 19 by way of a collar portion 22.

FIGURE 4 illustrates a still further modified embodiment of a bullet generally designated by reference numeral 30 in which the hollow cylindrical bullet body 31 is provided with a continuous axial bore 32. The forward tip of the bullet body 31 is thereby removed during the boring operation in view of the initial ogival shape of the tip corresponding to the shape of the live ammunition so that it is only necessary to use a relatively small closure insert generally designated by reference numeral 33 which consists of a plug-like pin portion 34 inserted into and securely held within the bore 33 and of a tip portion 35 formed integral therewith and again of ogival shape.

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The rear portion of the shell body is again provided with conically truncated end surfaces 36. A closure insert generally designated by reference numeral 37 similar to that of FIGURE 3 may also be utilized in this embodiment to close the rear end of bore 32. However, the rear closure insert may also be of the type illustrated in FIGURE 2 of any other appropriate configuration which produces the desired shearing-off function, yet completes the rear end of the bullet body substantially to its original shape.

While FIGURES 1 through 4 illustrate embodiments that can be used to particular advantage for practice ammunition, the present invention is not limited to such use but may also be utilized in connection with live ammunition.

FIGURE 5 illustrates a modified embodiment utilizing the teachings of the present invention which is of particular advantage with live ammunition. The bullet generally designated by reference numeral 50 includes a hollow cylindrical bullet body 51 provided with a continuous axial bore 52. A forward insert generally designated by reference numeral 53 includes a pin-like plug portion 54 inserted into and held fast within the bore 52 and an external tip portion 55 integral with the pin portion 54 and completing the ogival shape of the bullet body. In order to realize a particularly large penetrating force, the forward ends of the bullet body 51 are beveled off as indicated at surfaces 56; complementary beveled or undercut surfaces 56' are provided at the closure insert 53. The pin portion 54 is of substantially greater length than shown in FIGURES 1 to 4, extending over more than one-half the axial length of the bore 52.

The rear insert of this embodiment which is generally designated by reference numeral 58, includes a plug-like pin portion 59 inserted into the bore 52 and an external hollow cylindrical portion 60 extending externally over the hollow cylindrical bullet body 51 up to a point within the area of the rear end of the pin-like plug portion 54 and provided with beveled end surfaces 61' at the forward end thereof. The pin portion 59 and the hollow cylindrical portion 60 of the rear closure insert 58 are connected with each other by means of an annular end portion 61 provided with a central aperture 62. Of course, the length of the plug-like pin portions 54 and 59 as well as of the external cylindrical portion 60 may be varied at will to achieve any particular desired characteristics of the shell. The same is also true in connection with the embodiments of FIGURES 2 through 4.

The bullet body as well as the closure members may be made of any known conventional material. Furthermore, the present invention is applicable also to any other shape known in connection with similar ammunition.

Similar to FIGURES 1 through 4, intended primarily for practice ammunition and provided with an axial bore that may amount up to one-half, preferably up to one-third the external diameter of the cylindrical shell body, the diameter d_1 of the bore 52 may amount up to about one-half, preferably up to one-third of the diametric dimension d_2 of the cylindrical bullet body 51 as shown in FIGURE 5.

The bullet according to FIGURE 6, is similar to the bullet illustrated in and described with respect to FIGURE 1, with identical numerals being employed for identical parts. Therefore, the above description applies. In addition, the bore 12 is roughed up to increase the flight resistance and correspondingly reduce the range, by ring-shaped lamellae-like ribs 61 formed by annular grooves 60.

The bullet according to FIGURE 7, is similar to the previously described bullet illustrated in FIGURE 1, with like numerals being employed for like parts, with the exception that the bore 12 in FIGURE 7 is provided with a thread with a pitch extending in the opposite direction to the rifling to increase the flight resistance and correspondingly reduce the range.

While we have shown and described several embodi-

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ments in accordance with the present invention, it is understood that the same is not limited thereto but is susceptible of numerous changes and modifications as known to a person skilled in the art, and we therefore do not wish to be limited to the details shown and described herein but intend to cover all such changes and modifications as are encompassed by the scope of the appended claims.

We claim:

1. A practice projectile having a front and rear end with respect to the direction of intended flight for firing from the barrel of fire arms with automatic mechanisms comprising: a tubular projectile body having a through axial bore aligned with the direction of intended flight and constructed of a material to remain intact during the firing and the flight to the target; a readily destructible closure means closing the rear end of said bore and being more destructible than said body material to move through and exit from the front end of said passage during firing; said closure means blocking the passage of propellant gasses through said bore during at least the initial period of firing to produce a sufficient actuation of the automatic mechanisms and freeing said bore during at least the last period of firing to produce a short range for said body.

2. An ammunition according to claim 1, wherein the diameter of the bore amounts to about one-half of the caliber cross section of the projectile.

3. An ammunition according to claim 2, further comprising front closure means at the forward end of the bore, said front closure means completing the projectile body to its original shape and being provided with a pin-shaped extension adapted to be securely clamped within said bore.

4. An ammunition according to claim 3, wherein the wall of said bore is roughened up to constitute means for increasing the flight resistance of said body and correspondingly decreasing its range.

5. An ammunition according to claim 1, wherein the diameter of the bore amounts to about one-third of the caliber cross section of the projectile.

6. An ammunition according to claim 3, further comprising front closure means at the forward end of the bore, said front closure means completing the projectile body to its original shape and being provided with a pin-shaped extension adapted to be securely clamped within said bore.

7. An ammunition according to claim 6, wherein the wall of said bore is roughened up to constitute means for

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increasing the flight resistance of said body and correspondingly decreasing its range.

8. An ammunition according to claim 1, wherein said rear closure means consists of a cardboard disk.

9. An ammunition according to claim 1, wherein said rear closure means consists of synthetic plastic material.

10. An ammunition according to claim 1, wherein said rear closure means consists of a metal foil.

11. An ammunition according to claim 1, wherein said closure means is a plastic molded piece having a pin-shaped extension adapted to be securely clamped within the bore.

12. An ammunition according to claim 1, further comprising front closure means at the forward end of the bore, said front closure means completing the projectile body to its original shape and being provided with a pin-shaped extension adapted to be securely clamped within said bore.

13. An ammunition according to claim 1, wherein the wall of said bore is roughened up to constitute means for increasing the flight resistance of said body and correspondingly decreasing its range.

14. An ammunition according to claim 13, wherein the roughened up wall is in the form of ring-shaped lamellae-like ribs.

15. A practice ammunition according to claim 13, wherein the roughened up wall is in the form of a thread with a pitch extending in the opposite direction to the projectile rifling.

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U.S. Cl. X.R.

102—92.4