Oct. 6, 1964 K. C. SWINDLE 3,151,412

FIREARM BARREL WITH GROOVES AND PROJECTILE WITH FINS FITTING IN SAID GROOVES

Filed Jan. 2, 1962

Fig. 1.

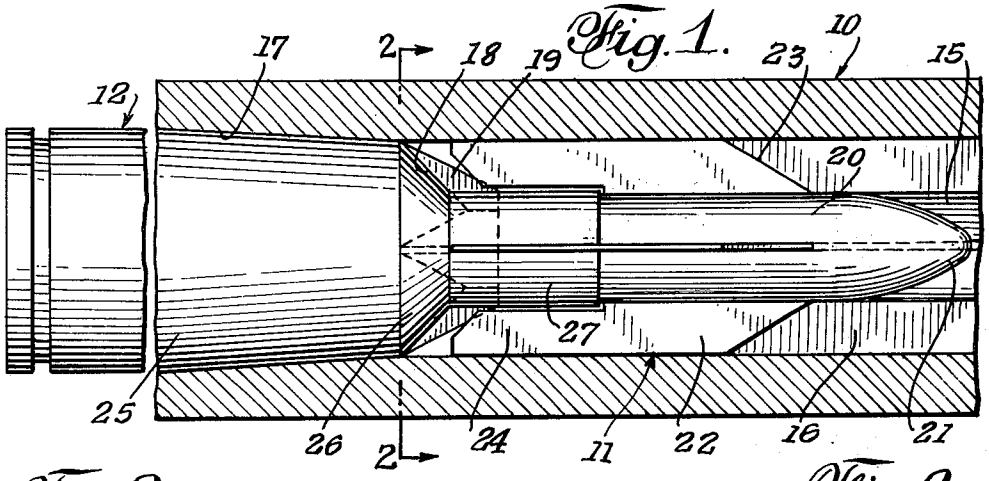


Fig. 2.

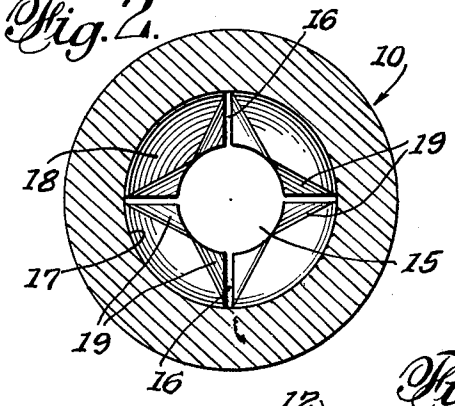


Fig. 3.

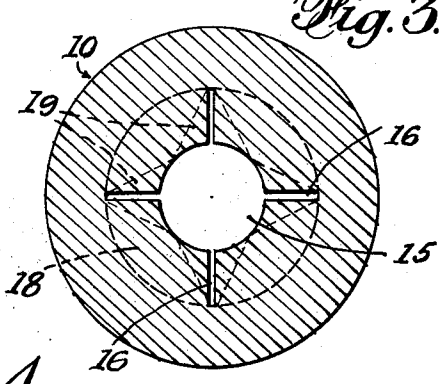


Fig. 4.

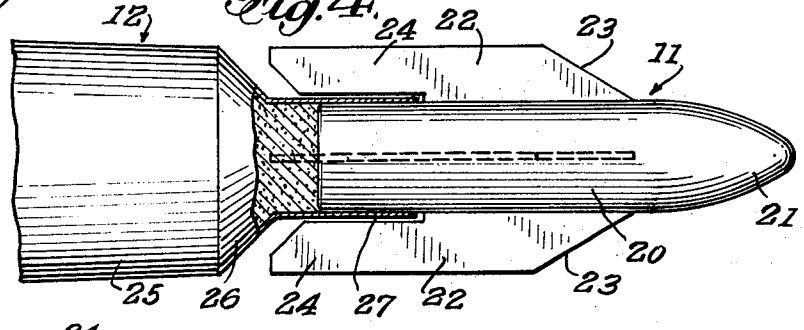
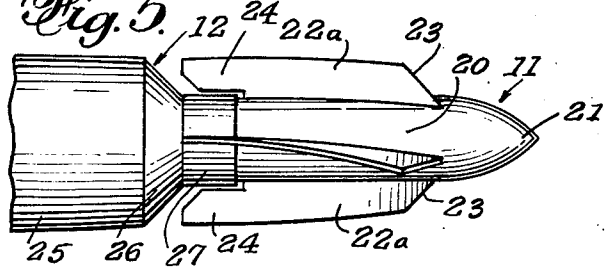


Fig. 5.



INVENTOR.
KENNETH C. SWINDLE
BY C. G. Stratton
ATTORNEY

United States Patent Office 3,151,412 Patented Oct. 6, 1964

3,151,412

FIREARM BARREL WITH GROOVES AND PROJECTILE WITH FINS FITTING IN SAID GROOVES

Kenneth C. Swindle, South El Monte, Calif., assignor to Jack Spencer, Big Bear Lake, Calif.

Filed Jan. 2, 1962, Ser. No. 163,657
4 Claims. (Cl. 42—76)

This invention relates to a firearm and has for an object to provide a combination of a barrel and projectile that is efficient, yet inexpensive to manufacture, and provides for a wide range of design for both long and short propulsion range.

Another object of the invention is to provide a combination as above characterized that has accuracy of projectile flight at a flatter than normal trajectory and in which barrel rifling is omitted while still retaining projectile stability during propulsion thereof.

A further object of the invention is to provide, in a combination as indicated, a fin-stabilized projectile and a barrel that so guides the fins of the projectile that flight accuracy results.

This invention also has for its objects to provide such means that are positive in operation, convenient in use, easily installed in a working position and easily disconnected therefrom, economical of manufacture, relatively simple, and of general superiority and serviceability.

The invention also comprises novel details of construction and novel combinations and arrangements of parts, which will more fully appear in the course of the following description and which is based on the accompanying drawing. However, said drawing merely shows, and the following description merely describes, preferred embodiments of the present invention, which are given by way of illustration or example only.

In the drawing, like reference characters designate similar parts in the several views.

FIG. 1 is a broken longitudinal sectional view of a firearm according to the present invention.

FIG. 2 is a cross-sectional view as taken on the line 2—2 of FIG. 1.

FIG. 3 is a cross-sectional view of the barrel as seen from the right end of FIG. 1.

FIG. 4 is a side elevational view, partly broken away, of the projectile shown in FIG. 1.

FIG. 5, to a smaller scale, is a side elevational view of a modification.

The firearm that is illustrated comprises, in combination, a barrel 10, a projectile 11 cooperatively engaged with the barrel, and a cartridge case 12 into which the projectile is fitted.

The barrel 10 may be made of any suitable rigid material, as steel or plastic, depending on the use to which the firearm is to be put. In the present case, said barrel is provided with a bore 15 from which radiates a plurality of radial grooves 16 that are uniformly circumferentially spaced. The drawing shows four such grooves, but three may be used or a greater number than four.

Said bore opens into a cartridge chamber 17, a conical lead-in throat 18 constituting a transition chamber space between the bore and the chamber to guide the projectile 11 into the former. Said lead-in throat 18 is formed to have sloping guide sides 19 that lead from the throat 18 to the grooves 16 for reasons later apparent.

The cartridge chamber 17 may be of any conventional design and is preferably as large or larger than the dimension across the outer edges of grooves 16, the chamber, thereby, freely passing the projectile 11 of the present combination.

The projectile 11, of plastic, metal or any other suitable rigid material, comprises a body 20 with a preferably

pointed end 21 and formed of a size and elongated shape to have a sliding fit in the bore 15. A complement of fins 22, either integral or affixed, radiates from said body, said fins being of a depth and thickness to slidingly fit into the grooves 16. The same number of fins as grooves is used. Each fin has a rearwardly sloping front edge 23 and rearwardly directed extensions 24 that are spaced from the body 20 and may extend rearwardly beyond the rearward end of said body.

Said body may be solid or hollow, as desired. If hollow, the same may be filled with a ballast material or with an explosive charge that is set off on impact. In any case, the outer surface of the projectile body is smooth and designed to have ballistic efficiency and, therefore, the accuracy in flight that is provided by the stabilizing effect of the fins 22.

The cartridge case 12 has a rear body 25 that fits the chamber 17 and the same is preferably reducingly tapered toward the muzzle of the barrel 10. In any of the usual conventional ways, said case, or its equivalent, may be percussed by an explosive charge or by compressed air or gas.

The body 25 terminates at its forward end in a conical part 26 that fits the lead-in throat 18 of the barrel, said part 26 having a tubular extension 27 into which the rear end of the projectile body 20 is tightly fitted so that said body end is aubject to the propulsion forces generated in the cartridge case 12, as above described. Said tubular extension resides in the spaces provided between the body 20 and the fin extensions 24.

When a projectile is inserted, with its cartridge, into the barrel 10, the lead-in throat 18, together with the sloping sides 19, guides the fins 22 into the grooves 16, the sloping fin edges 23 aiding such insertion since the full widths of the fins do not achieve entry into grooves 16 until after the progressive entry of the lead-in ends of the fins.

It will be clear that percussion effective on the rearward end of the projectile body will propel the projectile from the bore 15 with the fins stabilized by their engagement with the grooves 16 to proxide the mentioned accuracy in flight of the projectile.

The modification of FIG. 5 shows the fins 22*a* on a small or flat helical pitch, it being understood that the grooves for said fins will be similarly pitched. Thus, propulsion will result in a rotative movement of the projectile in flight, yet rotation-inducing rifling as practiced with malleable bullets is not used.

While the foregoing has illustrated and described what is now contemplated to be the best mode of carrying out the invention, the constructions are, of course, subject to modification without departing from the spirit and scope of the invention. Therefore, it is not desired to restrict the invention to the particular forms of construction illustrated and described, but to cover all modifications that may fall within the scope of the appended claims.

Having thus described this invention, what is claimed and desired to be secured by Letters Patent is:

1. In combination:
   (*a*) a firearm barrel having a cylindrical bore in the wall thereof;
   (*b*) a cylindrical projectile slidingly fitted in said bore;
   (*c*) cartridge means comprising,
      (1) a chamber in one end of the barrel wall larger in diameter than the bore thereof, and a conical transition space connecting said bore and chamber, and
      (2) a cartridge case fitted into said chamber and provided with an extension into which an end of the projectile is fitted; and

(*d*) means to stabilize the flight of the projectile upon discharge from the barrel bore comprising,

(1) a plurality of parallel, longitudinal and circumferentially spaced grooves in said barrel wall extending radially from the barrel bore to a diametral size at least as large as the cartridge chamber, and

(2) a similar number of parallel fins extending radially from the portion of the projectile that extends beyond the end of the projectile in the cartridge case extension, said fins being fixed to the projectile and slidingly fitted into said grooves.

2. The combination according to claim 1 provided with a conical lead-in transition throat between the adjacent ends of the bore and cartridge chamber.

3. In combination:

(*a*) a firearm barrel having a cylindrical bore in the wall thereof;

(*b*) a cylindrical projectile slidingly fitted in said bore;

(*c*) cartridge means comprising,

(1) a chamber in one end of the barrel wall larger in diameter than the bore thereof, and a conical transition space connecting said bore and chamber, and

(2) a cartridge case fitted into said chamber and provided with an extension into which an end of the projectile is fitted; and

(*d*) means to stabilize the flight of the projectile upon discharge from the barrel bore comprising,

(1) a plurality of parallel, longitudinal and circumferentially spaced grooves in said barrel wall extending radially from the barrel bore to a diametral size at least as large as the cartridge chamber, and

(2) a similar number of parallel fins extending radially from the portion of the projectile that extends beyond the end of the projectile in the cartridge case extension, said fins being fixed to the projectile and slidingly fitted into said grooves, the trailing ends of the fins extending beyond the trailing end of the projectile.

4. The combination according to claim 3 provided with a conical lead-in transition throat between the adjacent ends of the bore and cartridge chamber, the trailing ends of the fins terminating at a midpoint of the transition throat.

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