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(54) Pack for a fragil tubular object.

(57) Pack for a fragile tubular object (1) with relatively heavy end rings (2) comprising a carrying tube (3) enclosing the object (1) at a distance and having at both ends supporting elements (4) which are fixed relative to the carrying tube (3) and which support each of the end rings (2) in the radial direction and in at least one axial direction.

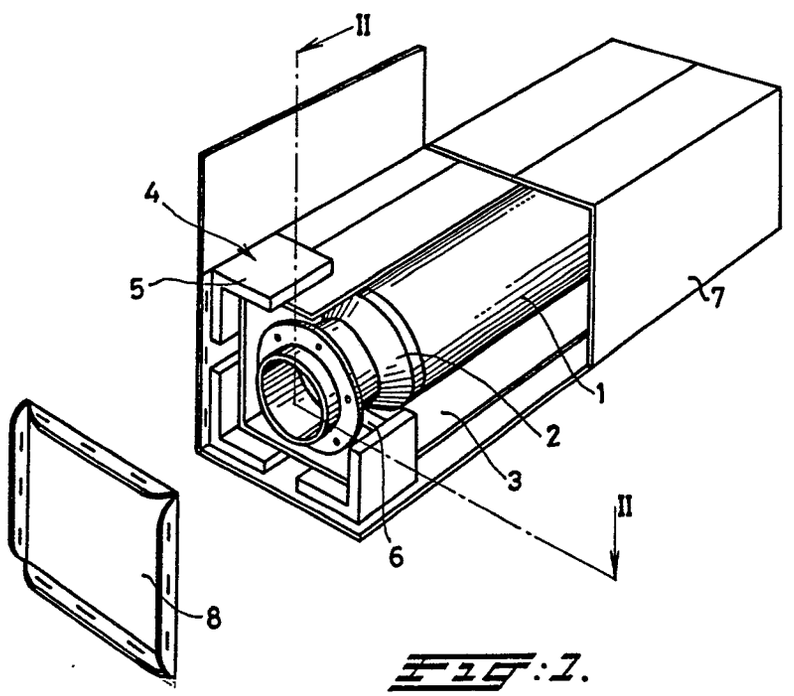

Fig. 1.

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Pack for a fragile tubular object.

The present invention relates to a pack for a fragile tubular object, which is provided at both ends with relatively heavy end rings. In particular, the application relates to a pack for a cylindrical screen of a rotary screen printing device. Such a screen consists of a very thin cylinder which is 0.055 mm, bearing picture information in the form of a lacquer pattern and having at both ends an aluminum ring weighing 2.5 kg. The screen cylinder is of the highmesh-type, made by welding flat high-mesh material into cylinders using a laser and subsequently carrying out the picture transfer process. This produces an extremely fragile, high-grade product which, due to the glued-in aluminum end rings of relatively great weight, can easily be damaged beyond repair if subjected to shock or impact stress. This risky shock or impact stress arises, for example, during transportation of the finished product to the customers.

The object of the invention is to produce a pack with which damage during handling, transport and storage is avoided in a reliable manner. This object is achieved according to the invention in that the pack comprises a carrying tube of a relatively rigid material enclosing the object at a distance, said carrying tube being provided at both ends with supporting elements which are fixed relative to the carrying tube, and which support each of the end rings of the object in the radial direction and in at least one axial direction directed towards the opposite end ring. In this way the fragile cylindrical wall of the object is suspended completely free inside the pack, while pressure stresses on the cylindrical wall of the aluminum end rings are absorbed by the carrying tube via the supporting elements, and thus do not act on the cylindrical wall.

In a preferred embodiment of the invention, the suppor ting elements each have a part lying against the outer periphery of the carrying tube which projects in the axial direction beyond the carrying tube, a casing being provided which lies at a distance from the carrying tube and rests against the outermost parts of the supporting elements, said casing containing end partitions which rest against axially projecting parts of the supporting elements when the pack is assembled. In this way the cylindrical wall of the object is surrounded by a double-walled structure, while the outermost parts of the supporting elements serve as spacers between the walls which are spaced apart.

Each supporting element is preferably provided with a supporting leg extending inwards from the outermost part through an aperture in the carrying tube until it is in contact with the corresponding end ring of the object. The supporting leg can in this way be pushed through an aperture provided or prepared beforehand in the supporting frame, as a result of which these supporting elements are also fixed relative to the carrying tube.

The invention will be elucidated with reference to the appended drawing, in which:

Fig. 1 shows a cutaway perspective view of the pack according to the invention containing an object to be packed therein;

Fig. 2 is a cross-section along the line II-II in Fig. 1; and

Fig. 3 shows on an enlarged scale the detail III of Fig. 2.

As Fig. 1 shows clearly, a fragile tubular object to be packed, consisting of a cylinder 1 which is provided at both ends with a relatively heavy end ring 2, is surrounded by a carrying tube 3 which is made of a relatively rigid material such as corrugated cardboard. The carrying tube 3 is provided at both ends with a number of supporting elements 4 which are made of a plastic foam material such as polythene.

In the embodiment shown in the drawing the carrying tube 3 has a rectangular cross-section, and each supporting element 4 is made up of an angular part 5 which rests against the outside of the carrying tube 3 and grips round each of the corner points thereof. Four supporting elements are therefore present at each end of the carrying tube. Each supporting element is provided with a supporting leg 6, which extends from the inside of the angular part 5 through an aperture provided beforehand in the carrying tube, and with its end comes into contact with one of the end rings 2 of the object to be packed, in order to support this end ring in the radial and axial direction. The angular parts 5 also project in the axial direction slightly beyond the carrying tube 3.

A casing 7 is provided round the carrying tube 3, which casing rests against the outside of the angular parts 5 of the supporting elements, and is thus situated a distance away from the carrying tube 3, the casing 7 and the carrying tube 3 forming a double-walled structure in which the parts 5 form spacers between said walls. The casing 7 has a cross-section corresponding to the cross-section of the carrying tube 3 and projects in the axial direction a little beyond the supporting elements 4. The casing also has end partitions 8 forming the end sides of the casing. These end partitions rest against the axial ends of the supporting elements 4 and are fixed to the casing by means of staples 9.

Fixed on the parts of each supporting element

projecting radially beyond the carrying tube 3 there is also a radially inward-facing part 10 which extends past the outer periphery of the end rings and can, if desired, be made integral with the supporting element 4. This part 10 together with the axial end of the part 5 forms a stop face for the end partition 8. The parts 10 can be designed as a single rectangular plate which is provided with a central aperture, and in which the angular parts 5 of the four supporting elements grip round each corner point of the plate.

The object shown in the drawing has end rings which are provided with a radially projecting flange. As can be seen in Fig. 2, four supporting legs always grip behind each flange in such a way that the object is fixed in the axial direction and the cylinder 1 of the object in that state is held in position so that the cylinder 1 is relieved of the pressure forces exerted thereon by the end rings.

The packing of a fragile object takes place in the following manner. At one end of the carrying tube the four supporting elements are fitted by inserting them by their supporting leg 6 into an aperture made previously therein. The apertures can also be prepared in such a way that a piece of cardboard is taken in with the supporting leg, as shown in Fig. 3 by reference numeral 11. The object is then inserted into the carrying tube from the side where the supporting elements are fitted until the flange of the end ring rests against the supporting legs. After this, the supporting elements are fitted at the other end of the carrying tube, in such a way that their supporting legs grip behind the flange of the other end ring. The fragile cylinder of the object is thus held stretched in the axial direction between the supporting legs, so that this cylinder is relieved of impact and pressure forces. Thereafter the casing 7 made of, for example, corrugated cardboard is fitted, and the end partitions 8 are stapled down.

The pack now forms a rigid unit which can withstand a falling test of 1.2 m without damage to the object, and in which the end rings exert no forces on the fragile cylinder during transportation.

Since the object to be packed is fully supported by the supporting elements, it is possible to include objects with a difference in diameter of approximately 20 mm in the same pack. In this case the supporting elements are compressed to a greater or lesser extent.

The pack described above can also be used for other objects such as, for example, a thin-walled glass tube with metal end rings.

It will be clear that the pack according to the invention is not restricted to the embodiment described and shown here. The carrying tube can also have, for example, a cylindrical cross-section, while the number and shape of the supporting elements can vary.

Claims

1. Pack for a fragile tubular object (1) which is provided at both ends with relatively heavy end rings (2), characterized in that the pack comprises a carrying tube (3) of a relatively rigid material enclosing the object (1) at a distance, said carrying tube (3) being provided at both ends with supporting elements (4) which are fixed relative to the carrying tube (3), and which support each of the end rings (2) of the object in the radial direction and in at least one axial direction directed towards the opposite end ring.

2. Pack according to Claim 1, characterized in that the supporting elements (4) each have a part (5) lying against the outer periphery of the carrying tube (3) which projects in the axial direction beyond the carrying tube, a casing (7) being provided which lies at a distance from the carrying tube (3) and rests against the outermost parts of the supporting elements (4), said casing (7) comprising end partitions (8) which rest against axially projecting parts (10) of the supporting elements (4) when the pack is assembled.

3. Pack according to Claim 2, characterized in that the outermost parts of the supporting elements (4) project in the axial direction beyond the carrying tube (3) and from this projecting part there is a radially inward running part (10) which extends past the outer periphery of a corresponding end ring (2).

4. Pack according to one or more of the preceding Claims 1-3, characterized in that each supporting element is provided with a supporting leg (6) extending inwards from the outermost part through an aperture in the carrying tube (3) until it is in contact with the corresponding end ring (2) of the object.

5. Pack according to one or more of the preceding Claims 1-4, characterized in that the carrying tube (3) has a rectangular cross-section, and the outermost parts of the supporting elements (4) are angular.

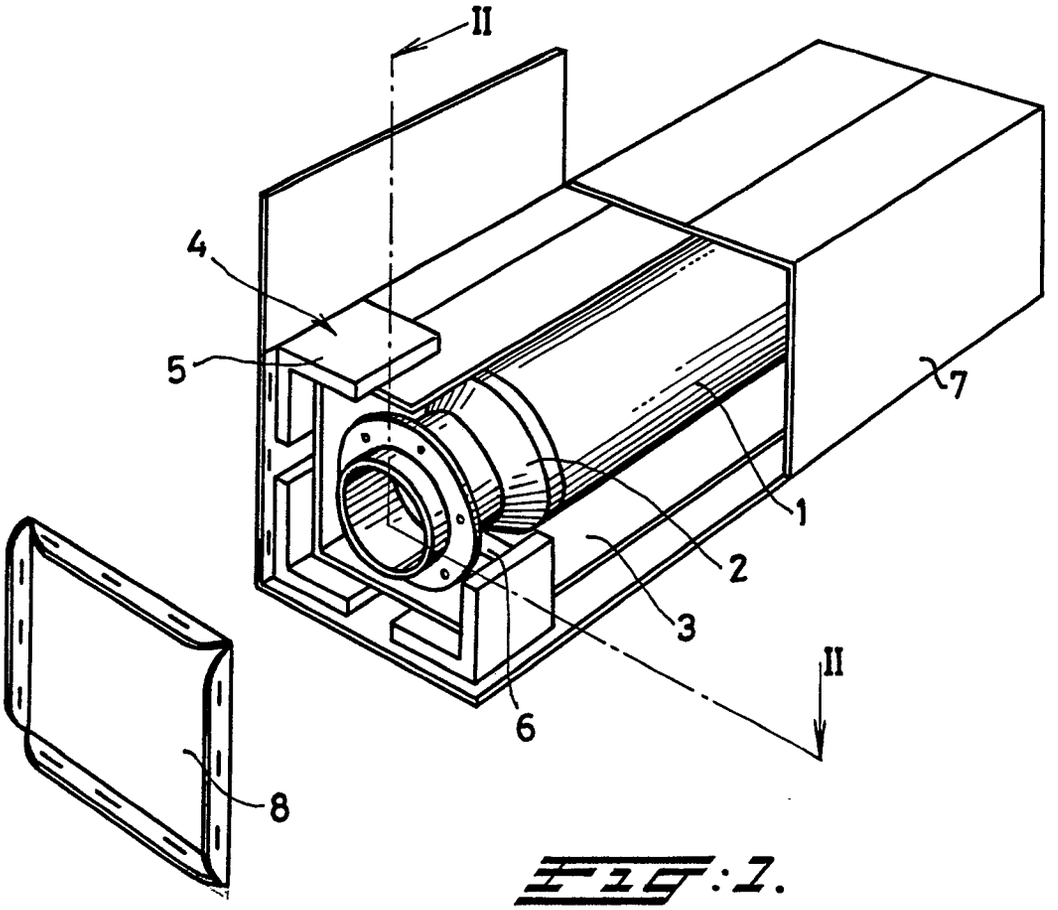

Fig:1.

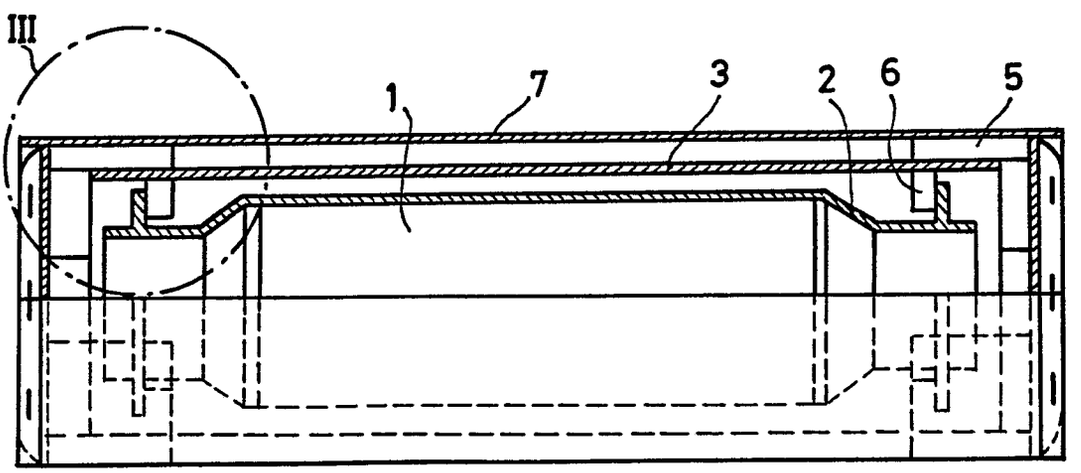

Fig:2.

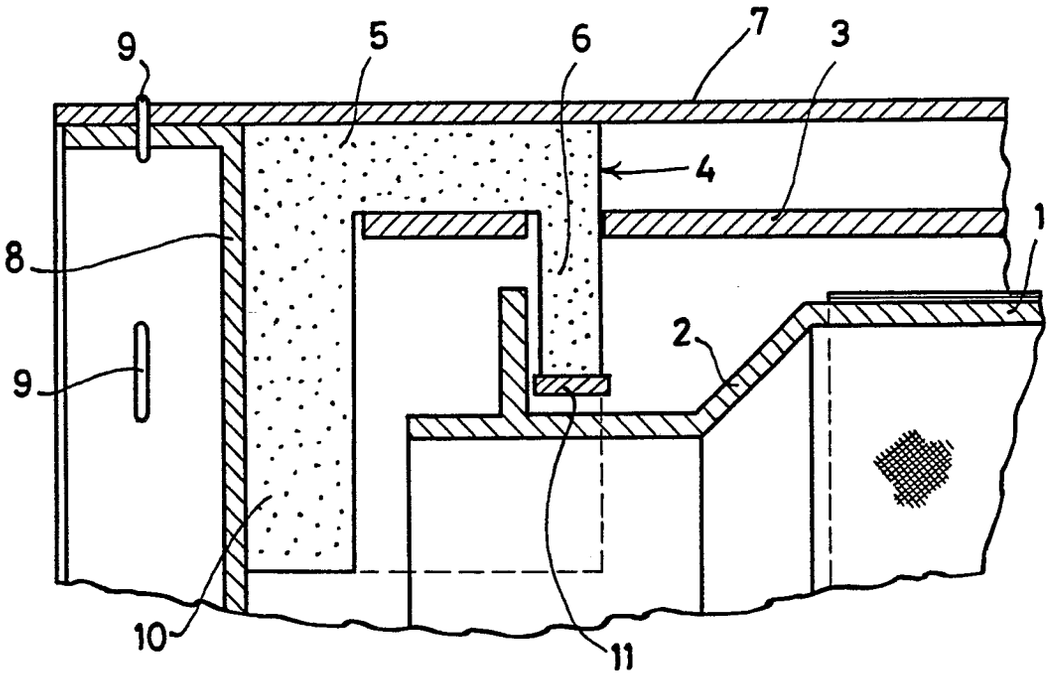

Fig: 3.

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EUROPEAN SEARCH REPORT

Application Number

EP 89 20 3025

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)
A	FR-A-1 232 806 (ENGLISH ELECTRIC)		B 65 D 85/00 B 65 D 81/04
A	FR-A-1 358 614 (DROPSY)		
A	US-A-2 639 807 (AMBRETTE)		
A	US-A-3 695 421 (WOOD)		

TECHNICAL FIELDS SEARCHED (Int. Cl.5)

B 65 D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	14-02-1990	MARTIN A.G.M.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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