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CONTAINER FOR SAFETY BLASTING EXPLOSIVES

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Fig. 1.

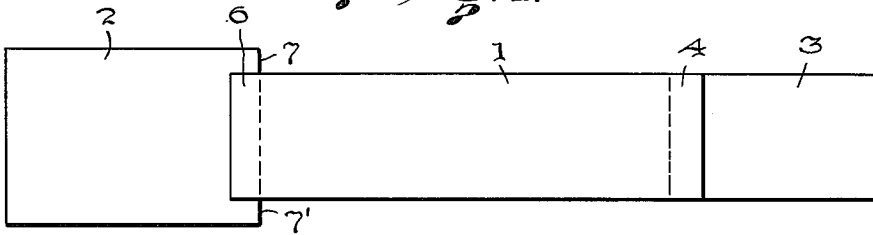


Fig. 2.

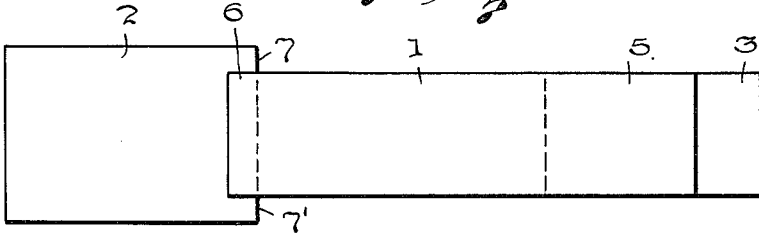


Fig. 3.

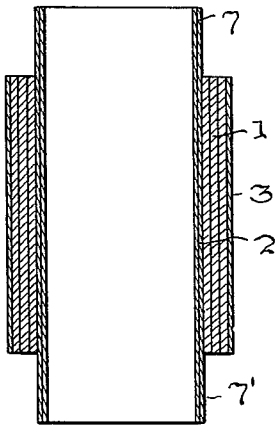
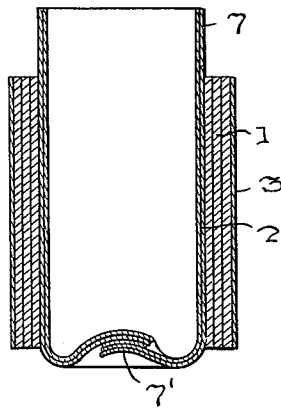


Fig. 4.



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CONTAINER FOR SAFETY BLASTING EXPLOSIVES

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4 Claims. (Cl. 102—24)

1

The present invention relates to containers for safety blasting explosives and to the provision of safety-sheathed blasting explosive cartridges formed from safety blasting explosives in said containers.

By the phrase "safety-sheathed blasting explosive cartridges" is meant a cartridge of a detonating explosive made from a composition including a suitable proportion of ingredients adapted to minimise its capacity for igniting fire-damp air mixtures or coal-dust air mixtures when it detonates and which is provided along its cylindrical surface with an external safety sheath that comprises flame quenching or cooling ingredients.

In safety-sheathed detonating explosive cartridges the explosive composition customarily includes ammonium nitrate as one of its power producing ingredients, one or more compounds capable of vaporisation, fusion or thermal decomposition with absorption of heat as a flame quenching or cooling ingredient, and the safety-sheath also comprises one or more compound of the latter description. It is also the practice for the explosive cartridge proper to be provided with a waterproofed paper wrapper and for this portion of the sheathed cartridge to comply with the official gallery tests for permitted explosives.

The blanketing effect of carbon dioxide on the flame of the explosive and its innocuous character render it a particularly desirable gas to be generated by the sheathing material when the detonation takes place. Sheathing materials consisting essentially of various more or less insoluble metal carbonates have been tried with varying results. Of the carbonates sodium bicarbonate is the most effective and is the compound generally employed in practice in this country, notwithstanding the fact that it is slightly soluble in water and must be carefully separated by a waterproof wrapping from the explosive cartridge, since it would otherwise react with the ammonium salt present in the explosive to produce ammonium bicarbonate which gives rise to loss of ammonia and carbon dioxide.

For example, British specification No. 416,586 discloses inter alia a flexible safety sheathing material for blasting explosives consisting of flame quenching felt material in sheet form and comprising a uniform mixture of a fibrous binding material and a preponderating proportion of a cooling salt or mixtures of cooling salts.

In British Patent No. 584,848 there is claimed inter alia a safety sheathed blasting explosive

2

cartridge wherein the said sheath comprises a mixture of one molar part of a metal carbonate not freely soluble in water and a third of two molar parts of a dry hydrated form of alumina.

The object of the present invention is to provide in a simple and convenient manner a container for a safety blasting explosive which shall embody in itself the three essentials required in the covering of a safety-sheathed blasting explosive cartridge, namely the water-proofed paper wrapper for the cartridge proper, the flame quenching felt material and the external unwaxed paper wrapping, thereby permitting safety sheathed blasting explosives to be more advantageously manufactured.

According to the present invention a container for a safety blasting explosive consists internally of waxed paper and externally of unwaxed paper, the waxed and unwaxed papers being separated from one another by flame quenching felt material and is formed from a length of quenching felt material cemented at one end to a length of unwaxed paper and at its other end to a length of waxed paper, wherein the width of the felt material and unwaxed paper corresponds substantially to the length of explosive charge to be held by the container and the width of the waxed paper is such that it projects at each side of the felt material to enable the end-closures of the container to be formed and wherein the lengths of the felt material and waxed and unwaxed papers are such as to permit the desired numbers of layers of each of these to be provided.

If desired the unwaxed paper may be so cemented to the flame quenching felt as to leave only a free narrow longitudinal strip of unwaxed paper sufficient to form a sealed cylinder.

For explosive compositions containing ammonium nitrate there must be at least one complete layer of waxed paper in order to prevent any contact between said explosive and the bicarbonate containing felt. The number of felt layers depends upon the desired ratio of quantity of felt to explosive. It is usually sufficient for the container to be provided with only one external layer of unwaxed paper.

It is often considered desirable for the inside of the container to be provided with a layer of wax so as to provide a moisture resistant layer between the explosive and the atmosphere. It may be desirable for the ends formed by folding the projections of the internal waxed paper to be sealed by a layer of wax.

According to the present invention the meth-

od for the production of a cartridge container according to the invention comprises fashioning into a cylinder a length of flame quenching felt material cemented at one end to a length of waxed paper having a width such that it projects at each side of the felt material and at its other end to a length of unwaxed paper of substantially the same width as itself so that the waxed paper forms the internal surface of the cylinder and the unwaxed paper forms the external surface of the cylinder, and folding one end of the exposed waxed paper.

If desired the inside surface of the container thus formed can be given a coating of wax by the spraying thereon of a melted wax composition.

According to the invention the method for the production of safety-sheathed blasting explosive cartridges comprises introducing a charge of safety blasting explosive into a container consisting internally of waxed paper and externally of unwaxed paper separated from one another by flame quenching felt material and formed from a length of flame quenching felt material cemented at one end to a length of unwaxed paper and at the other end to a length of waxed paper wherein the width of the felt material and unwaxed paper corresponds substantially to the length of explosive charge to be held by the container and the width of the waxed paper is such that it projects at each side of the felt material to enable the end-closures of the container to be formed and wherein the lengths of the felt material and waxes and unwaxed papers are such as to permit the desired number of layers of each of these to be produced.

By way of example the invention is illustrated in the diagrammatic drawing accompanying the specification whereof each of Figs. 1 and 2 is a plan view of a length of flame quenching felt material cemented at one end to unwaxed paper and at its other end to waxed paper, Fig. 3 is a longitudinal section through a cylinder formed by rolling the felt material-paper lengths shown in Fig. 1 or Fig. 2, and Fig. 4 is a longitudinal section through a container formed by folding one of the projections in the cylinder shown in Fig. 3.

Referring to the drawing, 1 is a piece of flame quenching felt material $6\frac{3}{8}$ inches wide and $12\frac{1}{2}$ inches long and consisting approximately of 85 per cent sodium bicarbonate and 15 per cent wood pulp, 2 is a piece of waxed manilla paper, $8\frac{1}{4}$ inches long and $8\frac{1}{4}$ inches wide, 3 is a piece of unwaxed paper $6\frac{3}{8}$ inches wide and $6\frac{1}{4}$ inches long. In Figs. 1 and 2, the felt material is shown on top of the papers 2 and 3. According to the embodiment shown in Fig. 1 only a narrow edge of the unwaxed paper 3 and the felt material 1 are shown cemented together at 4 whereas according to the embodiment shown in Fig. 2 most of the unwaxed paper 3 is cemented at 5 to the felt material 1 leaving only a narrow strip of free unwaxed paper. In each embodiment the waxed paper 2 is shown cemented only by a narrow edge 6 to the felt material 1. The waxed paper 2 is so positioned with respect to the felt material 1 as to leave projections 7, 7' at each side of the felt strip 1. The felt material paper lengths are rolled into cylinders of $1\frac{3}{8}$ inches internal diameter in such a way that the waxed paper 2 is first formed into cylindrical shape and that the felt material at 6 is in due course between waxed paper surfaces. When the projection 7' of the cylinder shown in Fig. 3 is suitably folded a

finished container is formed as shown in Fig. 4. The external diameter of the finished container as shown in Fig. 4 is approximately $1\frac{7}{8}$ inches. This container has two layers of waxed paper 2, three layers of felt material 1 and one layer of unwaxed paper 3. Into the finished container shown in Fig. 4, 4 ozs. of "Polar Viking" composition (Home Office Permitted List) can be introduced whereupon the projection 7 is folded. "Polar Viking" is a nitroglycerine powder explosive suitable for use in coal mines in which fire damp or coal dust may be present. If desired, the folded ends of the closed container can be given a spray-coating of wax.

We claim:

1. A safety blasting explosive charge container consisting internally of a length of waxed paper sheet and externally of a length of unwaxed paper sheet, the waxed and unwaxed paper sheets being separated one from the other by a flame quenching felt sheet, said flame quenching felt sheet comprising a uniform mixture of a fibrous binding agent and a preponderating proportion of at least one powdered flame cooling compound, and having at one end the length of unwaxed paper sheet cemented across its width, and at its other end the length of waxed paper sheet cemented across its width, wherein the width of the sheet of flame quenching felt material and unwaxed paper correspond substantially to the length of the explosive charge to be held by the container and the width of the waxed paper is such that it projects at each side of the felt material and thereby provides end-closure means, and wherein the joined lengths of the felt material, waxed, and unwaxed sheets which comprise the confines of the said container, are in a desired number of layers of each of the same.

2. A container for a safety blasting explosive as set forth in claim 1 wherein the inside of the container is provided with a layer of wax.

3. A method for the production of a container for a safety blasting explosive which comprises fashioning into a cylinder a length of flame quenching felt material cemented at one end to a length of waxed paper having a width such that it projects at each side of the felt material and cemented at its other end to a length of unwaxed paper substantially the same width so that the waxed paper forms the internal surface of the cylinder and the unwaxed paper forms the external surface of the cylinder, and folding one end of the projecting waxed paper.

4. A method as set forth in claim 3 wherein the inside surface of the container formed is coated by spraying thereon a melted wax composition.

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