

PATENT SPECIFICATION (11)

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(54) CARTRIDGE OF SELF-SETTING COMPOSITION

(71) We, FOSROC A.G., a Swiss Body Corporate of Gartenstrasse 2, 6301 Zug, Switzerland, 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:—

The invention relates to a cartridge containing a self-setting composition, and preferably for use in securing a fixing element in a substrate, for example an anchor bolt in a mine wall or roof. There have been numerous proposals to provide cartridges containing preproportioned quantities of the components of self-setting mix packaged in such a way that they do not interact until the cartridge is destroyed by the element to be fixed. We have disclosed one such cartridge in Patent Application No. 28649/73 (Serial No. 1,384,364).

The invention concerns a generally improved cartridge and a way of making the cartridge for the purpose specified. A cartridge of the invention has a long shelf life because the interactive components are held in separate compartments and the cartridge is hazard-free because it is not made of glass. Also the cartridge is economical to make in a variety of ways using relatively simple equipment.

According to the invention, a cartridge containing the interactive components of a self-setting composition comprises a tube of flexible plastics material, the tube being sealed at each end and being substantially filled with a first interactive component, the wall of the tube being depressed inwardly to define a depression in the filled tube, the depression extending longitudinally of the cartridge, a second interactive component being contained within the depression, and sealing means sealing the mouth of the depression.

Most preferably, one component, the major one, comprises a paste of a filler and a curable or hardenable resin such as an unsaturated polyester resin, and is located within the tube, and the second component comprises a paste of a filler and a hardener for the resin, and is contained within the

depression. In the case of an unsaturated polyester resin the hardener will typically include a peroxide such as benzoyl peroxide. Other resin systems which can be used include epoxy and polyurethane.

Most preferably, the sealing means is constituted of an overlying longitudinal strip of tape which is adhered to the exterior surface of the tube on each side of the depression. Preferably the adhesion is done by heat sealing the strip to the surface of the tube using a suitable heat-sealable adhesive which is inert to the ingredients of the interactive component contained within the depression.

In a modification, the edge portions of the tube wall defining the sides of the depression are joined together by heat sealing to seal the mouth of the depression, so saving the need for a discrete sealing tape.

Although mention has been made of a heat sealing technique, other means, both chemical and mechanical may be used to secure the sealing means in the desired position. In one preferred way of making cartridges on a continuous basis, the tube is filled with the major component following which the depression is formed in the tube, the depression is filled with the other component and the mouth of the depression is sealed. In another method the depression is first formed and filled with its component and then sealed, following which the tube is filled with the major component. These actions may be done to continuous tube from which is then separated individual cartridges.

Materials which can be used as the films and the interactive components are as indicated in the above mentioned patent application.

One embodiment of cartridge of the invention and a method of manufacture is shown in the accompanying diagrammatic drawings in which:

Figure 1 is a longitudinal median sectional view of a cartridge,

Figure 2 is a cross sectional view of the cartridge of Figure 1, and

Figure 3 is a longitudinal view in section

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showing a stage of manufacture of the cartridge on a continuous basis.

The cartridge comprises a tube 1 of a plastics film, preferably a saturated polyester film, sealed at each end by a metal clip 2. The body of the tube is filled with sufficient volume of a mixture of unsaturated polyester, filler and accelerator so that the tube is of generally circular cross-sectional shape. At its upper side, the wall of the filled tube 1 is pushed inwardly to define a depression 3. The depression is filled with a hardener paste mixture of a peroxide (such as benzoyl peroxide) and filler. A length of adhesive tape 4 extends over the upper surface of the tube 1 to seal the mouth of the depression 3 and at each end of the cartridge the tape is trapped in the metal clip 2. At each side the tape 4 is sealed to the underlying plastics material of the wall of the tube 1.

A method of making a cartridge according to Figures 1 and 2 from continuous lay flat plastics tube is shown diagrammatically in Figure 3. The tube is first filled with an unsaturated polyester composition from an extrusion machine, not shown. The filled tube is then passed under a shoe 10 having in its toe a pipe 11 down which is passed the hardener paste and immediately in front of the pipe 11 is a roll of adhesive tape 12. The tube is continuously passed below the shoe and roll. The shoe makes the depression 3 in the upper side of the filled tube, the hardener paste is fed into the depression so formed and tape is wound off the strip 12 immediately and covers the filled depression. At further stations and in known manner the tube is voided and clips 2 are applied to close off individual cartridge lengths following which the leading cartridge length is parted from the parent tube to define an individual cartridge.

WHAT WE CLAIM IS:—

1. A cartridge containing the interactive components of a self-setting composition, comprising a tube of flexible plastics material, the tube being sealed at each end and being substantially filled with a first interactive component, the wall of the tube being

depressed inwardly to define a depression in the filled tube, the depression extending longitudinally of the cartridge, a second interactive component being contained within the depression, sealing means sealing the mouth of the depression.

2. A cartridge according to claim 1, in which the mouth of the depression is sealed by an overlying longitudinal strip of tape adhered to the exterior surface of the tube on each side of the depression.

3. A cartridge according to claim 1 or 2, in which the edge portions of the tube wall defining the sides of the depression are joined together to seal the mouth of the depression.

4. A cartridge according to claim 2 or 3, in which sealing is heat sealing.

5. A method of making a cartridge according to any preceding claim, in which the tube is filled with the one component following which the depression is formed in the tube, the depression is filled with the other component and the mouth of the depression is sealed.

6. A method of making a cartridge according to any of claims 1 to 4, in which the depression is first formed and filled with its component and then sealed, following which the tube is filled with the other component.

7. A method according to claim 5 or 6, in which a continuous tube is employed from which is then separated individual cartridges.

8. A cartridge substantially as described with reference to Figure 1 and 2.

9. A method of making a cartridge, substantially as described with reference to Figure 3.

10. A cartridge when made by a method according to claim 5, 6, 7 or 9.

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showing a stage of manufacture of the cartridge on a continuous basis.

The cartridge comprises a tube 1 of a plastics film, preferably a saturated polyester film, sealed at each end by a metal clip 2. The body of the tube is filled with sufficient volume of a mixture of unsaturated polyester, filler and accelerator so that the tube is of generally circular cross-sectional shape. At its upper side, the wall of the filled tube 1 is pushed inwardly to define a depression 3. The depression is filled with a hardener paste mixture of a peroxide (such as benzoyl peroxide) and filler. A length of adhesive tape 4 extends over the upper surface of the tube 1 to seal the mouth of the depression 3 and at each end of the cartridge the tape is trapped in the metal clip 2. At each side the tape 4 is sealed to the underlying plastics material of the wall of the tube 1.

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WHAT WE CLAIM IS:—

1. A cartridge containing the interactive components of a self-setting composition, comprising a tube of flexible plastics material, the tube being sealed at each end and being substantially filled with a first interactive component, the wall of the tube being

depressed inwardly to define a depression in the filled tube, the depression extending longitudinally of the cartridge, a second interactive component being contained within the depression, sealing means sealing the mouth of the depression.

2. A cartridge according to claim 1, in which the mouth of the depression is sealed by an overlying longitudinal strip of tape adhered to the exterior surface of the tube on each side of the depression.

3. A cartridge according to claim 1 or 2, in which the edge portions of the tube wall defining the sides of the depression are joined together to seal the mouth of the depression.

4. A cartridge according to claim 2 or 3, in which sealing is heat sealing.

5. A method of making a cartridge according to any preceding claim, in which the tube is filled with the one component following which the depression is formed in the tube, the depression is filled with the other component and the mouth of the depression is sealed.

6. A method of making a cartridge according to any of claims 1 to 4, in which the depression is first formed and filled with its component and then sealed, following which the tube is filled with the other component.

7. A method according to claim 5 or 6, in which a continuous tube is employed from which is then separated individual cartridges.

8. A cartridge substantially as described with reference to Figure 1 and 2.

9. A method of making a cartridge, substantially as described with reference to Figure 3.

10. A cartridge when made by a method according to claim 5, 6, 7 or 9.

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