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PYROTECHNIC DEVICE

This invention relates to a pyrotechnic device, in particular of the type known as a "thunderflash".

The thunderflash is used, for example, in military training, to simulate the explosion of munitions in a battlefield without injury to the soldiers on the battlefield. However, it is still possible for injury to be caused by the bursting of a thunderflash, because relatively large portions of the casing of the thunderflash can be propelled at high speed when the thunderflash charge ignites. The use of relatively soft materials such as cardboard for the casing of the thunderflash can reduce the risk of injury to a certain extent, but cardboard alone is not waterproof and the reliable functioning of the device can be affected by damp storage conditions or contact with moisture during use. The addition of waterproofing materials to, for example, cardboard tends to make the cardboard more rigid and therefore more likely to cause injury.

The present invention provides a hand operable pyrotechnic device for use by infantry, comprising a sealed casing containing a pyrotechnic charge, and incorporating self ignition means within said casing for the charge, the casing being formed of a plastics foam of a density such that, upon firing of the charge, the casing is reduced to fine particulate form.

Preferably the plastics foam is a polyurethane foam of a closed cellular structure and having a density of approximately 5.66 kgm^{-3} . The casing is preferably moulded in such a manner as to form on the outer surface thereof a waterproof skin of the polyurethane or other plastics material.

It has been found that by use of such materials, the danger of flying fragments of casing is removed, and the reliability of the device under a wide range of climatic conditions is significantly improved.

Reference is made to the drawings, in which:

Figure 1 shows a sectional perspective view of a

thunderflash in accordance with a preferred embodiment of the invention; and

Figure 2 shows a sectional view through the top part of the thunderflash shown in Figure 1, the sleeve having
5 been slid to the ignition position.

The thunderflash has a cylindrical body 1 moulded in a polyurethane foam with a waterproof outer skin formed during moulding. The open end of the body 1 is closed by a fuze housing 2 which is also moulded in foamed polyurethane. The fuze housing 2 contains a delay fuze 3, which
10 is a predetermined length of "Bickford" type safety fuze, extending in a tubular bore within the fuze housing 2. The fuze 3 communicates at one end with a body of explosive charge 5 and at the other end with a body of igniter composition 4, which extends through the fuze housing so as to leave a portion exposed externally thereof.
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Igniter compositions are well known in the pyrotechnic art. Suitable compositions are boron and chromic oxide, silicon and potassium nitrate, or antimony sulphide and potassium chlorate. Such compositions may be
20 ignited readily by friction alone. Alternatively, compositions such as charcoal and potassium chlorate or sulphur and potassium nitrate may be used, these requiring striking by a "match" composition, as in the manner of safety matches on the prepared surface of a match-box.
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The charge is a loose filled charge of 1 to 15 grams of "flash" powder. Flash powders are well known and are typically based on mixtures of aluminium, magnesium, or aluminium/magnesium alloy in powder form, with suitable
30 oxidants such as potassium nitrate, potassium perchlorate, potassium chlorate, and barium chlorate. Additives to the base mixture, known in the art as "sensitizers" may be included. These are typically selected from graphite, carborundum powder, glass powder, and
35 silica.

The fuze housing may be secured to the fuze body by an adhesive so as to form a water-tight seal.

5 A plastics sleeve 6 is provided around the fuze housing 2 and the upper end of the body 1. The sleeve has on the inner face thereof a circumferential band of a coating 7, disposed centrally along the length of the sleeve. The coating material will depend upon the choice of igniter composition 4. For a purely friction-ignited composition, the coating material may be glasspaper, 10 emery, glass powder, sand, carborundum powder or other abrasive. Where a coating of "match" composition is required to react with the igniter composition, the coating material 7 may be a mixture of phosphorus in a suitable binding agent such as shellac or polyvinyl acetate.

15 The sleeve is attached to the device by means of, for example, a locating groove and ring or by the use of an adhesive at the ends 8.

In use, the sleeve 6 is drawn off the body rapidly upwards so as to pull the coating material 7 across the 20 exposed face of the igniter composition 4. This causes ignition of the igniter composition and from it the fuze 3, which after its predetermined delay ignites the flash powder 5. After ignition by drawing off the sleeve 5 the thunderflash is thrown in the manner of a grenade, and 25 its detonation reduces the whole body and fuze housing to a powder, with no significant fragments of casing to be propelled through the air.

30 With the seal formed by the sleeve 6, the thunderflash is completely waterproof and can still be operated satisfactorily after immersion in water for several days.

CLAIMS

1. A hand operable pyrotechnic device for use by infantry, comprising a sealed casing containing a pyrotechnic charge, and incorporating self ignition means within said casing for the charge, the casing being
5 formed of a plastics foam of a density such that, upon firing of the charge, the casing is reduced to fine particulate form.
2. A pyrotechnic device according to Claim 1, wherein the casing comprises a body portion closed by a fuze
10 housing containing a fuze providing a firing delay, the fuze housing being sealed to the body portion by an adhesive.
3. A pyrotechnic device according to Claim 1 or Claim 2, wherein the plastics foam is a polyurethane foam of a
15 closed cellular structure.
4. A pyrotechnic device according to Claim 3, wherein the plastics foam has a density of approximately 5.66 kgm^{-3} .
5. A pyrotechnic device according to any one of Claims
20 1 to 4, wherein the casing is moulded in such a manner as to form on the outer surface thereof a continuous skin of the plastics material.
6. A pyrotechnic device according to any preceding claim, wherein the ignition means comprise an igniter
25 charge communicating with a delay fuze which in turn communicates with the pyrotechnic charge, the igniter charge having a portion thereof exposed externally of the casing, and a slidable sleeve surrounding the casing and having on a portion of the inner face thereof a coating
30 which, when drawn across the exposed portion of the igniter charge, causes the igniter charge to ignite to initiate firing of the pyrotechnic charge.
7. A pyrotechnic device, substantially as described with reference to, or as shown in, the drawings.

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