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PACKAGING CONTAINER FOR ARTICLES OF CIRCULAR CROSS-SECTION

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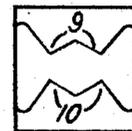
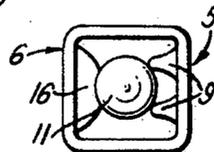
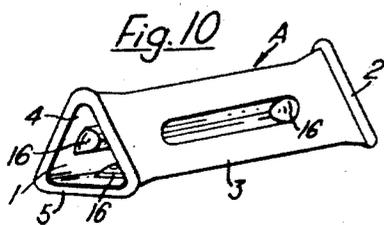
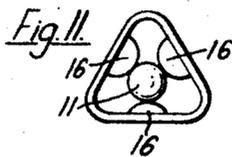
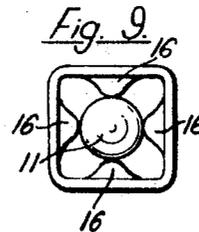
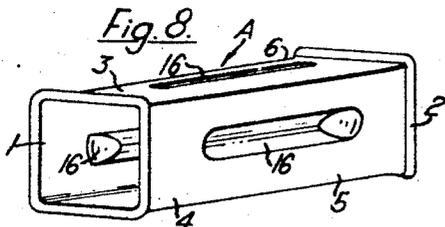
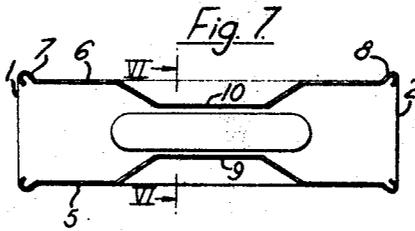
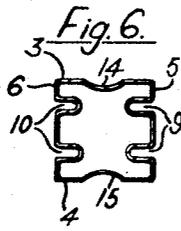
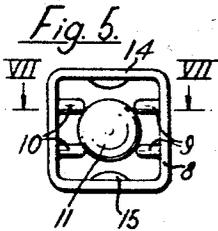
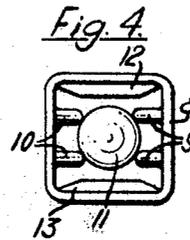
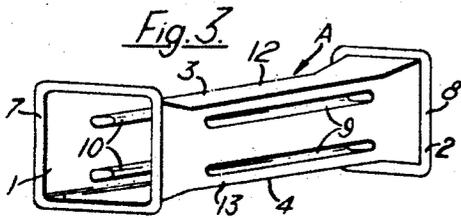
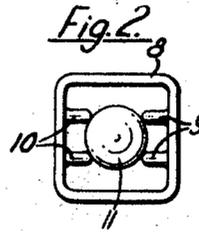
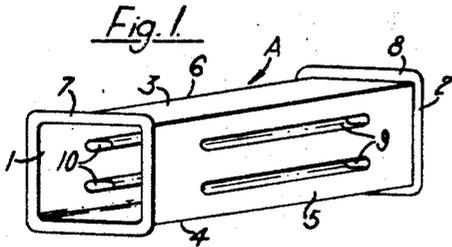


Fig. 13.

Fig. 14. Inventor

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PACKAGING CONTAINER FOR ARTICLES OF CIRCULAR CROSS-SECTION

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10 Claims

ABSTRACT OF THE DISCLOSURE

The invention provides a packaging container, e.g. for pharmaceutical ampoules, in the form of an open ended elongate tubular body of thermo-plastic material having a polygonal transverse cross-section. Each of the faces or walls of the polygon is formed with an inwardly projecting fold, which together serve to grip and support an article to be packaged by their resilience.

The present invention relates to a packaging container for articles of circular cross-section.

Various packaging containers have been proposed for articles of circular cross-section, such as pharmaceutical ampoules. The present invention aims at providing an improved form of such container.

According to the present invention there is provided a packaging container for an article of circular cross-section, such container comprising an open ended tubular elongate body portion of thermo-plastics material, having a polygonal transverse cross-section, with inwardly projecting longitudinal folds formed in at least two of the longitudinal walls of said body portion, to support an article by their resilience.

In order that the invention may be more readily understood, the following description is given, merely by way of example, reference being made to the accompanying drawings, in which:

FIGURES 1, 3 and 8 are perspective views of three embodiments of packaging container according to the invention, and having a substantially square cross-section;

FIGURES 2, 4, and 9 are end views of the containers of FIGURES 1, 3 and 8 respectively;

FIGURE 5 is an end view of a modified form of container having a square cross-section;

FIGURE 6 is a transverse cross-section of the container of FIGURE 5, taken along the line VI—VI of FIGURE 7;

FIGURE 7 is a longitudinal section taken along the line VII—VII of FIGURE 5;

FIGURE 10 is a perspective view of a triangular cross-section container according to the invention;

FIGURE 11 is an end view of the container of FIGURE 10;

FIGURE 12 is an end view of a modification of the container of FIGURES 10 and 11; and

FIGURES 13 and 14 are end views of two further modified forms of container according to the invention.

In the drawings like reference numerals in each of the views refer to like parts.

Turning particularly to FIGURES 1 and 2, there is illustrated the first embodiment of container according to the invention, including an elongate tubular body A of square cross-section. The ends 1 and 2 of the body are open. The body itself comprises upper and lower longitudinal faces 3 and 4 and side longitudinal faces 5 and 6 the latter each being provided with two inwardly projecting longitudinal folds 9 and 10 respectively. It will be seen from the figures that the folds 9 and 10 finish

inwardly of the open ends 1 and 2, which are provided with thickened reinforcing portions 7 and 8.

The embodiment of FIGURES 3 and 4 is essentially similar to the embodiment of FIGURES 1 and 2, except that the upper and lower faces 3 and 4, in the central portion of the length of the body A, are less spaced apart than the portions 12 and 13, to provide a central region of smaller cross-section.

The embodiment of container illustrated in FIGURES 5, 6 and 7, is generally similar to the embodiment of FIGURES 1 and 2, except that the upper and lower faces 3 and 4 are each provided with an inwardly extending longitudinal fold 14 and 15, these folds being wider than the two folds 9 and 10 in each of the side walls 5 and 6 respectively.

Turning now to FIGURES 8 and 9, a similar construction is illustrated, except that each of the walls 3, 4 and 5 and 6 is provided with a single inwardly projecting longitudinal fold 16.

A further embodiment of the square cross-section construction as illustrated in FIGURE 13, in which one of the side walls 6 is provided with a single wide fold 16, while the opposite side wall 5 is provided with two narrower folds 9. The embodiment of FIGURE 14 is again of square cross-section with two pairs of folds 9 and 10. However, this construction does not have the reinforcement 7 and 8 at the end faces, and is particularly suitable for production by injection moulding.

The embodiments illustrated in FIGURES 10 and 12 are generally similar, but are of triangular cross-section. In FIGURES 10 and 11, wide inwardly projecting longitudinal folds 16 are formed centrally of the three sides of the equilateral triangle cross-section body portion. In FIGURE 12, the folds 16 are formed at the juncture of the sides of the triangle. In each of the embodiments, the article to be packaged, e.g. a pharmaceutical ampoule, is indicated by the reference numeral 11.

In each case, the tubular body is made of a tin thermo-plastic material, and the folds, bulges and reinforcements are constructed by simply forming the walls appropriately. The folds are given such a form and arrangement that the circular section article to be packaged is held in position by friction, by the cooperation of the various folds. While the packaging container of the present invention has been especially produced for the packaging of pharmaceutical ampoules, both of the "bottle" type and the "two point" type, it will be appreciated that the container is suitable for packaging other circular section articles, such as injection syringes and radio valves. Similarly it would be also possible to use the container for less fragile or non-fragile articles.

The container of the invention may be made of any thermo-plastic material such as cellulose esters, e.g. cellulose acetate or cellulose acetobutyrate. Similarly polyvinyl esters such as polyvinyl acetochloride or polyvinyl chloride may be used. Furthermore, polyolefines such as polyethylene and polypropylene, polyamides, polycarbonates and compounds such as high impact polystyrene, may also be used.

For economic reasons, it is advantageous to construct the ampoule carrier with as small a thickness as possible and a thickness of between 0.1 and 1 mm., preferably 0.15 to 0.5 mm., will be generally suitable. The container can be made by any normal technique such as injection moulding, blow extrusion and forming under vacuum. The container has many advantages over existing types, including lightness, easy manipulation, more particularly for automatic packaging, and also excellent protection of the article being packaged, particularly against lateral shock.

As an example of ampoule carrier constructed accord-

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ing to the invention, a construction which was generally similar to that illustrated in FIGURES 3 and 4 was produced and was specifically designed for a 2 cc. "bottle" ampoule having a length of 60 mm. and a diameter of 6 mm. The length of the container was 70 mm., and its overall cross-section was 25 x 25 mm. the faces 3 and 4 being slightly curved in re-entrant manner, the faces 5 and 6 being plane and provided with two folds 9 and 10, 35 mm. in length at the base and 25 mm. at the crest. The folds had a base width of 3 mm. and a total height of 7 mm.

The reinforcements 7 and 8, at the end faces 1 and 2 were formed as grooves having an internal width of 1 mm. The assembly was made from high density polyethylene having a white pigment and a thickness of 0.15 mm. by a conventional blow extrusion technique. The resulting package has a weight of 5 grams.

We claim:

1. Packaging container for a pharmaceutical ampoule or the like, said container comprising in combination:
 - (a) an elongate body portion of thermoplastic material of polygonal transverse cross-section;
 - (b) a plurality of substantially flat longitudinally extending walls defining said body portion;
 - (c) means defining open ends to said body portion;
 - (d) substantially flat end portions extending longitudinally inwardly from said open ends; and
 - (e) a total of at least three inwardly projecting longitudinal folds formed in at least two of said substantially flat longitudinal walls, between said substantially flat end portions, whereby the length of said folds is less than the length of said longitudinal walls; said folds being effective to support an ampoule by their resilience with the ampoule spaced inwardly from each of said flat longitudinal walls.
2. The packaging container defined in claim 1, wherein said walls define a square transverse cross-section, with a first and second pair of opposite walls.
3. The packaging container defined in claim 2 and including two inwardly projecting longitudinal folds formed in each of said first pair of opposite walls.
4. The packaging container defined in claim 3 and in-

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cluding a longitudinal fold formed in each of said second pair of opposite walls.

5. The packaging container defined in claim 2 and including an inwardly projecting longitudinal fold formed in each wall of both of said first and second pairs of opposite walls.

6. The packaging container defined in claim 2 and including a longitudinally extending fold in one of the walls of said first pair of said walls, and two longitudinal folds in the opposite wall of said first pair of opposite walls.

7. The packaging container defined in claim 1 wherein said walls define a substantially equilateral triangular cross-section with three longitudinal walls, a longitudinal fold being formed in each said wall.

8. The packaging container defined in claim 1 wherein said walls define a substantially equilateral triangular cross-section, with three longitudinal walls, a longitudinal fold being defined at each of the junctures of such three walls.

9. The packaging container defined in claim 1 and including a central portion to such tubular body portion, such central portion being of reduced cross-section, and incorporating therein said inwardly projecting longitudinal folds.

10. The packaging container defined in claim 1 wherein said open ends to said tubular body portion include means reinforcing said open end.

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