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(54) IMPROVEMENTS RELATING TO IGNITION DEVICES

(71) We, RONSON PRODUCTS LIMITED, a British Company, of 5, London Wall Buildings, Finsbury Circus, London, E.C.2. do hereby declare the invention, for which we pray that a Patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to ignition devices of the kind which include a small cartridge containing a pyrophoric substance, that is a substance which ignites in contact with air. In use, such devices are operable to release a small quantity of the pyrophoric substance from the cartridge, for example to ignite a gaseous fuel such as butane.

Cartridges of this kind have a small orifice through which a minute quantity of the pyrophoric substance is discharged at each operation of the device. In order to achieve this dosing effect the cartridge contains a mechanism which, in its operative condition, maintains the orifice sealed to prevent leakage. In use, this mechanism has been found to be entirely reliable. However, should it be necessary to send cartridges of this kind by post or by air, then it may be considered that the sealing of these cartridges is inadequate.

Accordingly the invention contemplates that such a cartridge shall be enclosed in a removable protective skin formed of an impervious and fire resistant material, the skin operating to prevent escape of the pyrophoric substance to atmosphere before the cartridge is brought into use. In a preferred form the cartridge is encapsulated in material which includes a polyamide resin and has a melting point less than 150°C but preferably between 90° and 120°C the material including at least one additive to render it fire resistant and preferably further additives to render the material sufficiently soft as to be easily opened by hand as well as to prevent the material bonding to the car-

tridge except by friction or by part engulfment of components of the cartridge. If desired, a tear strip may be included whereby the encapsulating skin may be broken to release the cartridge when required.

A preferred composition for the encapsulating material comprises by weight:

54% Polyamide resin
32% Chlorinated diphenyl
11% Ester wax
3% N-butyl stearate

A suitable polyamide resin is that manufactured by General Mills Inc. under the name "Versamid 940" (Versamid is a Registered trade mark).

The chlorinated diphenyl imparts excellent flame resisting qualities to the mixture such that the direct application of a flame simply causes the mixture to melt.

Of the other two additives the ester wax reduces the hardness of the polyamide resin so that the encapsulation may be torn open by hand, whilst the n-butyl stearate prevents the mixture from bonding to the cartridge.

A polyamide resin was chosen after extensive tests as the most suitable of presently available resins for providing a suitably tough and impervious skin. Other resins that were tried, tended to include and retain numerous air bubbles or had a melting point which was so high that the encapsulation of the cartridge could be hazardous.

In carrying out the method of this invention, the encapsulating material may be heated to a temperature of from 95° to 120°C. The cartridges are then dipped in the molten material for not more than two seconds, removed and the coating of the material allowed to set and dry at room temperature.

It is important not to overheat the pyrophoric substance in the cartridge and to this end the cartridge may be chilled or frozen

prior to dipping. This procedure also helps to achieve a faster setting time for the coating and for the same purpose the coated cartridge may be plunged into a cold water bath after dipping.

5 Preferably a tear strip of a polyester tape having incorporated glass fibre strands is applied round the cartridge with one end extending away from the cartridge before
10 the cartridge is dipped in the encapsulating mixture so that the end of the strip protrudes through the resultant skin, the arrangement of the strip being such that
15 when the end of the strip is pulled the skin is torn and the cartridge is released.

Tear strips formed of other kinds of plastics, of non-plastics, or even metal wire may also be used.

20 Indeed any known and suitable method of opening or tearing the skin for releasing the cartridge may be adopted provided however that the skin, before opening or tearing, is without any aperture or slit which
25 would prevent the cartridge being completely sealed by the skin.

WHAT WE CLAIM IS:—

1. A cartridge containing a pyrophoric substance and having an orifice through which such substance may be discharged when the
30 cartridge is in use in an ignition device wherein the cartridge is enclosed in a removable protective skin formed of an impervious and fire resistant material, the skin operating to prevent escape of the pyrophoric substance to atmosphere.

2. A cartridge as claimed in Claim 1 including a tear strip arranged beneath the skin and having an end protruding there-
40 through.

3. A cartridge as claimed in Claim 2, wherein the tear strip comprises a polyester tape having glass fibre strands incorporated therein.

4. A cartridge as claimed in any preceding claim wherein the material includes a
45 polyamide resin.

5. A cartridge as claimed in any preceding claim, wherein the melting point of the material is less than 150°C.

6. A cartridge as claimed in Claim 4, wherein the melting point of the material is
50 between 90° and 120°C.

7. A cartridge as claimed in Claim 4, wherein the material includes an additive
55 to render it fire resistant.

8. A cartridge as claimed in Claim 7,

wherein the additive is a chlorinated diphenyl.

9. A cartridge as claimed in any preceding claim, wherein the material includes an additive which makes the skin easy to tear by
60 hand.

10. A cartridge as claimed in Claim 9, wherein the additive is ester wax.

11. A cartridge as claimed in any of
65 claims 1 to 3, wherein the material comprises by weight:

54% polyamide resin
32% chlorinated diphenyl
11% ester wax
70 and 3% N-butyl stearate.

12. The method of preventing escape to atmosphere of a pyrophoric substance contained in a cartridge having an orifice
75 through which such substance is discharged when the cartridge is in use which consists in enclosing the cartridge in a removable skin formed of an impervious and fire resistant material.

13. The method claimed in Claim 12 in which the material is heated to its melting point, the cartridge is dipped in the
80 molten material, is removed and the coating of material is allowed to set.

14. The method claimed in Claim 13 including the step of freezing or chilling the
85 cartridge prior to dipping.

15. The method claimed in Claim 13 or Claim 14 including the step of immersing the cartridge after dipping in a cold water
90 bath.

16. The method claimed in Claim 13, Claim 14 or Claim 15 including the step prior to dipping of applying round the cartridge a tear strip having an end extending
95 away from the cartridge.

17. The method of preventing escape to atmosphere of a pyrophoric substance contained in a cartridge substantially as herein described.
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18. Cartridges containing a pyrophoric substance when enclosed within a removable skin by the method claimed in any of claims 12 to 16.

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prior to dipping. This procedure also helps to achieve a faster setting time for the coating and for the same purpose the coated cartridge may be plunged into a cold water bath after dipping.

5 Preferably a tear strip of a polyester tape having incorporated glass fibre strands is applied round the cartridge with one end extending away from the cartridge before the cartridge is dipped in the encapsulating mixture so that the end of the strip protrudes through the resultant skin, the arrangement of the strip being such that when the end of the strip is pulled the skin is torn and the cartridge is released.

15 Tear strips formed of other kinds of plastics, of non-plastics, or even metal wire may also be used.

20 Indeed any known and suitable method of opening or tearing the skin for releasing the cartridge may be adopted provided however that the skin, before opening or tearing, is without any aperture or slit which would prevent the cartridge being completely sealed by the skin.

WHAT WE CLAIM IS:—

1. A cartridge containing a pyrophoric substance and having an orifice through which such substance may be discharged when the cartridge is in use in an ignition device wherein the cartridge is enclosed in a removable protective skin formed of an impervious and fire resistant material, the skin operating to prevent escape of the pyrophoric substance to atmosphere.

2. A cartridge as claimed in Claim 1 including a tear strip arranged beneath the skin and having an end protruding there-through.

3. A cartridge as claimed in Claim 2, wherein the tear strip comprises a polyester tape having glass fibre strands incorporated therein.

4. A cartridge as claimed in any preceding claim wherein the material includes a polyamide resin.

5. A cartridge as claimed in any preceding claim, wherein the melting point of the material is less than 150°C.

6. A cartridge as claimed in Claim 4, wherein the melting point of the material is between 90° and 120°C.

7. A cartridge as claimed in Claim 4, wherein the material includes an additive to render it fire resistant.

8. A cartridge as claimed in Claim 7,

wherein the additive is a chlorinated diphenyl.

9. A cartridge as claimed in any preceding claim, wherein the material includes an additive which makes the skin easy to tear by hand.

10. A cartridge as claimed in Claim 9, wherein the additive is ester wax.

11. A cartridge as claimed in any of claims 1 to 3, wherein the material comprises by weight:

54% polyamide resin
32% chlorinated diphenyl
11% ester wax
and 3% N-butyl stearate.

12. The method of preventing escape to atmosphere of a pyrophoric substance contained in a cartridge having an orifice through which such substance is discharged when the cartridge is in use which consists in enclosing the cartridge in a removable skin formed of an impervious and fire resistant material.

13. The method claimed in Claim 12 in which the material is heated to its melting point, the cartridge is dipped in the molten material, is removed and the coating of material is allowed to set.

14. The method claimed in Claim 13 including the step of freezing or chilling the cartridge prior to dipping.

15. The method claimed in Claim 13 or Claim 14 including the step of immersing the cartridge after dipping in a cold water bath.

16. The method claimed in Claim 13, Claim 14 or Claim 15 including the step prior to dipping of applying round the cartridge a tear strip having an end extending away from the cartridge.

17. The method of preventing escape to atmosphere of a pyrophoric substance contained in a cartridge substantially as herein described.

18. Cartridges containing a pyrophoric substance when enclosed within a removable skin by the method claimed in any of claims 12 to 16.

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