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(12) # EUROPEAN PATENT APPLICATION

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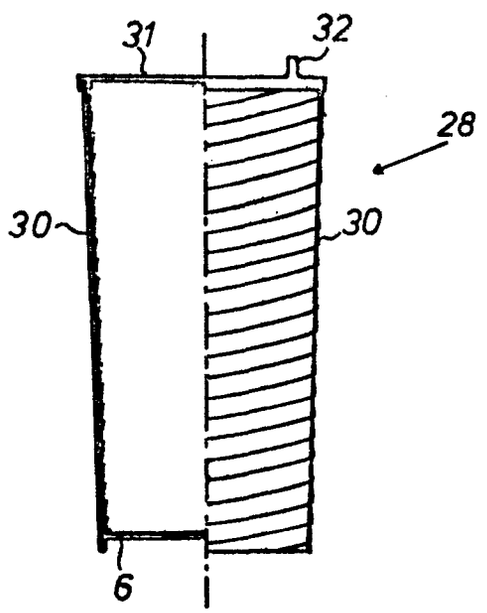
(54) **Container for waste, method and device for manufacturing such a container and cover for such a container.**

(57) A container made mainly from cardboard-containing material for storing and transporting waste, said cardboard-containing material being wound in the form of a strip with partly overlapping turns in order to obtain a conical body provided with a bottom and a cover wherein the cardboard-containing material is a cardboard plasticized with synthetic resin.



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Container for waste, method and device for manufacturing such a container and cover for such a container.

The invention relates to a container made mainly from cardboard containing material for storing and transporting waste, said cardboard containing material being wound in the form of a strip having partly overlapping turns in order to obtain a conical body having a bottom and a cover. The invention furthermore relates to a cover for such a container and to a method and a device for manufacturing such a container.

From Dutch Patent Application 8020245 a device is known for manufacturing conical containers from strip-shaped rejected material, being cardboard, having a width of 40 to 60 mm, said strips being wound and glued to one another. In particular Dutch Patent Application 8020245 is directed to a device for manufacturing conical containers. German Patent Specification 256,937 also discloses a machine for manufacturing packing material from strip-shaped paper by interconnecting the partly overlapping strips by means of an adhesive.

Cardboard containers manufactured in accordance with the Patent Application 8020245 are not suitable for storing and trans-

porting wet waste material because the cardboard becomes soaked and the mechanical strength of the container gets lost. In particular attempts have been made to construct a container for storing, transporting and finally destroying hospital waste material. There is a great need for containers for storing and transporting this kind of waste because there is a tendency to destroy this waste as much as possible at one centre. This means a tendency to destroy the containers together with the waste, particularly to burn it so that the container can be used only once, which means in addition that the container must be cheap. On the other hand, however, the container has to meet given requirements of rigidity and sealing capacity because otherwise the risk of infection is too high.

The waste to be processed is especially concerned with anatomic waste, dead test animals, any infected waste material, chemical waste from laboratories and pharmacies. injection needles, bandages, tampons and other rubbish material resulting from chirurgical operations and domestic rubbish material from hospitals and similar institutes. The above enumeration will show that for these purposes no cardboard container can be used. Cardboard has, however, the advantage that it can be readily burnt together with the waste material and it is a cheap raw material. Tests have shown that cardboard can be made water-tight, but the synthetic resins to be used thereto are often noxious to the environment due to the solvent to be employed. It is also possible to provide the cardboard on the inner side with a bag of a synthetic foil, but it has been found that such bags are readily torn or perforated, particularly, when injection needles and other similar instruments are thrown in such a bag. Moreover, the container or the vessel has to be resistant to moisture on the outer side, which is not the case for the containers disclosed in Patent Application 8020245.

The research made has shown that it is possible to produce a container for the above-mentioned waste material in a comparatively cheap way and the container embodying the invention is characterized in that the cardboard-containing material is a cardboard plasticized with a synthetic resin. It has been found that a large

amount of material used for producing packing material for milk, known by the term of "milk boxboard" is rejected for this purpose because, for example, it is slightly damaged during transport, it has become moist or waste cuttings or the like result from the manufacture of beakers or the like. Moreover a large amount of this material is rejected because of any bacteriological impurity. This rejected "milk boxboard" consists of cellulose provided on both sides with a polyethylene film, which material has a satisfactory resistance to moisture. Destruction of this rejected milk boxboard involved great problems, because it cannot be reused as board material since the cellulose is provided with a synthetic resin layer, as a result of which the material is watertight and not suitable for recycling. Dumping this rejected material is also undesirable, because this material is very slowly disintegrated. Therefore, burning of this material is one of the few satisfactory solutions. Besides milk boxboard a packing material is used in a comparable manner in which an aluminium layer is sandwiched between the cardboard and the synthetic resin layer. This packing material is mainly used in the beverage industry and it supplies a raw material for the container embodying the invention in the same manner as said milk boxboard.

According to the method of the invention this rejected material is cut into strip-shaped material having a width of 5 to 12 cm, after which this mateiral is processed to obtain containers in which the aforesaid wet waste can be collected, stored, transported and destroyed. The method according to the invention for manufacturing a container of the kind set forth is carried out by winding the strip-shaped material on a mandril, the strips overlapping one another partly, said method being characterized in that the strips are firmly connected with one another by heating them.

By heating the strips of plasticized cardboard, i.e. polyethylene in the case of milk boxboard, the synthetic resin, particularly the polyethylene is fused so that the two contacting strips are unreleasably interconnected. In this way the conventional gluing operation for cardboard containers is replaced by a welding process. The resultant advantage is that it is not necessary to use

glue containing mixtures which have subsequently to be burnt during the destruction of the waste so that now smaller amounts of noxious substances are set free. Moreover, the resultant container is more resistant to water and can be made at lower cost. Since it has now been found that a container made by the method according to the invention from plasticized cardboard has such satisfactory properties for storing and transporting wet waste, it will be obvious that the invention is not limited to containers made from strip-shaped milk boxboard, since for this purpose other plasticized kinds of cardboard may be used as well. If a container according to the invention is to be used for storing liquid material or liquid containing mixtures, it is preferred to make the container from double-wound strips so that the inner and outer sides of the container consist of uncut or continuous strips of material. The fluid can thus not moisten the head side of the strip or soften and/or attack it.

The bottom of the container according to the invention is preferably also made from the same material as the body, whereas the cover is an injection moulded product, preferably, of polyethylene.

The invention will be further explained with reference to the accompanying drawing, in which

Fig. 1 is a front view of a device in accordance with the invention at the beginning of the manufacturing method,

Fig. 2 is a plan view of the device embodying the invention in which strip-shaped material is wound,

Fig. 3 shows a container according to the invention,

Fig. 4 shows a detail of the bottom of the container and

Fig. 5 shows a detail of the cover.

Fig. 1 shows by way of example a device suitable for manufacturing the containers according to the invention. For this purpose a conical body or mandril 2 is rotatable around its axis and arranged in a machine part 1 fastened to a frame 4. On the side of the large diameter of the mandril a sliding ring 3 is arranged for removing the container from the device whilst co-operating with the displaceable supporting part 8. On the side of the small diameter of the mandril, said mandril 2 is supported by a disc 7, which urges the

bottom part 6 centrally against the mandril 2. For rotating the mandril 2 the disc 7 is journalled in a supporting part 8 shown schematically, which is movable in the direction of length on the frame 4 in the direction indicated by the arrow 5 so that after being wound up to the desired height the container can be removed from the device shown in Fig. 1. As soon as the container has been wound up to the desired height, the underside and the top side of the container are cut by means of the knives 11 and 12 so that a container of the correct dimensions and with a smooth top side and underside is obtained. At the beginning of the operation the bottom part 6 is first formed by sealing a few layers of milk boxboard to one another so that a cup-shaped model as shown in Fig. 4 is obtained. This bottom 6 is disposed in the device of Fig. 1 on the rotatable disc 7, after which the first path of strip-shaped milk boxboard is placed at the level of the bottom and connected herewith by spraying a hot melk glue to the bottom 6 so that a firm connection is established between the first strip and the bottom. The hot melt serves, in addition, to seal the underside 15 of the bottom so that the various layers of board are satisfactorily interconnected. After the application of the first turn, a heating member 25 as shown in Fig. 2 is used instead of the glue head 10.

The heating member 25 may be a burner by which a flame is held at a given distance from the plasticized board material, which is thus heated so that the synthetic resin melts and a satisfactory adhesion is obtained between the partly overlapping turns. The required temperature depends on the melting point of the synthetic resin to be used on the board material. Because a burner has certain disadvantages with respect to safety, this burner can be replaced by infrared radiators, hot air blowers and the like of a kind known to an expert in this field. The heating member 25 is fastened to a slide 9 shown in figs. 1 and 2 so that the heating member 25 moves synchronously with the supplied strips of board material designated by 22 and 23. Fig. 2 shows two strips 22 and 23, although it is also possible to supply only one strip or more than two strips in accordance with the desired rate of production. By

supplying two or more strips the rate of production is raised. Instead of using two strips the same rate of production could also be obtained by a single strip of twice the thickness, but for aesthetical reasons the off-set of the strips of the container, which is visible on the outer side of the container, should not be too large. An off-set of 1 to 2 cm has been found to be most suitable. Since rejected milk boxboard is usually available in a thickness of 0.5 mm it is advisable to supply simultaneously two or more strips as illustrated in Fig. 2. The mandril 2 is cooled in order to prevent the inner side of the container from becoming sticky and from adhering to the mandril 2. The strips 22 and 23 pass from the supply point not shown in the drawing through a member ensuring a constant tension on the strips to the slide 9, the strips being fastened via the rollers 21 in the part 20, where they are turned through about 90^{o} and set at the desired angle depending on the speed of rotation of the mandril 2, the speed of displacement of the slide 9, the number of strips supplied and the thickness of the material and after being turned they are guided towards the mandril 2 below the heating member 25. Thus a container according to the invention is obtained in which the turns partly overlap one another and the overlapping layers are welded to one another.

The heating member 25 may be a member moving together with the supply of material, for which purpose the width of the heating member and the speed of displacement are variables determinable by one skilled in the art. As an alternative the material can be fed to a totally heated environment, in which case no displaceable heating members are used, the local temperature being automatically controlled in dependence on the place of supply of the material. After the last turn has been disposed and the container has obtained the desired height, the top and bottom edges are cut clean by means of a knife and the container is taken off from the mandril. Then a container as shown in Fig. 3 is obtained, in which the off-set wall 30 is unreleasably connected to the bottom 6. The cover 31 is shwon in detail in Fig. 5.

Because the vessel or container has to be firmly closed

during and after use, a cover is designed of the kind shown in Fig. 5. It has a U-shaped end 29 fitting to the top edge of the outer wall 30 of the container. Owing to the U-shaped profile a satisfactory closure is ensured as long as the container can be filled up so that undesirable odours will not escape from the container. As soon as no further material need be stored in the container, the cover can be struck to the edge of the container so that the extension 35 clamps tight around the rim 33, from which it can only be loosened with the aid of tools. The rim 33 may be made from metal or a synthetic resin. In this way a safe closure of the container with its contents is obtained. The rim 33 may be applied as a sleeve 33 to the top edge of the wall 30 or in the U-profile of the cover 31.

The extension 35 serves to lock the cover around the hook 34. A simpler embodiment of the cover 31 can be obtained by causing the extension 35 to co-operate with a notch in the wall 30 at the level of the extension 35. In order to hold the extension 35 firmly in the notch, a compressible synthetic resin plug is provided in the U-profile 29, said plug being slightly compressed on the top edge of the wall 30 when the cover 31 is disposed on the container and the extension 35 snaps into the notch. In this embodiment the rim 33 can be dispensed with.

Furthermore the cover preferably made from polyethylene is provided with an upwardly extending extension 32, which is arranged on the cover at a place such that a vessel disposed on the cover of the first vessel fits within the dimensions of the extension 32. In this way a safe stack of filled containers is obtained. The containers not yet used and without cover have such a conical shape that they are readily nestable so that within a given space a maximum number of containers can be stored.

It is preferred to make a container of a height of 68 cm and a bottom diameter of 30 cm, the cover having a diameter of 34 cm. For the manufacture thereof it is preferred to use milk boxboard having a thickness of 0.5 mm, whilst the successive strips overlap one another over a distance of 17 mm. With a strip width of

7 cm the wall thickness of the container will then be 70/17 times the thickness of the material, which comes down to a wall thickness of about 2 cm. When two strips are supplied, the thickness will be 1 mm and the overlap 34 mm so that the wall thickness is also about 2 cm.

When the container is being used, it is preferably standing in a frame of a pedal pail construction. By foot pressure the filling opening is set free. The cover will not move up and down, but it will move in a substantially horizontal plane so that air displacement is minimized and the risk of infection of the ambient air is also minimized. The cover can be fastened in this frame by clamping it to the extensions 32.

The figures used in the claims are only meant to explain more clearly the intention of the invention and are not supposed to be any restriction concerning the interpretation of the invention.

CLAIMS

1. A container made mainly from cardboard-containing material for storing and transporting waste, said cardboard-containing material being wound in the form of a strip with partly overlapping turns in order to obtain a conical body provided with a bottom and a cover characterized in that the cardboard-containing material is a cardboard plasticized with synthetic resin.

2. A container as claimed in Claim 1 characterized in that the bottom is also made from plasticized cardboard.

3. A container as claimed in Claims 1 and 2 characterized in that the cardboard-containing material consists of rejected milk boxboard or a similar plasticized cardboard provided with a further layer, for example, of aluminium.

4. A container as claimed in Claims 1 to 3 characterized in that the top edge of the container is provided with a sleeve (33) having a hook (34).

5. A cover for a container as claimed in Claims 1-4 characterized in that it has a U profile (29) at the periphery, fitting across the edge of the container, said U-shaped profile terminating in an extension (35) co-operating in sealing relationship with a hook (34) or with a notch in the wall (30) of the container.

6. A cover as claimed in Claim 5 characterized in that it is provided on the top side with one or more extensions (32), within which the bottom of a second container fits, which can be disposed on the first container.

7. A method of manufacturing a container as claimed in Claim 1 by winding strip-shaped material on a mandril, in which the strips partly overlap one another, characterized in that the strips are stuck to one another by heating the strips.

8. A method as claimed in Claim 7 characterized in that the basic material is formed by strips having a width of 5 to 12 cm and a thickness of 0.5 to 2 mm.

9. A method as claimed in Claims 7 and 8 characterized in that a first turn is firmly fastened to the upwardly extending rim of the bottom, after which the next turn, whilst being heated, is connected with the first turn.

10. A method as claimed in Claim 9 characterized in that the first turn is fastened with the aid of a "hot melt" composition to the upwardly extending rim of the bottom.

11. A method as claimed in Claims 7 to 10 characterized in that two or more strips are supplied to obtain a higher rate of production and/or in that double-wound strips are used.

12. A device for the manufacture of containers as claimed in Claim 1 comprising a rotatable mandril with supply of strip-shaped basic material characterized in that a heating member is arranged near the mandril at the place of supply of the strip-shaped material.

13. A device as claimed in Claim 12 characterized in that the heating member is displaceable in accordance with the supply of material.

14. A device as claimed in Claims 12 and 13 characterized in that the mandril is provided with cooling members.

15. A device as claimed in Claims 12 to 14 characterized in that one or more knives are arranged at the ends of the mandril to cut off the wound container.

16. A device as claimed in Claims 12 to 15 characterized in that the feeder of material is provided with guide members so that two or more strips can be simultaneously supplied.

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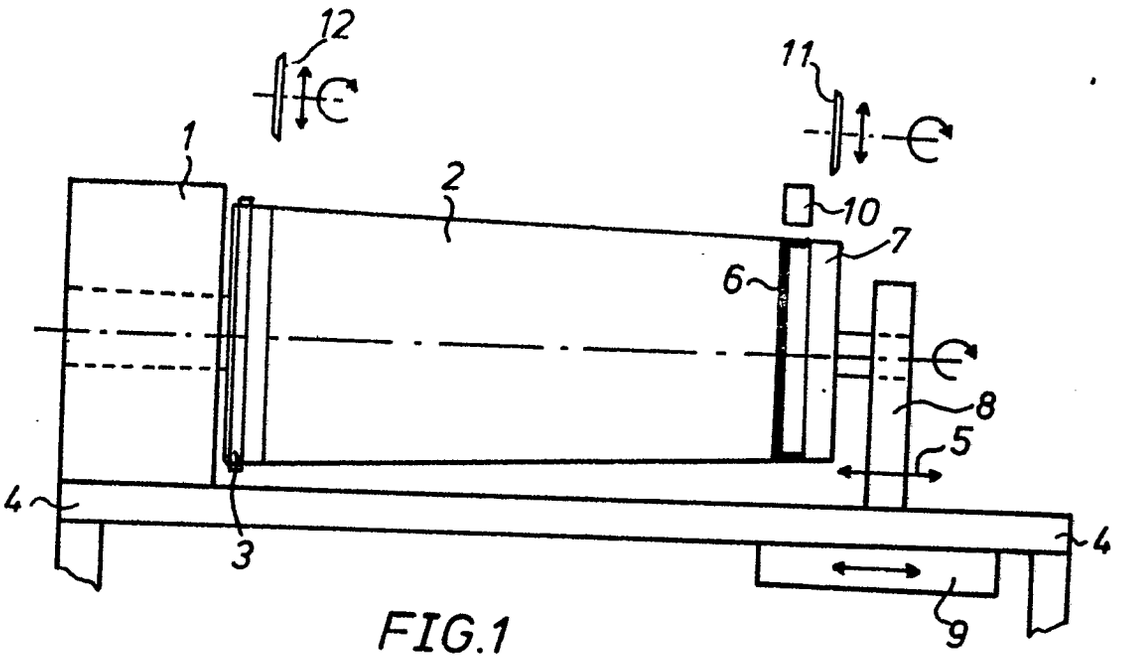

FIG.1

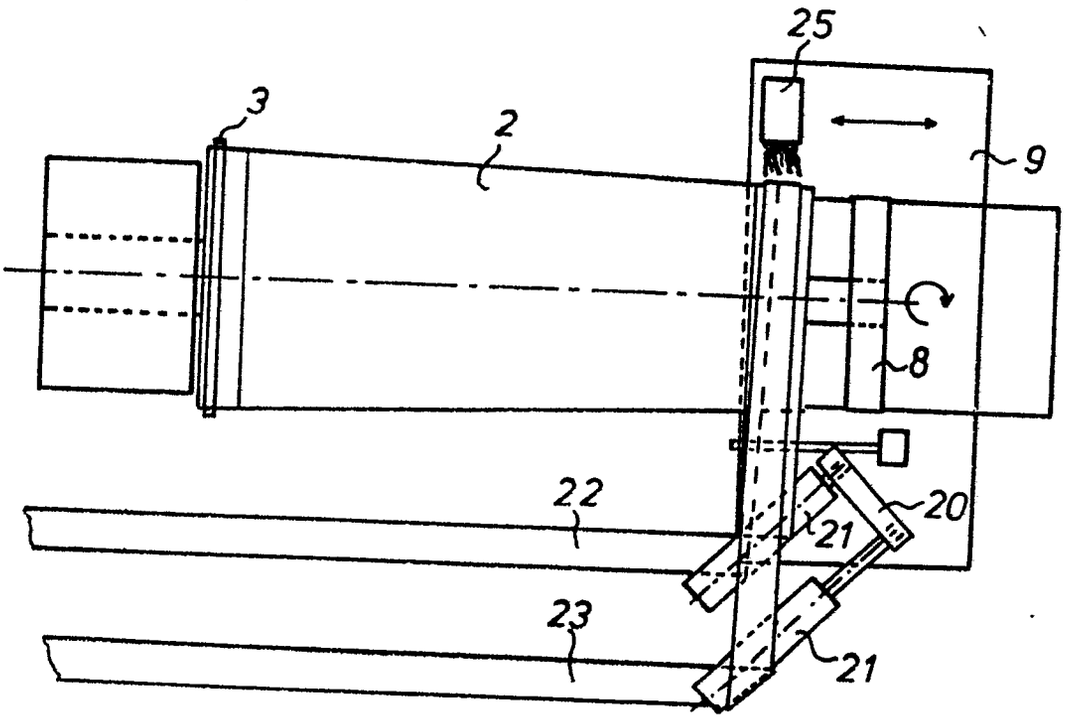

FIG.2

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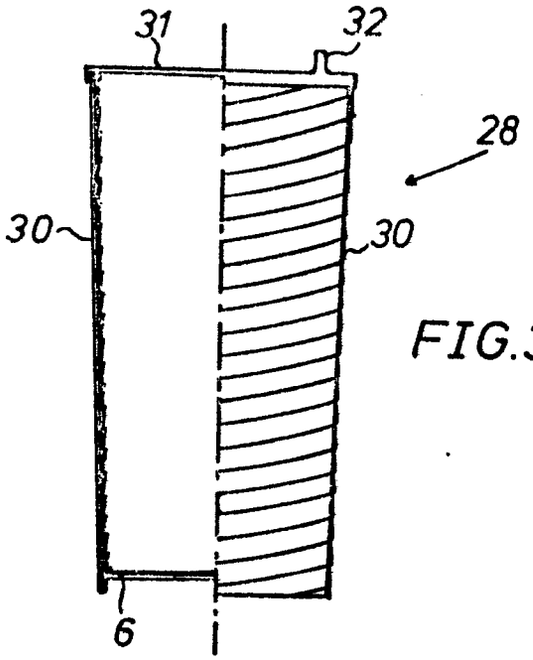

FIG.3

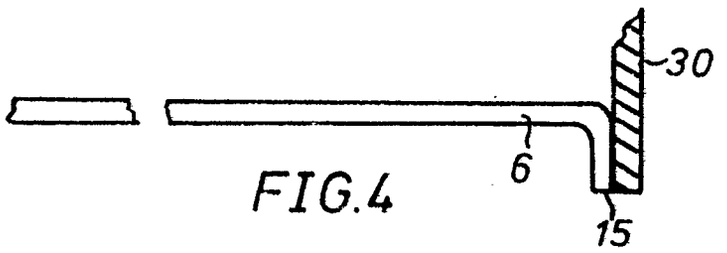

FIG.4

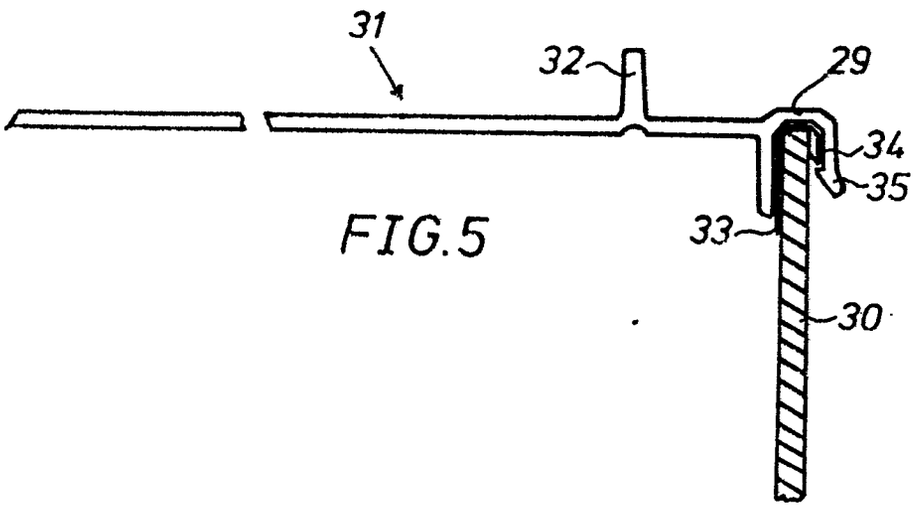

FIG.5

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EUROPEAN SEARCH REPORT

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Application number

EP 83 20 1718

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. ³)
Y,D	WO-A-8 100 081 (FAGERBERG) * Page 1; page 2, paragraph 1 *	1,2,4-7,11,12,15,16	B 65 D 3/06
Y	US-A-3 428 239 (T.M. WANNAMAKER et al.) * Column 3, line 35 - column 4, line 19; column 4, line 74 - column 5, line 39; column 5, lines 42-59; column 6, line 28-47; figures 1-8 *	1,2,4-7,11,12,15,16	
Y	GB-A-2 059 400 (METALBOY) * Page 1, lines 77-124; figure 2 *	4	TECHNICAL FIELDS SEARCHED (Int. Cl. ³)
Y	NL-A-7 806 030 (LINGNER) * Page 7, line 24 - page 8, line 25; figures 4-7 *	5,6	B 65 D B 31 C
A	FR-A-1 439 043 (SONOCO) * Page 2, right-hand column, line 16 - page 3, right-hand column, paragraph 3; figures *	1,7,11,12,14,16	

-/-

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	15-03-1984	MARTENS L.G.R.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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D : document cited in the application
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EUROPEAN SEARCH REPORT

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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. ³)
A	US-A-2 255 444 (BLANCHARD) * Whole document *	9	
A	US-A-3 215 325 (SHAPPELL) * Whole document *	10	
A	FR-A-2 146 957 (LEVI) * Page 1, paragraph 1 *	1,2	
A	GB-A-1 078 326 (DURAT) * Page 2, line 76 - page 3, line 1; page 3, lines 39-82; figures *	1,2,7	
A	FR-A-2 281 831 (AB ZIRISTOR) * Page 1, paragraph 2 *	1,2,3	
			TECHNICAL FIELDS SEARCHED (Int. Cl. ³)

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	15-03-1984	MARTENS L.G.R.

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