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(54) Reinforced paper cartridge.

(57) A shell (10) is formed from a tube (13) closed at one end by an end cap (14) including a primer. The tube (13) is realized from a strip of paper (11) closely rolled in accordance with the axis of the tube with positioning between the turns of flexible reinforcing elements such as for example gauze (12) or threads extending substantially in the direction of extension of the strip.

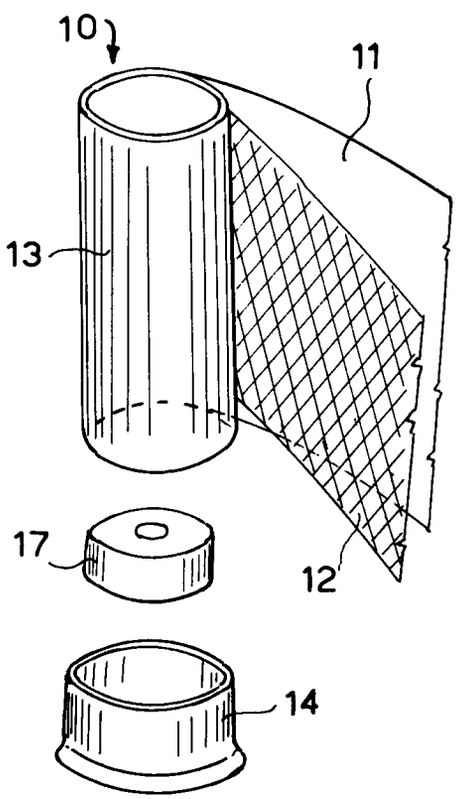

Fig.1

EP 0 526 924 A1

Shells are known, as for example the hunting type with lead shot, having the shell formed from a tubular part for containment of the charge and shot with a metal end cap containing the primer. It is clear that, upon shooting, the tubular part must resist high pressure without breaking or splitting.

In the known art said tubular part, generally to be discarded, is made of plastic or stout cardboard.

Realization in plastic ensures the necessary mechanical characteristics but constitutes a source of nonbiodegradable waste material.

On the other hand, cardboard shells have mechanical characteristics poorer than those of plastic and, to be acceptable, the papers used for manufacture of the tube must be of excellent quality. With the manufacturing procedures for shells of the known art there are required thus papers with special characteristics such as those made with pure long fibre cellulose which can only be obtained by the use of virgin vegetable cellulose.

This excludes for example cardboard tubes made with papers coming from the recycling of paper products which, even if not having valuable characteristics, have the undeniable advantage of lesser cost.

The general purpose of the present invention is to obviate the above mentioned shortcomings by supplying cardboard shells having mechanical characteristics of resistance comparable to those of plastic shells, even while using papers of not elevated quality, such as for example papers obtained by recycling.

In view of said purpose it has been sought to provide, in accordance with the present invention, a cartridge shell of the type formed from a tube closed at one end by an end cap including a primer and characterized in that the tube is formed from a strip of paper glued and closely wound along the axis of the tube with positioning between the turns of flexible reinforcement elements extending substantially in the direction of extension of the strip.

To further clarify the explanation of the innovative principles of the present invention and its advantages as compared with the known art there are described below with the aid of the annexed drawings possible embodiments as nonlimiting examples applying said principles. In the drawings:

- FIG. 1 shows an exploded perspective view of a first embodiment of a shell in accordance with the present invention,
- FIG. 2 shows an exploded perspective view of a second embodiment of the shell in accordance with the present invention, and
- FIG. 3 shows an exploded perspective view of a third embodiment of the shell in accordance with the present invention.

With reference to the figures, FIG. 1 shows a shell, indicated as a whole by reference number 10, partially unwound to show its innovative structure. The shell in accordance with the present invention is made of a strip of paper 11 and a strip of gauze 12 wound together with a bonding agent to form a tube 13 to which is applied at one end, in accordance with the known art, a normal metal end cap 14 containing for example a base wad 17 for firmly assembling the tube and end cap and supporting the cartridge primer. Said base wad can be of paper or other biodegradable material. The gauze must be of material of suitable mechanical strength depending on the characteristics of the shell it is desired to obtain and the type of paper used. For example, plain cotton has been found to be usable. In this manner, the tube is formed of successive alternating layers of gauze and paper glued together. Such an embodiment furnishes high strength, both longitudinal and transverse, to the shell, making it competitive with plastic products, even though it is more economical to construct.

FIG. 2 shows an alternative embodiment applying again the principles claimed herein. In said second embodiment a shell 110 is realized by winding a strip of paper 111 together with parallel threads 115 so as to form a tube 113 to which is applied an end cap 114 similar to the end cap 14 of FIG. 1, with base wad 117. The threads 115 can be made of cotton, nylon, metal, etc.

In this embodiment too there is achieved high strength of the shell, making it competitive with plastic products.

FIG. 3 shows a third embodiment in accordance with the innovative principles of the invention. In said third embodiment a shell 210 is made by winding a strip of paper 211 together with a thread 216 arranged helically so as to form a tube 213 to which is applied an end cap 214 similar to the end cap 14 of FIG. 1 and with base wad 217. The thread 216 must be a material with mechanical characteristics based on the characteristics of the shell it is desired to obtain and the type of paper used. For example, threads of cotton, nylon, metal, plastic in general, etc. have been found usable.

In this embodiment too there is obtained high strength of the shell, making it competitive with plastic materials.

In all the embodiments shown it is not necessary that the paper used be of high quality and it may be, for example, paper produced by recycling.

In addition, making the gauze or threads of biodegradable material, a shell is provided which disintegrates a short time after its abandonment to the elements.

Naturally the above description of an embodiment applying the innovative principles of the present invention is given merely by way of exam-

ple and therefore is not to be taken as a limitation of the patent right claimed here.

For example, the threads can be replaced by flexible elements realized in the form of strips. It is also possible, for example in the embodiment of FIG. 3, to use two threads arranged in opposing helices.

Finally, both the paper and the reinforcing elements can be wrapped with fixed or variable pitch inclined to the axis of rotation of the tube, e.g. at an angle of 45°. The reinforcement elements are thus substantially laid in the direction of winding of the strip, it being intended that they are not parallel to the tube axis but inclined thereto.

Claims

1. Cartridge shell of the type formed from a tube closed at one end by an end cap including a primer and characterized in that the tube is formed from a strip of paper glued and closely wound in accordance with the axis of the tube with Positioning between the turns of flexible reinforcement elements extending substantially in the direction of extension of the strip.

2. Shell in accordance with claim 1 characterized in that said elements are made of gauze.

3. Shell in accordance with claim 1 characterized in that said elements are made as a plurality of parallel elements each substantially contained in a plane normal with the axis of the tube.

4. Shell in accordance with claim 1 characterized in that said elements are made with at least one element arranged helically around the axis of the tube.

5. Shell in accordance with claim 1 characterized in that said elements are made in the form of threads.

6. Shell in accordance with claim 5 characterized in that said threads are of biodegradable material and in particular vegetable fibre such as cotton.

7. Shell in accordance with claim 5 characterized in that said gauze is of biodegradable material and in particular vegetable fibre such as cotton.

8. Shell in accordance with claim 1 characterized in that said elements are wrapped oblique to the axis of the tube and preferably at an angle of approximately 45°.

9. Shell in accordance with claim 9 characterized in that the paper strip is wrapped oblique to the axis of the tube and preferably at an angle of approximately 45°.

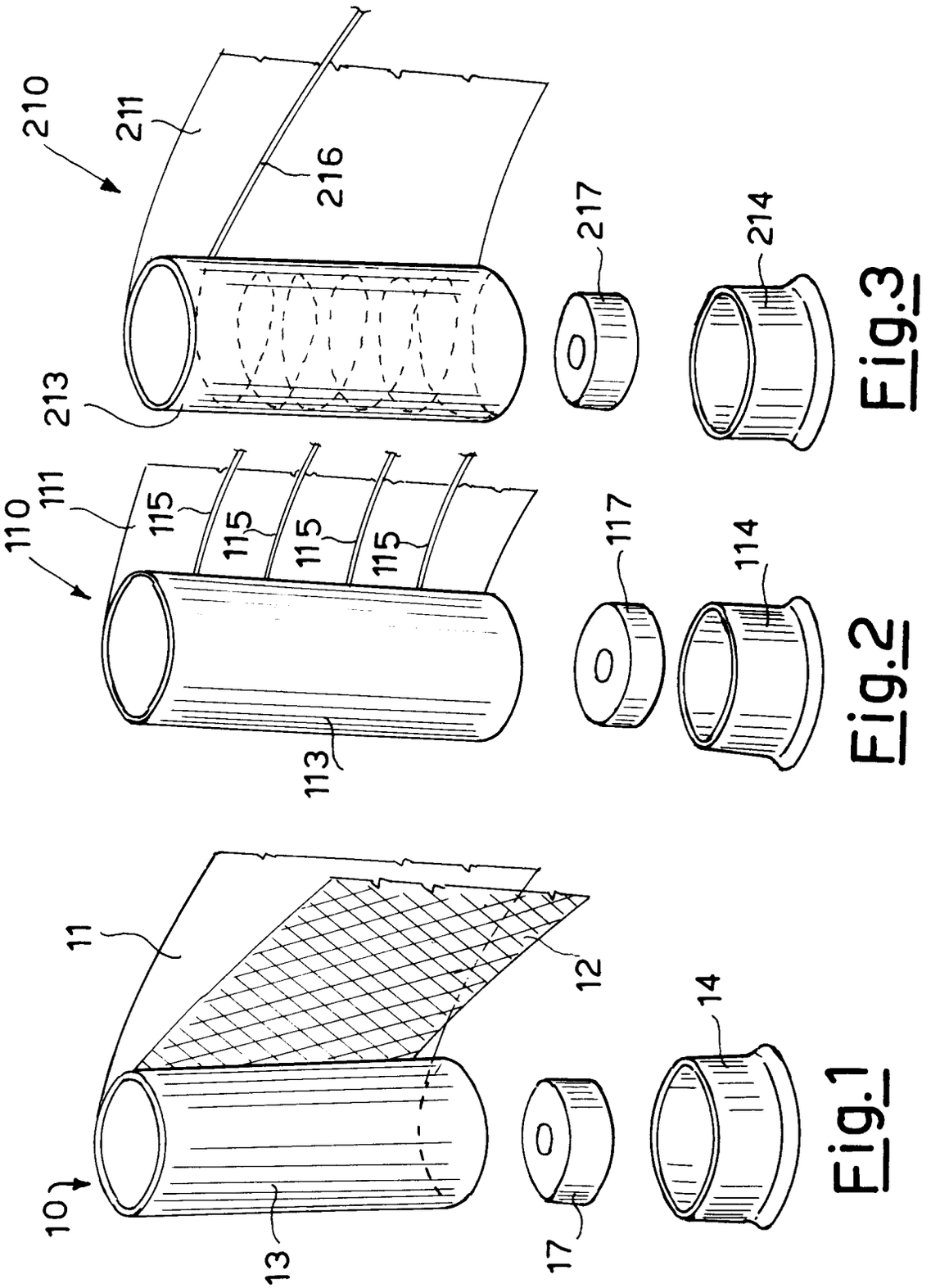

Fig.3

Fig.2

Fig.1

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EUROPEAN SEARCH REPORT

Application Number

EP 92 20 1938

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
X	FR-A-2 159 855 (AREAC S.A.) * the whole document *	1	F42B5/26
X	US-A-2 984 182 (FIENUP ET AL) * column 1, line 38 - column 3, line 11; claims; figures *	1,8,9	
X	US-A-3 076 409 (WILLIAMS ET AL) * the whole document *	1	
A	FR-A-1 163 884 (OLIN MATHIESON CHEMICAL CORPORATION) * page 3, right column, paragraph 2 -paragraph 4; figures 3-6 *	1-7	
A	EP-A-0 181 473 (FIOCCHI MUNIZIONI) * page 4, line 18 - page 5, line 5; claim 1 *	6	

TECHNICAL FIELDS SEARCHED (Int. Cl.5)
F42B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	05 OCTOBER 1992	DOUSKAS K.

CATEGORY OF CITED DOCUMENTS

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