

[54]	TRAINING BULLET FOR FIRE ARMS	2,995,090	8/1961	Daubenspeck.....	102/92.7
[75]	Inventors: Andre Castera , Creuzier-le-Vieux; Pierre Lucaire , Vichy, both of France	3,170,405 3,236,183 3,435,769 3,570,406	2/1965 2/1966 4/1969 5/1971	Jungermann et al. Littleford..... Germershausen Frey.....	102/41 X 102/87 102/92.7 102/92.7

[73] Assignee: **Manufacture de Machines du Haut-Rhin S.A.**, Mulhouse-Cedex, France

Primary Examiner—Robert F. Stahl

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[57] **ABSTRACT**

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Training bullet or cartridge provided with a projectile having an envelope or casing with at least one thin rupturable zone, there being an inert powder mass within the envelope which is released upon the breaking of the envelope when the projectile is subjected to a rather small impact. When the projectile thus breaks up the fragments thereof have a rather small striking range.

[52] U.S. Cl..... 102/92.7; 102/41
[51] Int. Cl.²..... F42B 11/18
[58] Field of Search..... 102/41, 92.7, 1 M

[56] **References Cited**

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9 Claims, 5 Drawing Figures

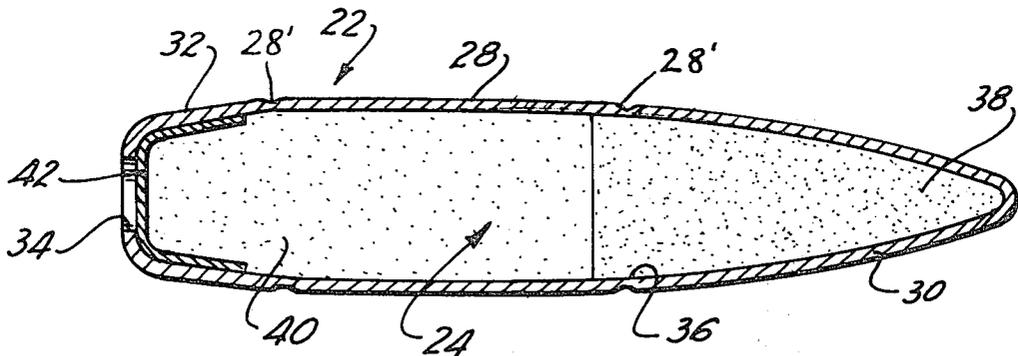


FIG. 1

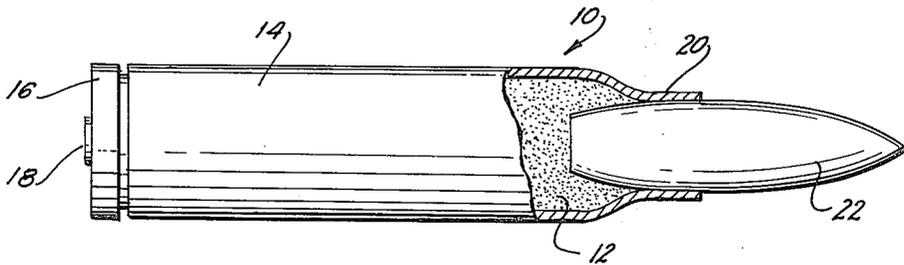


FIG. 2

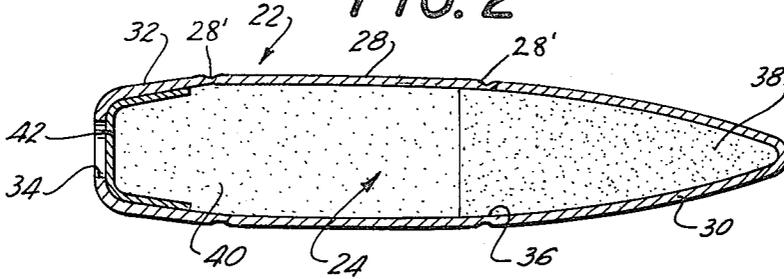


FIG. 3

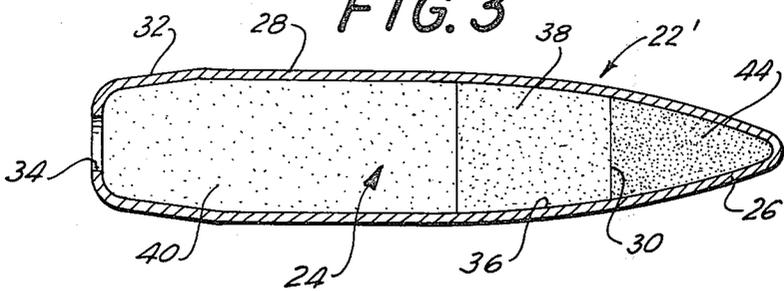


FIG. 4

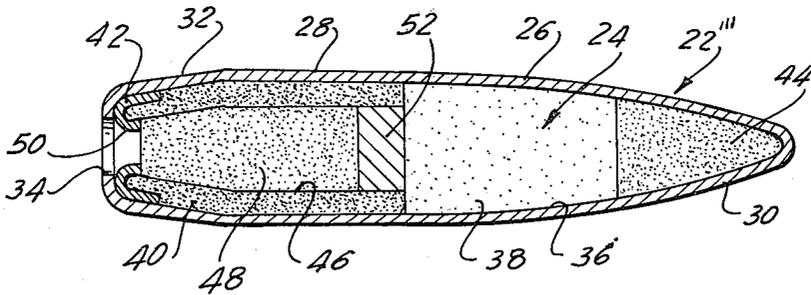
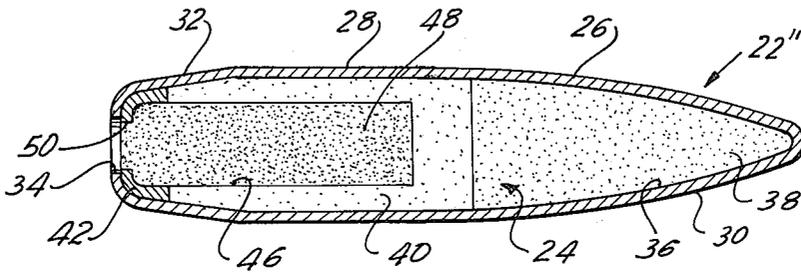


FIG. 5

TRAINING BULLET FOR FIRE ARMS

The present invention relates to training projectiles for fire arms.

Rifle practice for soldiers usually takes place in shooting galleries, or in rifle ranges which for security reasons are of a size commensurate with the maximum range of the type of fire arms being used. If the shots are made at a certain angle which does not result in the maximum range of the bullets, there still remains the possibility of ricochets whereby the bullets or at least parts of them may travel distances approximating the normal maximum range of the bullets. Thus, the ordinary rifle range or shooting field is necessarily of very large dimensions. On the other hand certain types of fire arms, having bullets capable of travelling long distances, cannot be used on fields and ranges which are too small.

It is, however, imperative if the goal of training is going to be achieved that the projectiles employed in training shall have characteristics as close as possible to those of real or battle ammunition, such characteristics including ballistic properties, since these condition the aiming reflexes of the soldier in training and the eventual correction of his aim. The projectiles employed in training also vitally effect the functioning and servicing of the fire arm, which are also a part of the basic instruction of the trainee.

There have already been proposed lighter projectiles which are more rapidly slowed down in their projectory than are the real or battle projectiles which they resemble in their general exterior shape. Such latter projectiles, however, require modification of the rifle in which they are to be used in order to assure the satisfactory operation of the rifle.

It has also been proposed to employ projectiles which have flatter noses than those of the corresponding real or battle projectiles. Such latter training projectiles, however, have the disadvantage of possessing ballistic characteristics which are markedly different from those of the real projectile.

The present invention has among its objects the provision of a training projectile which solves the two problems outlined above, that is, which provides a training projectile with characteristics identical with those of the real battle projectile, but which can nevertheless be used in rifle ranges or shooting fields of smaller dimensions than the maximum range of the rifle or fire arm in which the bullets are to be used.

More precisely, the invention provides a training projectile which is characterized by a combination of an envelope having at least one thinned zone at which the projectile breaks, the envelope being filled with an inert powder composition, so that when the projectile is subjected to even a small impact it is broken into fragments which have only small ranges of travel.

With a projectile of such characteristics, one can readily understand that with an envelope or casing having an external shape identical with that of a real or battle projectile, and with the judicious choice of the density of the inert powder composition which fills the envelope, one can obtain a projectile having characteristics (shape, weight, ballistic) identical to those of the battle projectile which it simulates. On the other hand, the faculty given to the casing to break under even small impacts and the nature of the finely divided content of the casing guarantee the disintegration of the

projectile at impacts with targets and other solid objects which are even slanted, thereby eliminating all possibilities of ricochets. The small mass of weight of the fragments of the projectile after impact, as well as their shapes which prevent them from travelling in ballistically correct paths, assures that such fragments will travel over short distances. As a result the range of the projectile is less, for a predetermined desired angle of fire, than the maximum range of the real projectile.

According to one embodiment of the invention, the inert powder composition is held together in the envelope by a binder consisting, for example, of a polymerizable product, thereby giving the projectile, if necessary, an improved rigidity. With such construction, however, the projectile is unable to withstand disintegration when subjected to a large oblique shock impact.

The invention will be more readily understood by consideration of the following description and of the drawings to which the description refers:

FIG. 1 is a view partially in side elevation and partially in longitudinal section of a training cartridge equipped with a first embodiment of projectile made in accordance with the invention; and

FIG. 2 is a view in longitudinal section through the projectile of the embodiment of cartridge shown in FIG. 1; and

FIGS. 3, 4, 5 are views similar to FIG. 2 of three further embodiments of the projectile.

Turning now to FIG. 1, the reference character 10 designates generally a bullet or cartridge in accordance with the invention, such cartridge being adapted for use in a portable fire arm such as a rifle, pistol, or machine gun. The cartridge 10 has a conventional casing 14 filled with a propulsive explosive powder 12, the casing 14 having a base 16 in the center of which there is affixed a percussion device or explosive cap 18. The forward end of the casing 14 is necked down at 20, there being mounted in the necked portion a projectile or bullet 22 which is mounted in the usual fashion in the forward end of the casing.

In accordance with the invention projectile 22 is a training projectile having characteristics (form, weight, ballistics) identical to those of a real or battle projectile with which the cartridge 10 would be normally provided, the projectile 22 having a fragility such that it breaks into fragments of small mass and size and, because of that, of a short range, even during an impact at a slanted angle with the target or the like and even at a reduced speed.

A first embodiment of the projectile 22 is shown in FIG. 2. In this embodiment, the projectile 22 is composed essentially of a heavy material which is inert and finely divided such as a metal powder 24 which fills a metallic envelope or casing 26 having an external form similar to that of the real or combat projectile which it simulates. The envelope 22 has an intermediate circular cylindrical portion 28, a forward gently rounded converging portion 30, and a base 32, the envelope being capable of breaking easily under impact even at a reduced speed. The density of the powdered metal composition 24 is determined by the addition of desired additives in such manner that the mass or weight of the training projectile 22 is equal to or at least very close to the weight of the real or combat projectile.

The powdered metal composition 24 may be introduced into the envelope 26 through an opening 34 pro-

vided in the base 32 of the casing, the powdered composition being compacted one or a number of times directly in the cavity 36 defined by the forward portion 30 of the envelope. In the embodiment of the invention shown in FIG. 2, the powder is disposed in two blocks 38 and 40, the first block being disposed within the nose portion 26 of the projectile, such disposition of the metal powder facilitating the fragmentation of the projectile 22 under impact. Preferably on both sides of the central part 28 of the casing there are annular thinned zones 28' of low strength, the front part 30 and the base 32 of the casing being so structured that the casing breaks easily under impact.

The metal powder composition 24 may be introduced through the initially rearwardly open base 32 of the projectile, thereafter there being introduced into such rear end of the casing a cup-like member 42, after which the base of the casing is suaged down and bent over to retain the member 42 therewithin in the manner shown. In a further embodiment of the projectile, not illustrated, the powdered metallic composition 24 may be compacted and agglomerated by means of a binder such as a suitable polymerizable material so as to give the projectile, if necessary, a better rigidity but insufficient strength to withstand appreciable oblique shock.

The projectile shown in FIG. 3, designated by the reference character 22', has a cavity 32 in the envelope 26 which is provided with a small mass of a pyrotechnic composition 44 which is sensitive to mechanical shock and is thus exploded at impact. This improves the faculty of disintegration of the projectile 22 and also serves, when the composition is such as to produce light upon explosion, to mark the location of impact of the projectile. The parts of the projectile of FIG. 3 are the same as those in FIG. 2, and are designated by the same reference characters as in the former figure.

In the embodiment of projectile shown in FIG. 4, wherein it is designated 22', the mass of the metallic composition 24 has a cavity 46 which communicates with the opening 34 at the rear end of the projectile. An illuminating pyrotechnic composition 48, which serves to trace the projectile, is disposed in the cavity 46. A terminal annular element 42 is provided, such element having a central opening 50 the diameter of which determines the duration of the trace provided by the burning of the composition 48.

In the embodiment of projectile shown in FIG. 5, wherein the projectile is designated generally by the reference character 22''', the rear block of powdered metal 40 is ring-shaped and is formed by being compacted in a mold so as to form a homogeneous block. A pyrotechnical composition 44 is first introduced into the nose of the projectile, and following this there is introduced the powdered metal composition 24 of the block 38. A rigid disc 52 may be disposed in block 40 to define the bottom of the cavity 46 therein and to reduce to some extent the central part 28 of the casing. Following the introduction of the powdered metal 24 in the casing, the thus-formed block 40 with the disc 52 therein is introduced into the rear end of the projectile

casing. The pyrotechnical tracer powder composition 48 may be then introduced within the cavity 46 in the block 40, 52. The rear end of the projectile casing is closed, as before, by an annular member 42, the annular member and the rear end of the casing having openings 50 and 34, respectively, therethrough, the diameter of such openings determining the duration and length of the trace provided by the burning of the composition 48.

It will be understood that in making the various embodiments of the projectiles above-described, the composition of the metallic powder 28 and/or the compacting of this composition may be varied in order to modify to a large degree the resistivity of the projectile and its mechanical strength under the shock of mechanical impact.

Although the invention is illustrated and described with reference to a plurality of preferred embodiments thereof, it is to be expressly understood that it is in no way limited to the disclosure of such a plurality of embodiments, but is capable of numerous modifications within the scope of the appended claims.

What is claimed is:

1. A training projectile for a firearm having a main body portion and a nose, comprising a metallic casing in one piece made of the same material and in the same form as the casing of the combat projectile, for such firearm, said training projectile casing having at least one annular thinned zone means which permits said casing to break into fragments upon impact with a target, and a mass of an inert composition in flowing powder form in the casing, the projectile being fractured into fragments having a relatively short range trajectory.
2. A training projectile according to claim 1, wherein the casing has an opening in its back part for the introduction of the inert composition in flowing powder form.
3. A training projectile according to claim 2, comprising a ring-shaped element in the rear end of the casing to determine the size of the opening in the latter.
4. A training projectile according to claim 2, comprising an illuminating pyrotechnical composition arranged in a cavity in the mass of the inert composition so as to discharge through the opening in the casing.
5. A training projectile according to claim 1, comprising a small mass of a pyrotechnical composition sensitive to mechanical shocks arranged in the nose of the casing.
6. A training projectile according to claim 1, wherein inert powder composition is agglomerated in the casing by a binder.
7. A training projectile according to claim 6, wherein the binder is composed of a polymerized product.
8. A training projectile according to claim 1, wherein there are two annular thinned zones means one of which is located in the nose of the projectile.
9. A training projectile according to claim 8, wherein the casing is an integral piece of metal, and the nose has a uniform wall thickness.

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