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(54) Valve bag closure.

(57) Method for closing a valve bag (1) with a tubular filler valve (2) extension (4) inside the bag, which extension (4) at least on part of its length is unsupported by the bag. In order to provide a positive closure preventing leakage during handling of the bag which makes unauthorised access to the contents of the bag difficult and which does not require additional materials to be applied, a sharp fold is made in the extension (4) of the valve after the valve has been folded flat, the fold being at least 90°. Apparatus for carrying out the method comprises spreading means (3) for insertion in the valve, a blunt plate (6), which is moved downwards against the bag passing close to the end of the spreading means, and pushing means (9) for shifting the contents of the bag towards the filler valve (4).

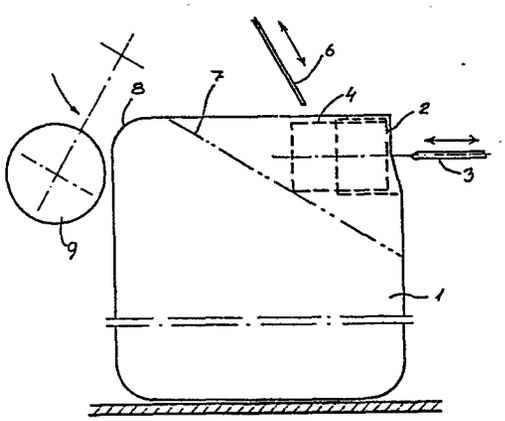

Fig. 1a

VALVE BAG CLOSURE

The invention relates to a method of and apparatus for closing a so-called valve bag which is a bag such as used for cement or fertilizer, having a filler valve through which the product is introduced into the bag. Often the valve has a tubular extension within the bag, which extension is at least on part of its length unsupported by the bag.

Normally, it is supposed that the valve on a valve bag will automatically provide a satisfactory closure after retraction of the filling spout. In most cases the valve will be pressed flat by the handling of the bag, whereby a pressure inside the bag will not be able to make an opening through thevalve through which the contents of the bag may leak out. Automatic closure of the valve does not provide security against unauthorised access later to the contents of the bag, and, therefore, various solutions for improving the closure of the valve have been suggested. For example, it has been proposed to apply glue to the inside of the valve after extraction of the filling spout in order to provide a positive closure when the valve is folded flat under pressure.

This method firstly implies a comsumption of glue, secondly it uses an apparatus for keeping the glue ready for use and for applying a predetermined amount of glue inside the valve.

One object of the present invention is to enable the valve to be positively closed without the need to apply glue, and to afford better security against unauthorised access.

According to the present invention we propose a method for closing a valve bag having a tubular filler valve extension inside the bag, which extension is at least on part of its length unsupported by the bag, characterised in that after folding the extension flat a sharp transverse fold of preferably 90° or more is formed therein.

The sharp fold formed in the extension of the valve prevents opening of the valve, and normally the contents of the bag will obstruct straightening out of the extension valve without any damage to the material from which the valve extension is made. The invention provides increased security both against leakage during normal handling and against unauthorised access to the contents of the bag. No glue or other special materials are required, consequently economical in use

Folding of the extension is achieved by a comparatively simple means inserted into the valve and otherwise by handling the bag from the outside, the contents of the bag being used for completing and securing the folding of the valve.

Apparatus for putting the method of the invention into effect comprises, spreading means movable into the open valve, to a depth which is less than the distance to

the end of the extension, the spreading means being substantially planar and spreadable to a width which corresponds to half of the perimeter of the valve, a folding member which is movable to pass close to the end of the spreading means, and pushing means operable to push contents of the bag toward the valve.

Other features of the invention are set forth in the appendant claims.

Embodiments of the invention will now be described by way of example with reference to the accompanying drawings, in which:

Figures 1 to 6 illustrate different steps of the method according to the invention; and

Figure 7 shows an embodiment of the spreading means for the filler valve.

Figure 1 shows a valve bag 1 after filling with, for example, a powder and after extraction of the filling spout. In practice, the bag 1 is pushed away from the filling spout and moved to one side, leaving the space in front of the filling spout free for filling another bag. The filled bag stands upright on a support possibly having means (not shown) to prevent the bag from tipping over. After filling, the valve 2 (Figure 1B) is open having an approximately circular cross-section and affording access for the insertion of spreading means 3 (Figure 1C) comprising two parallel, closely spaced fingers 3a, 3b. The valve 2 has a tubular extension 4 in order to improve the closing

effect, which extension is on part of its length extending into the interior of the bag unsupported. The extension may in some cases be made from a plastics foil, but normally it is made from the same paper material as the bag. The spreading means 3 is inserted into the valve 2, but not to such an extent that it reaches the free end of the extension. The spreading means is inserted into the valve as illustrated in Figure 2 which is a plan view of the bag 1. Then, the two fingers are moved apart in order to flatten the valve preferably along the original folds from the storage of the empty bag. The spreading means 3 shown in Figure 3 holding the valve 2 flat, an end edge 5 transversely oriented with respect to the axis of the valve 2 near the point at which the valve is connected with the bag and the part 4 which unsupported extends into the bag.

In order to provide a sharp fold in the extension 4 of the valve 2 a blunt platge 6 is moved downwardly passing close to the outer edge of the spreading means so that the bag 1 is deformed, and, at the same time, the extension 4 is folded downwards at an angle of approximately 90°. Since the bag is not completely filled with material, but only to a level 7, sloping down from the upper corner 8 opposite the filling valve 2 to a lower position at the opposite side of the bag. This sloping of the top surface of the material in the bag allows the folding of the valve extension to take place as illustrated in Figure 4. In

order to prevent the valve extension straightening after retraction of the spreading means the material in the bag is pushed forward as illustrated in Figure 5 in the direction of the valve by pushing means 9 having a curved surface which contacts the bag some distance below the upper corner 8 opposite the filling valve 2. Thereafter, the spreading means 3, the plate 6, and the pushing means 9 are retracted to their initial positions and the bag 1 is closed and ready for being moved. In addition, the bag may be tilted on its side in order to shift the contents towards the folded valve, so further compressing the folds therein to improve sealing of the bag.

Figure 7 shows another embodiment of the spreading means having two fingers 14 and 15 which are pivoted in a scissor-like arrangement on a spindle 16. Each of the fingers has a rearwardly directed arm 17 and 18, which arms are connected to a pneumatic cylinder 20 by connecting rods 19. When the pneumatic cylinder 20 is activated, the arms 17, 18 are urged apart, the fingers being thereby spread to a position indicated at 14' and 15'. The ends of the fingers are shaped at 21 so as, when spread to present parallel side edges and a squarefront edge. In a closed position the fingers together define a pointed end 22 facilitating the insertion of the spreading means into the filler valve 2.

The spreading means are initially inserted into the filling valve preferably at a level corresponding to

the longitudinal axis of the valve, but during the spreading it may be advantageous to lower the spreading means by an amount corresponding to the radius of the filling valve to ensure that the valve and especially its extension is planar and does not interfere with the sides of the bag.

The apparatus shown in Figure 1 comprises asupport on which the filled bag is carried and the spreading means 3 are arranged to be movable at a level corresponding to the height of the filling valve above the bottom of the upright bag. The plate 6 is shown mounted for displacement up and down at an angle of 90 - 140° to the spreading means. Alternatively, the plate 6 may be mounted on a pivoting arm to swing downwards and partly under the spreading means, which movement may under certain conditions provide an improved folding effect. The shape of the sides of the bag after the filling is such that the bag may flex and thus will not be damaged by the stretching caused by the forcing down of the plate 6. The sides of the bag are spread apart by the material and do not interfere with the folding of the extension of the valve.

Any suitable design of pushing means 9 may be used provided the shape of the face that contacts the bag is such that the bag is not damaged. It is, therefore, preferred that the pushing means comprises a rounded body, such as a roller, or a plate, which is so large that the edges do not touch the bag, the plate or the body being slidable or pivotable behind or above the bag 1.

CLAIMS:

1. A method for closing a valve bag (1) having a tubular filler valve (2) extension (4) inside the bag, which extension is at least on part of its length unsupported by the bag, characterised in that after folding the extension flat, a sharp transverse fold of preferably 90° of more is formed therein.

2. A method according to claim 1, comprising inserting into the open valve after the filling of the bag, to a distance less than the distance to the end of the extension substantially planar spreading means, spreading the said means to a width corresponding substantially to half of the perimeter of the valve (1), moving a folding member against the bag close to the end of the spreading means so as to fold the extension, and pushing the contents of the bag forwards against the folded extension.

3. Apparatus for closing a valve bag (1) having a tubular filler valve extension (4) extending unsupported into the interior of the bag, by the method according to claim 1 or claim 2, comprising spreading means (3) movable into the open valve to a depth which is less than the distance to the end of the extension (4), the spreading means (3) being substantially planar and spreadable to a width which corresponds to half of the perimeter of the valve (2), a folding member which is movable to pass close to the end of the spreading means (3) and pushing means (9) operable

to push contents of the bag toward the valve (2).

4. Apparatus according to claim 3 wherein the folding member comprises a blunt plate (6) which is movable in a plane at an obtuse angle to the end of the spreading means (3).

5. Apparatus according to claim 3 or claim 4, wherein the spreading means (3) comprises a pair of fingers (14,15) in a scissor-like arrangement, the fingers beingshaped so as in the spread position, to define a substantially rectangular shape.

6. Apparatus according to claim 4, wherein the blunt plate (6) is movable in a plane which forms an angle of 95 - 140° with the spreading means (3).

7. Apparatus according to any one of claims 3 to 6 wherein the pushing means (9) is a cylindrical body pivotably suspended on an arm in such a way that the cylinder hits the bag (1) below the top level (7) of its contents.

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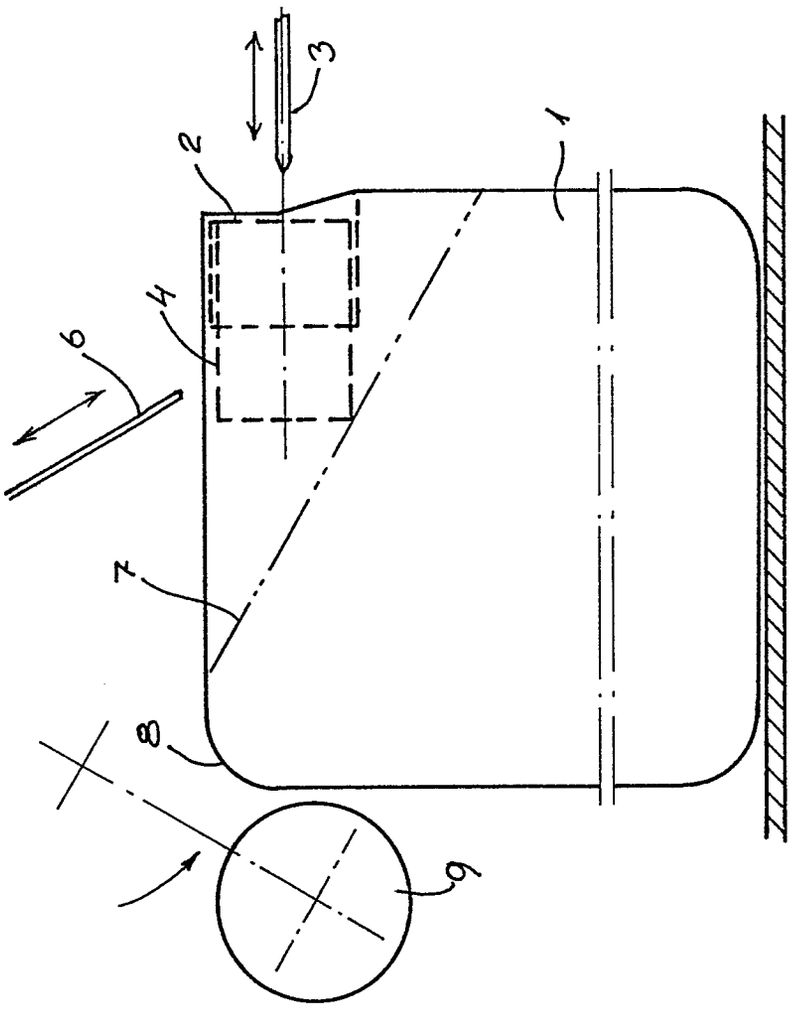

Fig. 1a

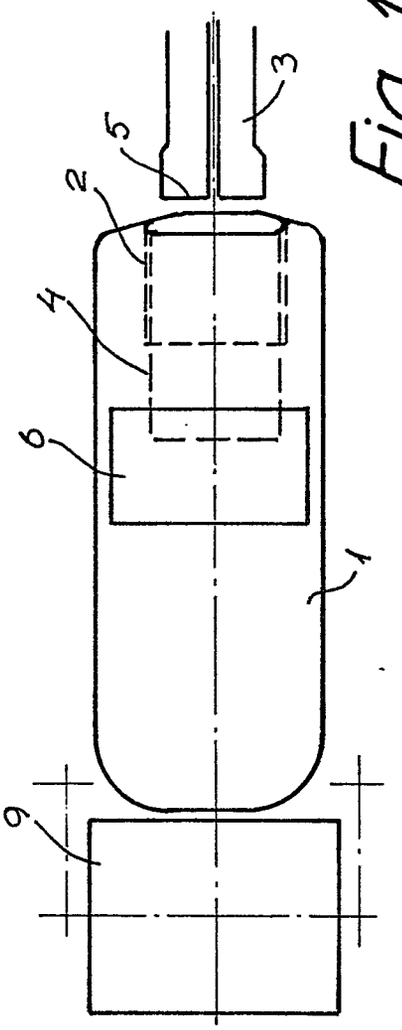

Fig. 1c

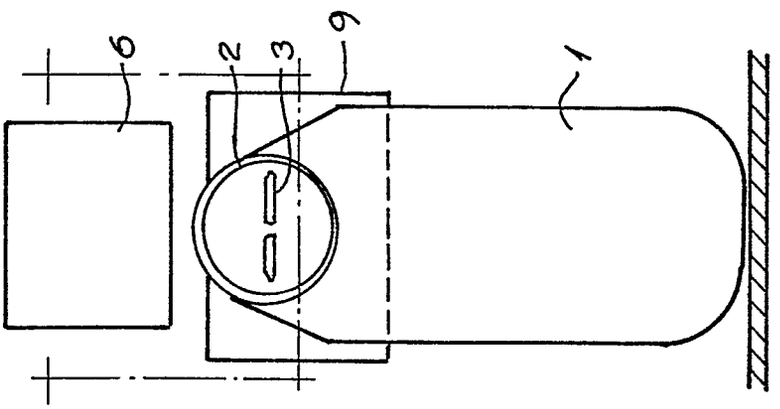

Fig. 1b

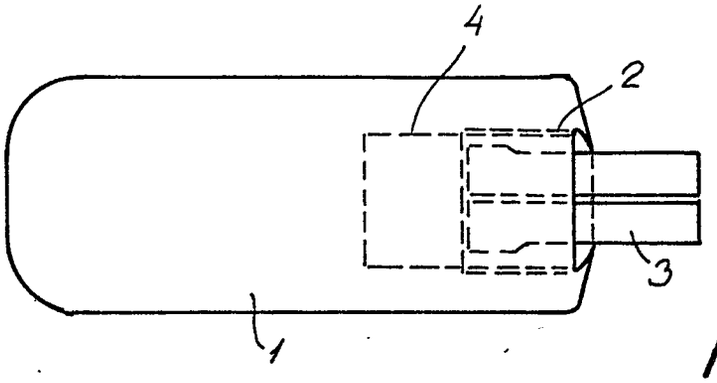

Fig. 2

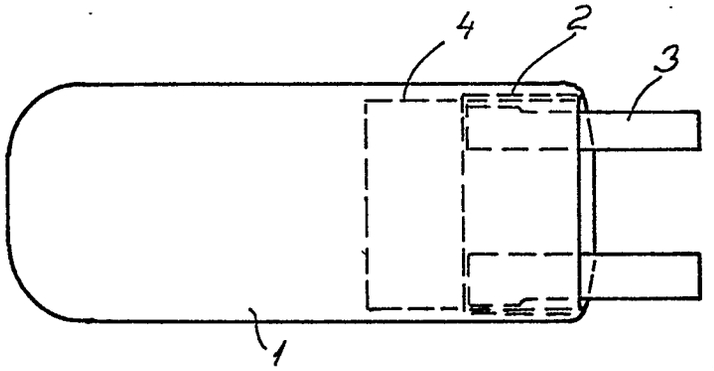

Fig. 3

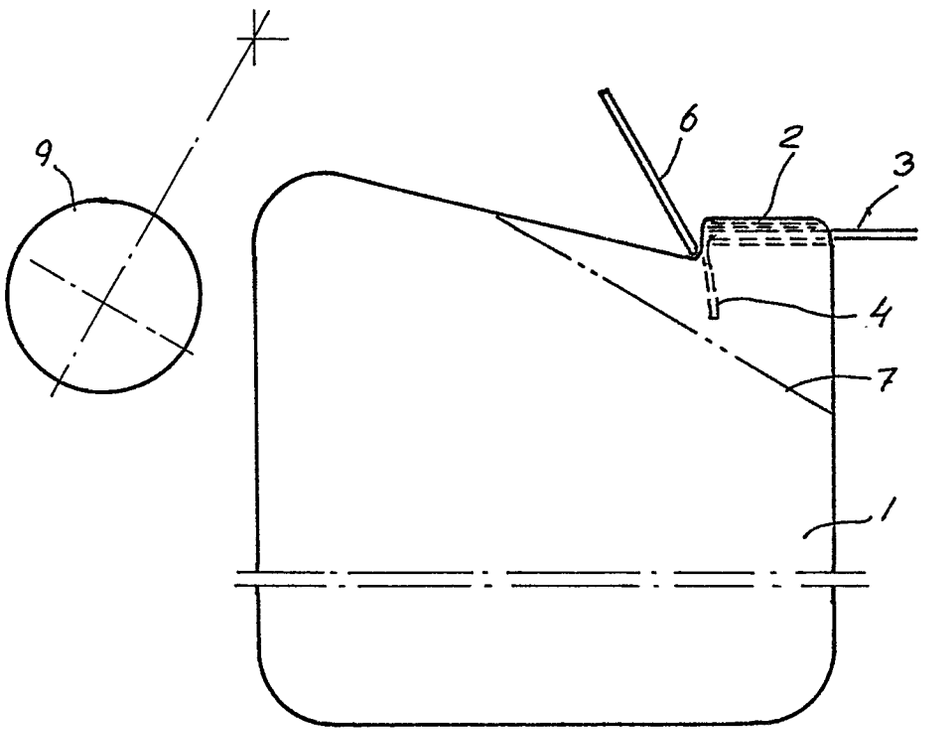

Fig. 4

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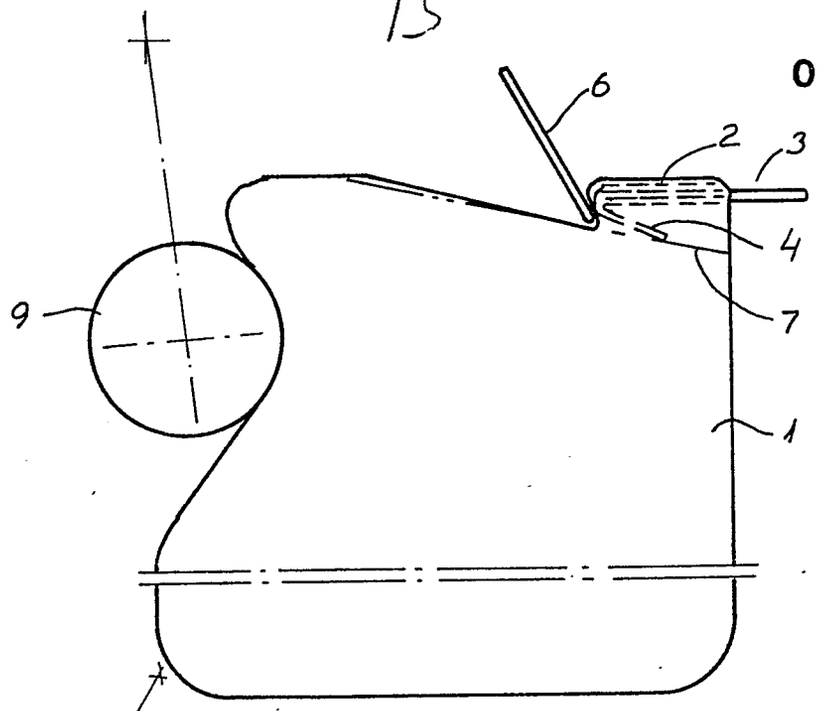

Fig. 5

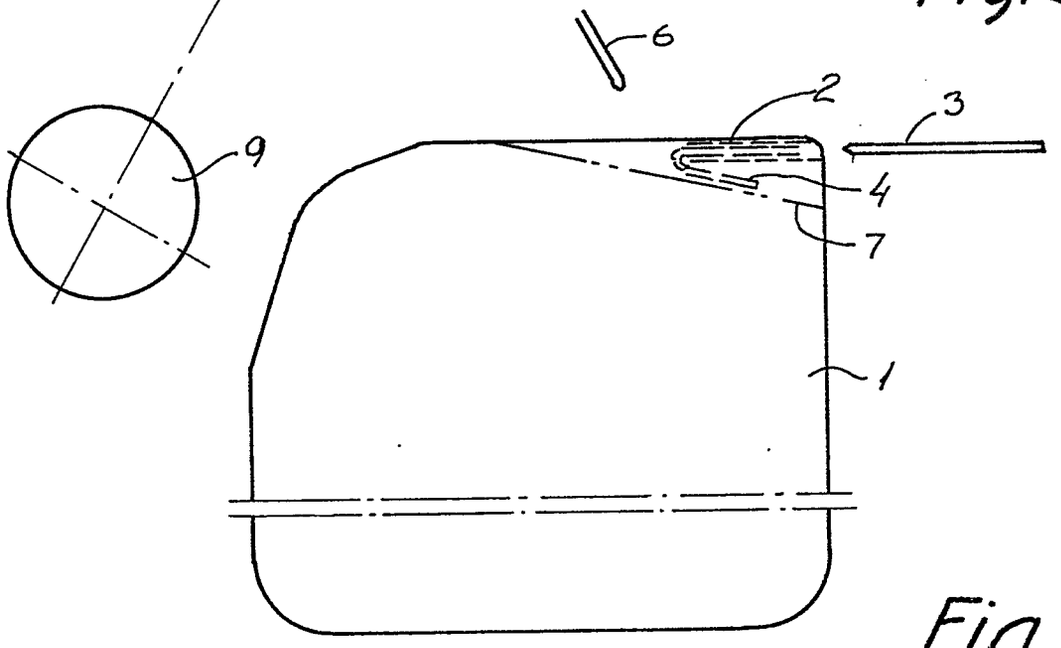

Fig. 6

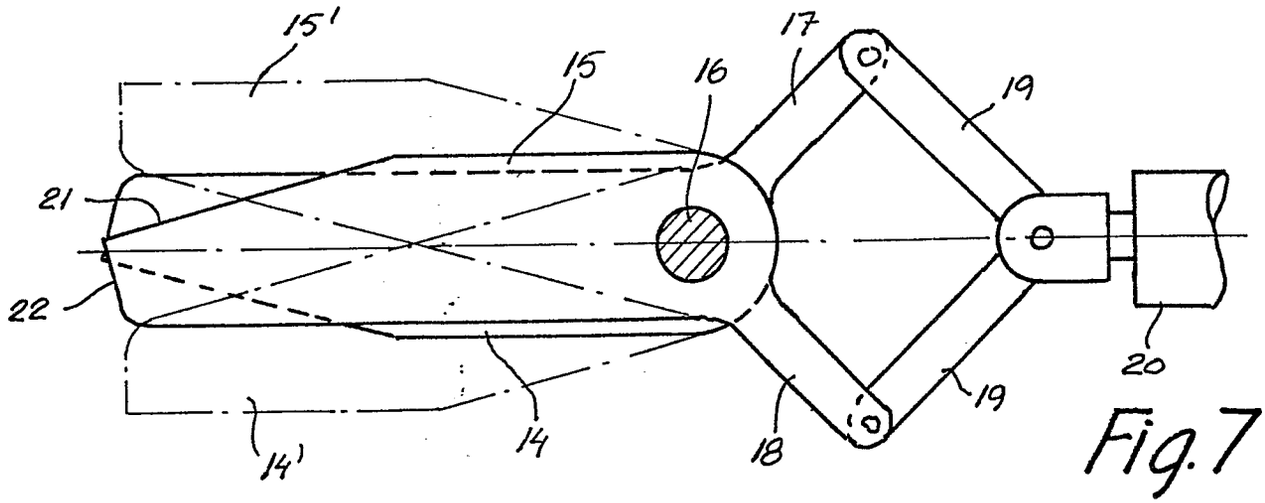

Fig. 7

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EUROPEAN SEARCH REPORT

0160357
Application number

EP 85 30 1192

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.4)
X	US-A-4 391 404 (CHAMPION) * Column 2, line 56 - column 3, line 48; figures 3,4 *	1	B 65 B 51/00 B 65 B 7/02 B 65 D 30/24
A	GB-A-1 449 879 (GILMAN) * Page 3, lines 41-47; page 3, lines 94-102; figures 2,5 *	1	

TECHNICAL FIELDS SEARCHED (Int. Cl.4)

B 65 B
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	04-06-1985	CLAEYS H.C.M.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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