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EXPLOSIVE PROJECTILE CONTAINING AT LEAST ONE SECONDARY PROJECTILE

Filed July 25, 1968

Fig. 1

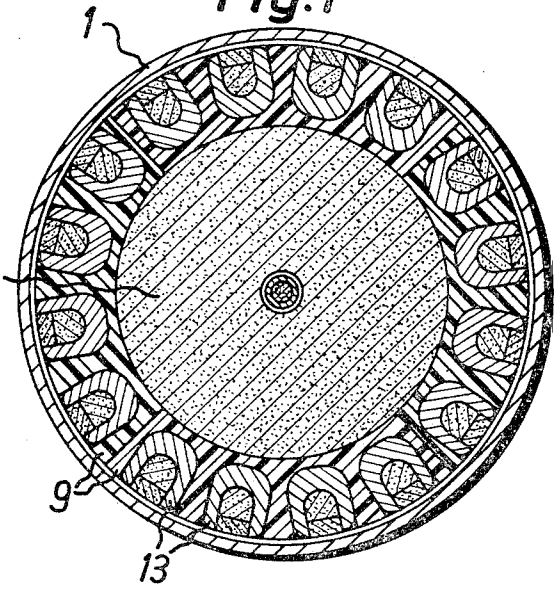


Fig. 2

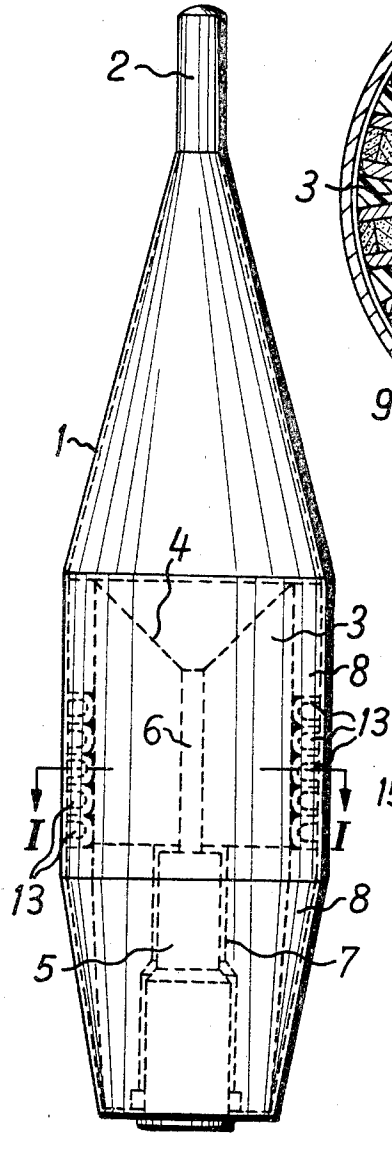


Fig. 3

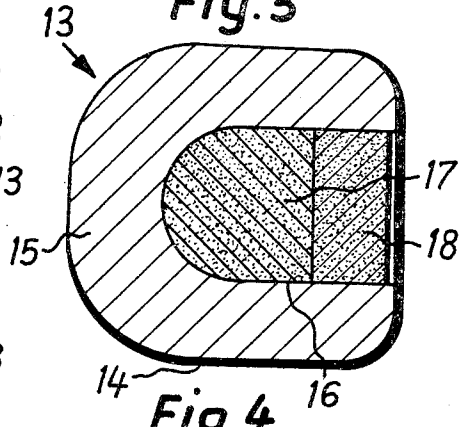
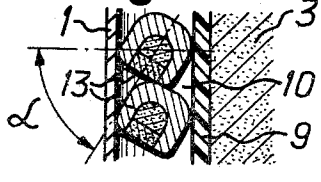


Fig. 4



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EXPLOSIVE PROJECTILE CONTAINING AT LEAST ONE SECONDARY PROJECTILE

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U.S. Cl. 102—61 1 Claim

ABSTRACT OF THE DISCLOSURE

An explosive projectile which contains an explosive charge around which a number of secondary projectiles are disposed. Each secondary projectile has an open blind hole in which an incendiary charge is contained which is covered by a glow charge. The mouth of the blind hole faces away from the explosive charge in order to prevent the secondary projectile being broken up by the pressure wave penetrating into the blind hole on the detonation of the explosive charge.

This invention relates to an explosive projectile containing at least one secondary projectile which is disposed on an explosive charge and has an open blind hole in which an incendiary charge is covered by an additional charge.

An explosive projectile of this type is known in which the mouth of the blind hole in the secondary projectile is directed towards the explosive charge. An arrangement of this type has the disadvantage that on the detonation of the explosive charge the secondary projectile is often broken up by the pressure wave penetrating into the blind hole. This broken-up secondary projectile has less penetrating power than a secondary projectile which remains whole. In addition, this broken-up secondary projectile can no longer serve its purpose, namely to start a fire in the environment of the detonation point. If the secondary projectile is not broken up, the arrangement has the disadvantage that the incendiary charge burns rapidly after the style of an explosion during the detonation, so that the secondary projectile can no longer subsequently have the effect of causing a fire.

The aim of the invention is to obviate all these disadvantages. The explosive projectile according to the invention is distinguished in that the mouth of the blind hole faces away from the explosive charge and that the additional charge consists of a glow charge having a low gas content.

Two examples of construction of the explosive projectile according to the invention are described in detail below with reference to the accompanying drawings, in which:

FIGURE 1 is a cross-section through a first example of construction of the explosive projectile, taken on line I—I in FIGURE 2;

FIGURE 2 is a side view of the explosive projectile;

FIGURE 3 is a longitudinal section through a secondary projectile; and

FIGURE 4 is a longitudinal section through part of an explosive projectile according to a second embodiment.

The explosive projectile illustrated in FIGURES 1 and 2 forms part of an anti-tank rocket which is not illustrated in greater detail. This projectile has a casing **1** of light metal. The casing **1** has a conical front portion on the tip of which a fuze **2** is screwed. This fuze **2** is described in Swiss patent specification No. 384,416 and illustrated in FIGURES 1 and 2 of said specification.

The rear portion of the projectile contains an explosive charge **3** which forms the core of the projectile. At the front the explosive charge **3** is hollowed out conically and forms a hollow charge, which is known in itself. The conical cavity is lined by an insert **4**. In the rear portion of the explosive charge **3** a safety element **5** is inserted. A safety element of this type is described and illustrated in Swiss patent specification No. 361,743. A central passage **6** connects the tip of the hollow cone to a bore **7** which contains the safety element **5**. The rear, substantially cylindrical portion of the projectile casing **1** encloses two annular fillers **8**, which are made of foam plastics, for example expanded polystyrene.

Between these two fillers there are disposed segmental cages **9** which are made of plastics material and intended to receive secondary projectiles **13**. These cages **9** have grooves **10** directed parallel to the axis of the projectile. The planes of symmetry of these grooves **10** are spaced apart by regular angular distances and form radial planes of the projectile. The length of the secondary projectiles **13**, which are in the form of bodies of revolution, is substantially equal to their diameter. This diameter of the secondary projectiles corresponds to the width of the grooves **10** in a cage **9**, and amounts for example to 13 millimeters.

The secondary projectile **13** has a short cylindrical middle portion **14** followed both at the front and at the rear by rounded portions, the rear rounded portion merging into a flat end face **15**.

At the opposite end face of the secondary projectile, **13**, which weighs about eight grams, to that where the end face **15** is situated, a blind hole **16** having a rounded bottom is provided, as illustrated in FIGURE 3. The axis of the blind hole **16** coincides with the axis of the secondary projectile **13**. The rear portion of the blind hole **16** contains an incendiary charge **17**. This incendiary charge **17** is composed of magnesium and polytetrafluorethylene. The front portion of the blind hole **16** contains an additional charge **18**, which consists of a glow charge having a low gas content. This glow charge **18** is composed of manganese and lead chromate. Each groove **10** of the cage **9** contains a row of secondary projectiles, the mouths of their blind holes **16** lying directly behind the inner surface of the projectile casing **1** in the embodiment illustrated in FIGURES 1 and 2.

In the second embodiment, which is illustrated in FIGURE 4, the axes of the secondary projectiles are inclined by an angle of sixty degrees in relation to a cross-sectional plane of the explosive projectile, the mouth being directed away from the surface of the explosive charge **3**.

The mode of operation of the projectile described is as follows:

The explosive projectile is used mainly for attacking armoured vehicles, for example armoured troop-carrying vehicles.

Through the action of the fuze at the target, the detonation of the explosive charge **3** is initiated through the safety element **5** in a manner which is known and therefore not explained more fully. On detonation the well known hollow charge effect occurs and at the same time the cages **9**, damping the detonation, and torn apart and the secondary projectiles are thrown off from the projectile at high speed in the radial direction. Through the detonation the glow charge **18** of the secondary projectiles **13** is ignited and after a burning time of 0.2 seconds ignites the incendiary charge, which then burns for about four seconds and in this time has the effect of producing a fire, either by penetrating tanks containing fuel or by striking against other combustible objects.

The detonation wave strikes primarily against the walls of the secondary projectiles, since the mouth of the blind holes **16** is turned away from the surface of the explosive

charge, so that the breaking-up of the secondary projectiles **13** is prevented. The time during which a detonation pressure, of such a nature that the incendiary charge would burn rapidly after the style of an explosion, exists must be bridged over by the glow charge having a low gas content. Both this arrangement of the secondary projectiles and the use of a glow charge having a low gas content prevent the incendiary charge from burning during the detonation.

We claim:

1. An explosive projectile having a longitudinal axis containing an explosive charge and at least one secondary projectile having an axis, said secondary projectile comprising a casing having an open blind hole extending along said secondary projectile axis, an incendiary charge in said hole, an additional charge covering said incendiary charge, said blind hole having a mouth facing away from said explosive charge for an angle between the axis of said secondary projectile and the longitudinal axis of said explosive projectile of more than 30° and said additional charge comprising a glow charge having a low gas content.

References Cited

UNITED STATES PATENTS

1,343,036	6/1920	Cook	102—5
2,726,943	12/1955	Heiskell	149—44
3,198,678	8/1965	Zeman et al.	149—44
3,309,249	3/1967	Allen	149—44

FOREIGN PATENTS

259,539	4/1926	Breat Britain.
804,400	10/1936	France.
1,054,114	2/1954	France.
787,096	12/1957	Great Britain.
1,257,608	2/1961	France.

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102—68