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(54) **Pack for a fragile cylindrical object.**

(57) Pack for a metal sleeve (3) of low wall thickness and low rigidity in the peripheral direction and open at both ends, in which a conical element (4) with a base circle which has a greater diameter than the sleeve (3) to be packed is inserted into each of the

open ends of the sleeve (3), such that the sleeve (3) rests only with its end edges against the conical surface (5) of the relative elements (4), and in which said two elements (4) are supported and fixed firmly in a box (1).

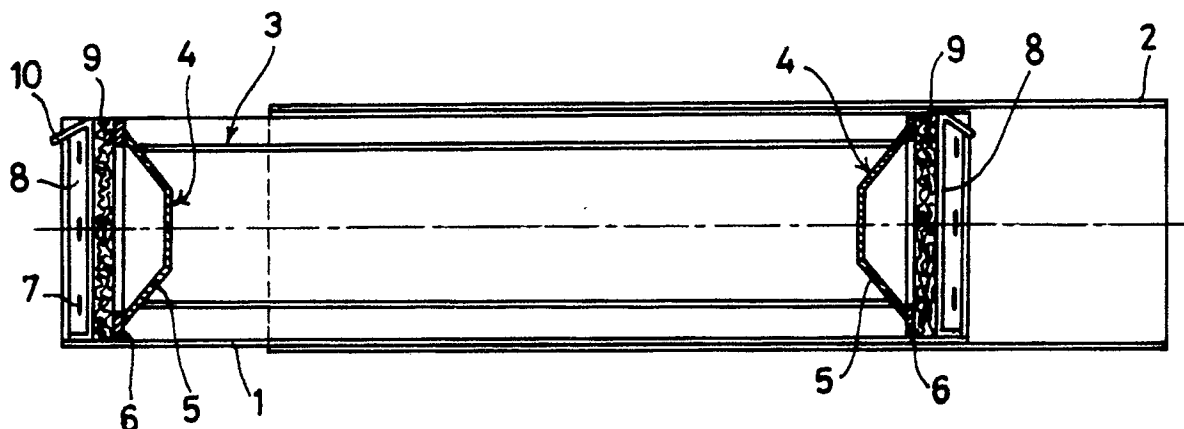


FIG. 2a.

EP 0 410 529 A1

PACK FOR A FRAGILE CYLINDRICAL OBJECT.

The present invention relates to a pack for a fragile cylindrical object, as described in the preamble of claim 1.

The object of the invention is to provide a pack which protects the object to be packed against damage during transport and storage.

A further object of the invention is to provide a pack in which the object can be replaced and stored again in the original position after use.

These objects are achieved according to the invention by means of the measures described in the characterizing clause of claim 1.

The sleeve to be packed is thus supported only by the two end edges and is therefore fixed in a free-hanging manner without further contact with packing materials.

Advantageous embodiments are described in the sub-claims.

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

Fig. 1 is a perspective view of the pack according to the invention;

Fig. 2a is a cross-section of the pack of Fig. 1 along the line IIa-IIa;

Fig. 2b is a cross-section of a modification of the embodiment shown in Fig. 2a;

Fig. 3 is a cross-section of an alternative embodiment of the pack, in which a number of sleeves are placed in a single box;

Fig. 4a shows a view of a unit made up of a number of conical elements;

Fig. 4b is a cross-section along the line IVb-IVb of Fig. 4a.

Figs. 1 and 2 show an embodiment of the pack with a rectangular, oblong box 1 which is open at one of the long sides, and which can be slid inside a correspondingly shaped, rectangular outer box 2 which is open at both ends. A cylindrical metal sleeve 3 of small wall thickness which is to be packed is placed inside the open box 1. Wall thickness variations which can be expected per type of sleeve lie between 0.05 and 0.60 mm, preferably between 0.1 and 0.125 mm. Such a seamless cylindrical sleeve is intended for sliding over a special roller core by means of compressed air or any other means.

The sleeve is supported in the box and fixed by means of two conical elements 4 inserted into the open ends of the sleeve. These elements are composed of a part 5 in the form of a truncated cone with a base circle which has a greater diameter than the sleeve 3 to be packed. A flat edge 6 abuts the base circle of the part 5, which edge lies at right angles to the axis of the cone and has an outer periphery which is adapted to the internal

dimensions of the box 3 and is provided with bearing faces so that the conical element 4 is supported firmly in the open box 3.

As can be seen clearly from the drawing, the open box 1 is made of a flat blank which forms the two opposite long sides and the bottom of the box. End walls 8 which complete the open box 2 are fixed by means of rivets 7. A layer 9 of shock-absorbing material, such as, for example, polyethylene foam, is placed between the end walls 8 and the conical elements 4.

Figure 2b shows in detail the corner design with the layer 9 and, resting against it, the flat edge 6 with the bearing faces 6a. This figure also shows how a protective sleeve 3b can be placed around the end edge 3a of the sleeve 3.

In the embodiment shown in Figs. 1 and 2 the open box is designed as a drawer which can slide into and out of the outer box 2. The outer box 2 is made so rigid here that a number of these packs can be stacked on top of each other for storage purposes and a desired open box can be slid out of this stack, while the outer belonging to it is left behind in the stack. This design has the advantage that no shelves or storage racks are needed for storing these packs ready for use. In order to facilitate the sliding in and out of the open boxes 1, each end wall 8 is provided with a lip 10, adjacent to which there are two holes 11 through which split pins 12 can be inserted when the open box 1 is in the pushed-in position, in order to permit fixing of the open box 1 in the pushed-in position to the outer which at 11 has corresponding perforations.

Fig. 3 shows a variant of the pack according to Figs. 1 and 2, which pack is intended in particular for packing a number of sleeves 3 in a box. The box or crate 13 can be of any suitable type and material, as long as it provides adequate strength to prevent damage to the sleeves to be packed during transportation. This means that, due to the fact that the latter are supported and fixed in the above-mentioned manner by means of the conical elements and shock-absorbing material, a number of conical elements 14 are provided abutting each other against two opposite sides of the box 13. Each of these elements 14 comprises a conical part 15 which is intended for insertion into the open end of a sleeve 3 to be packed, said part 15 being connected to a foam plastic part 16. The conical elements 14 thus take up the two opposite walls of the box 13, while every two opposite conical elements enclose a sleeve 3 between them.

It is also possible to use polyconical elements. In the case of a polyconical element the base circles of each hollow truncated cone part form part

of a greater face at right angles to the axis of the cones, a face whose ends again form the edges with bearing faces which have external dimensions adapted to the cross-section of the box.

It will be clear that the present invention is not limited to the embodiments described above and illustrated. In the embodiments according to Figures 1 and 2 the conical elements 4 are fixed, while the layer 9 of shock-absorbing material is placed loosely between the end wall 8 and the element 4. It is, however, also possible to provide the edge face 6 with a shock-absorbing layer which can then be connected in a fixed manner to the element 4.

An important aspect of the method of packing using conical elements must not be left unmentioned: in particular one specific embodiment can, through its dimensioning, fix a range of metal sleeve diameters in the packing situation. When the internal sleeve diameter exceeds the diameter of the base circle, fixing is no longer possible and then conical elements of a different size must be used for the envisaged purpose. The solution to this problem lies in the creation of a number of different embodiments - as regards size - of the conical elements, which covers a whole delivery programme of metal sleeves.

Figures 4a and 4b illustrate this embodiment schematically. The conical elements in this embodiment are arranged in three rows, the elements 30 with base circle d1 in the row 30a, the elements 31 with base circle d2 in the row 31a, and the elements 32 with base circle d3 in the row 32a. The elements are formed, for example by extrusion or deep drawing, from a single base sheet 33 whose flanged end edges 34 engage around the carrier block 35 of shock-absorbing material.

Claims

1. Pack for a fragile cylindrical object, in particular a metal sleeve (3) of low wall thickness and low rigidity in the peripheral direction which is open at both ends, comprising a rectangular, closable box (1), **characterized in that** a conical element (4) with a base circle which has a greater diameter than the sleeve (3) to be packed is inserted into each of the open ends of the sleeve (3), in such a way that the sleeve (3) rests only with its end edges against the conical surface (5) of the relative elements (4), said two elements (4) being supported and fixed firmly in the box (1).

2. Pack according to Claim 1, **characterized in that** each conical element (4) comprises a hollow part (5) formed like a truncated cone, with a base circle which is abutted by a flat edge (6) lying at right angles to the axis of the truncated cone (5)

and having an outer periphery which is provided with bearing faces (6a) and is adapted to the cross-section of the box (1).

3. Pack according to Claim 2, **characterized in that** each conical element (4) is fixed inside the box (1) and supported by a shock-absorbing, resilient material (9), in particular polyethylene foam.

4. Pack according to Claim 2, **characterized in that** a number of conical elements (14) are provided along each of two opposite side walls of the box (13), the edge parts of the adjacent elements abutting each other and lying flush, and a layer of shock-absorbing material (16) being provided between the particular side wall of the box (1) and the elements.

5. Pack according to Claim 4, **characterized in that** the base circles of the conical elements (30,31,32) are adapted to the differing diameters of a range of sleeves.

6. Pack according to any of the preceding Claims 1 - 3, **characterized in that** the open box (1) is designed as a drawer which can be slid inside an outer box (2) which is open on either side, said outer box being made so sturdy that a number of these packs can be stacked on top of one another, the stacked outers (2) forming a stable unit where the open boxes (1) can be slid in and out.

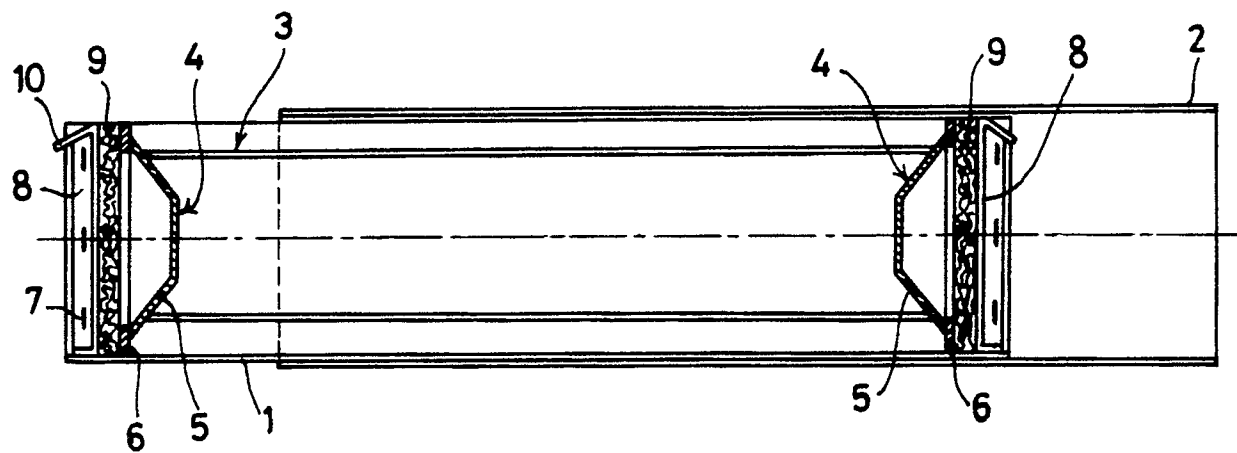
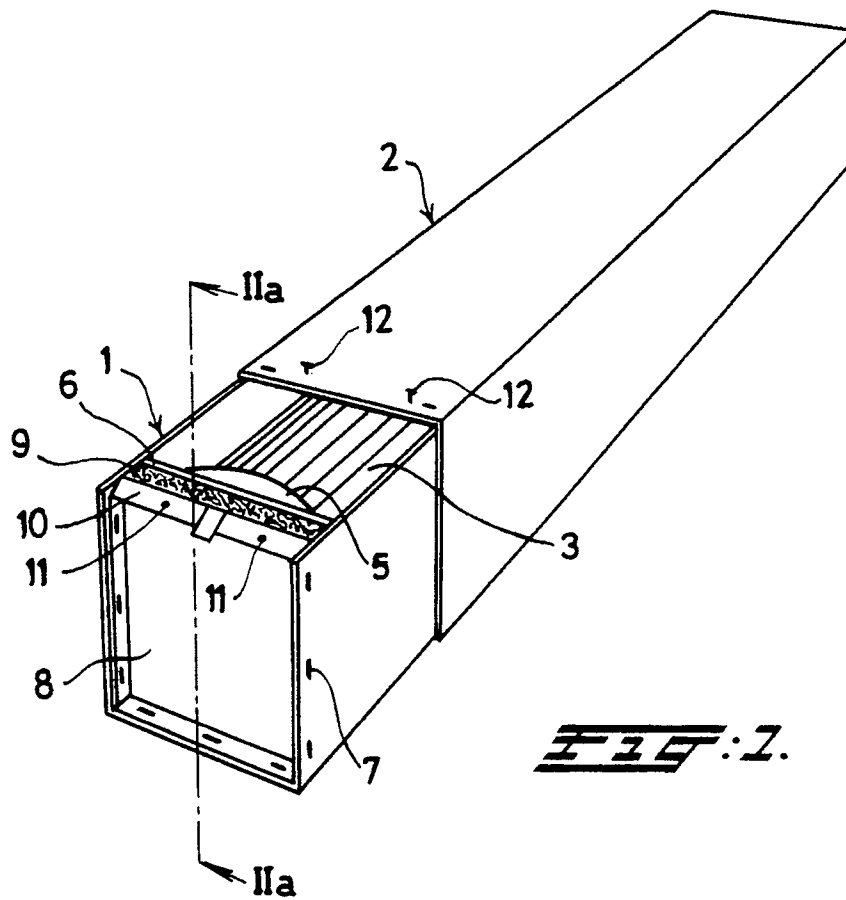


FIG. 2a.

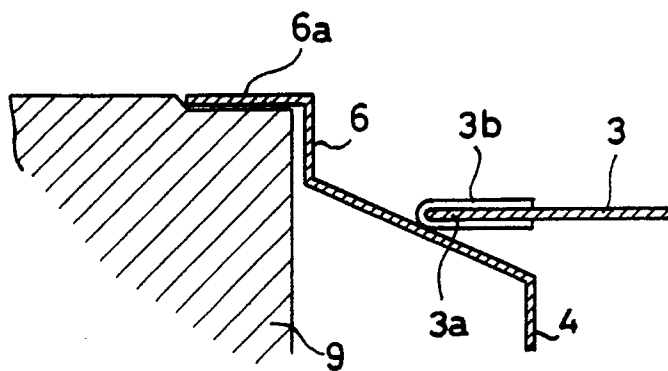


FIG. 2b.

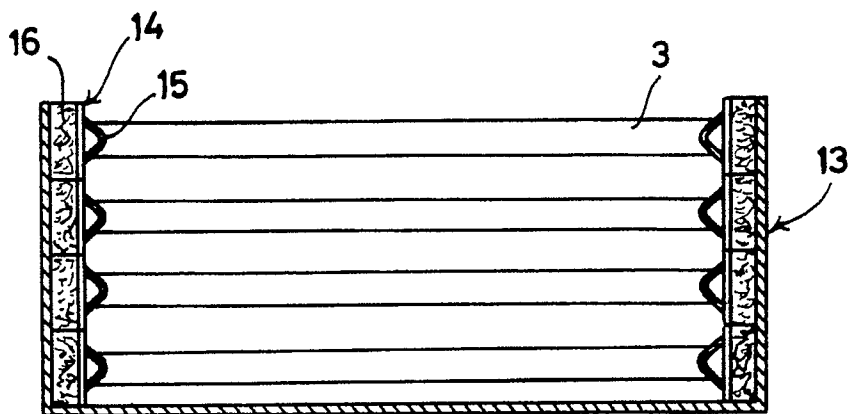


FIG. 3.

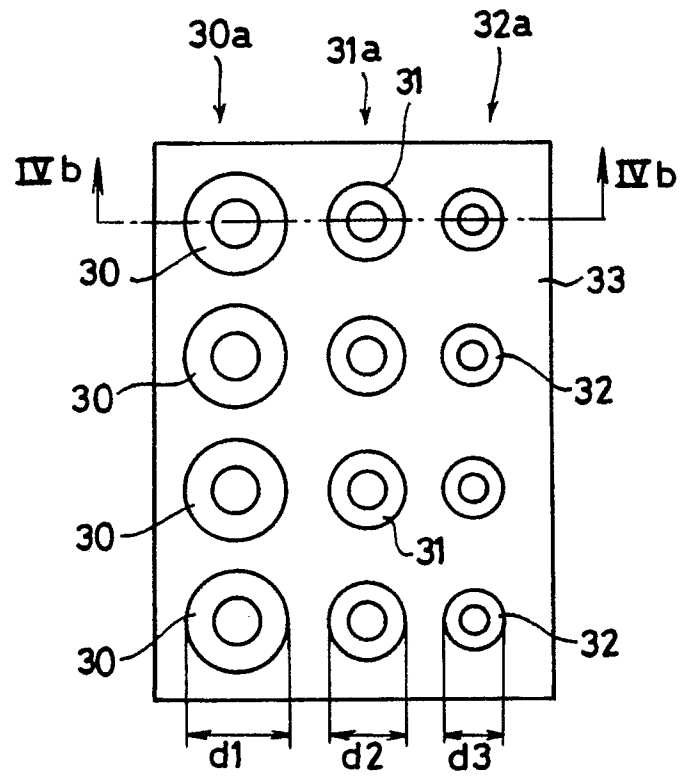


FIG. 4a.

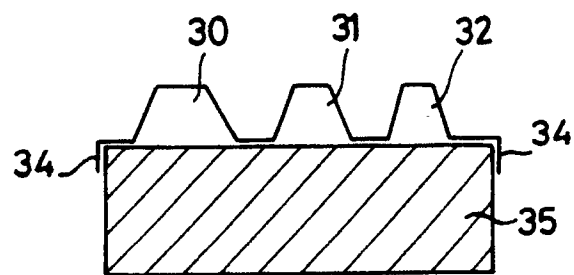


FIG. 4b.



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EUROPEAN SEARCH REPORT

Application Number

EP 90 20 2000

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-1 199 440 (SHELLY) * Page 3, column 2, paragraphs 4,5; page 4, column 2, paragraphs 1,3; figures 1,4,7 * ---	1,6	B 65 D 85/08
A	GB-A- 424 201 (ARMSTRONG CORK CO.) * Page 2, lines 45-65; figure 1 * ---	1-3	
A	DE-C-2 435 672 (CIBA-GEIGY) * Claim 1; figures 1-4 * ---	1,2,4	
A	FR-A-1 251 487 (COURT) * Page 1, column 2, paragraphs 3,4,5; figures 1,2 * ---	1,2,4,5	
A	FR-A-2 136 530 (COLGATE-PALMOLIVE) * Page 2, line 25 - page 3, line 11; figures 1-3 * -----	1,2,4	
			TECHNICAL FIELDS SEARCHED (Int. Cl. 5)
			B 65 D
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 08-10-1990	Examiner VANTOMME M.A.
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