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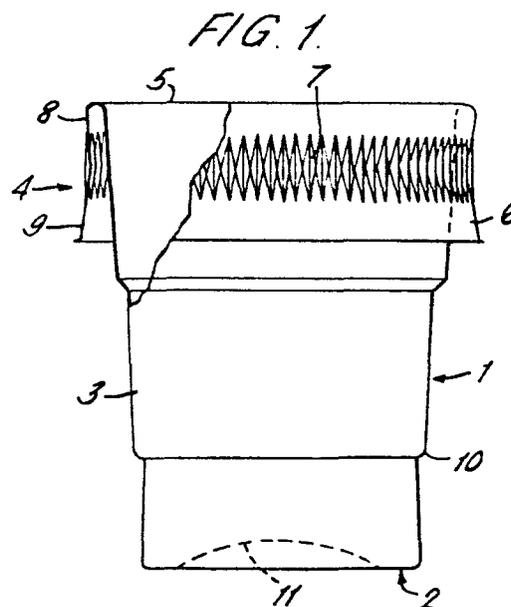
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Improvements in or relating to drinking cups and methods of making drinking cups.

This invention relates to nestable drinking cups.

A cup (1) comprises a base (2) having an integral peripheral upstanding wall (3) which together with the base (2) forms a liquid reservoir. The free end of the wall (3) is turned over to form an outwardly and downwardly extending collar (6) which extends circumjacent the upper part of the upwardly extending portion of wall (3) and is spaced therefrom. The collar (6) is so constructed that when the collar (6) is gripped by a user, it remains spaced from the upwardly extending portion of the wall (3). The collar (6) can be provided with strengthening features such as ribs (7) or an outwardly and downwardly inclined shoulder (13) or combination of these two, to increase the rigidity of the collar.

The construction of the cup provides a cup which is comfortably and easily held by a user when it contains hot beverages and which is also economic to manufacture.



"IMPROVEMENTS IN OR RELATING TO DRINKING CUPS
AND METHODS OF MAKING DRINKING CUPS"

The present invention relates to nestable cups, particular those cups in which hot beverages, such as coffee are drunk, and to stacks of such cups, each cup containing one or more beverage ingredients.

5 It has long been known that single walled cups do not present a very good thermal barrier to insulate the fingers of a person holding such cups containing a hot beverage from the heat given out by that beverage.

10 Various proposals have been made for cups which could provide better heat insulation, such as "double walled" cups. Alternatively, cups have been provided with holders or ear-like handles.

United Kingdom Patent Specification No.
15 1,379,371 describes an injection moulded cup which has a substantially cylindrical upper portion forming the mouth of the cup and lower portion tapering towards its bottom. A substantially cylindrical collar is connected to the transition between these
20 two portions by means of a web. This arrangement allows the user to grip the cup by means of the collar and the provision of the air gap between the collar and

the container wall means that heat is only transmitted to the user's fingers by conduction along the web.

The complicated nature of the shape of the cup shown in United Kingdom Patent No. 1,379,371 makes them difficult to manufacture and the only really feasible method of manufacturing them is by the expensive process of injection moulding. The vertical orientation of the collar means that the collar and web construction has to have considerable rigidity, and therefore thickness, in order to prevent the collar deforming when gripped, to such an extent that the collar engages the wall of the cup. Further the design of the cup is such that a large amount of material is needed to form the cup.

The present invention provides a nestable cup which can be held by the user when it contains hot water or hot beverage and which is simple and economic to manufacture.

According to the present invention, there is provided a nestable cup formed of thermoplastics material comprising a base, a wall integral with and upstanding from the base to define therewith a liquid reservoir and a collar circumjacent the wall, the collar being attached to and spaced from the wall such that when the collar is gripped by the user it remains spaced from the wall characterised in that the free end of the wall is turned over to form the collar and in that the collar extends downwardly and outwardly.

The cup may further comprise an outwardly extending and downwardly inclined shoulder formed in the collar.

In either of the above cases a cup may be provided with an inwardly extending shoulder on the wall, which

shoulder is capable of supporting a like cup and defining with the base of the like cup a space for one or more ingredients.

In the case where the collar is provided with a shoulder, the shoulder preferably lies at least 5 mm
5 below the lip of the cup.

The collar preferably has a depth below the lip of 20 to 30 mm.

Whilst any thermoplastics material may be used
10 to form the cup, currently commercially suitable materials include polystyrene, acrylonitrile/butadiene/styrene, and polypropylene resins, optionally filled with, for example, talc or chalk for additional strength. The use of barrier resins or laminates/coextrusions is preferred
15 since they improve the shelf life of beverage ingredients. Because of the relatively low softening point polyvinyl chloride and some acrylonitrile/butadiene/styrenes cannot be used for cups for which very hot beverages are to be drunk, although they can be used in connection with warm beverages.

20 When cups are stacked the top cup can be fitted with a plug or snap on cap to retain the beverage ingredient in the cup. Alternatively, a "dummy" cup which does not contain any ingredient may be useful. A plug is to be preferred to a snap-on cap when the stack
25 is wrapped since the plug allows the enveloping film to be drawn into the top aperture region of the stack of cups and enables adequate top pressure to be obtained. Preferably the wrapped stack should be under a top to bottom pressure sufficient to prevent seepage of the beverage
30 ingredients from the cups. Preferred methods of wrapping are described in United Kingdom Patent No. 1,539,729.

Specific embodiments of the invention will now be described with reference to the accompanying drawings in which:

Figure 1 is a part cut away side elevation of a
5 cup;

Figure 2 is an enlarged cross-sectional view of part of two cups of the type shown in Figure 1 in a nesting relationship;

Figure 3 is a side elevation, partially in section,
10 of an alternative form of cup;

Figure 4 is an enlarged cross-sectional view of the tops of two cups of the type shown in Figure 3 in a nesting relationship;

Figure 5 shows a manufacture of a cup of the
15 present invention with the apparatus in side view; and

Figure 6 shows from above a batch of 12 cups being made in accordance with the method of manufacture of Figure 5.

Figure 1 shows the cup generally indicated at 1
20 having a generally cylindrical base 2 with an upstanding integral wall formed around its periphery. The free end of the wall 3 is turned over to form a lip 5 and an outwardly and downwardly extending collar 6.

The collar 6 extends circumjacent the top of the
25 upwardly extending portion of the wall 3 and is spaced therefrom. The collar 6 is provided with a ring of vertically extending ribs 7 extending around its centre portion to increase the rigidity of the collar 6.

The collar 6 has an upper portion 8 which extends
30 downwardly parallel to the upwardly extending portion of wall 3 and a flared skirt portion 9 which diverges away from the upwardly extending portion of wall 3.

The cup 1 is further provided with an inwardly

extending annular internal shoulder 10, which is shown in Figure 2, for supporting a like cup in a nesting relationship.

The base 2 of the cup 1 has a central dome shaped portion 11 which is provided both to give strength to the cup 1 and to resist inversion of the base 2, which can occur when a hot liquid is poured into the cup 1.

Referring to Figure 2 in detail, it will be noted that the bases 2 of the nested cups together define a space 12. This space can contain one or more ingredients, such as coffee powder, for a beverage when the cup is stacked.

It will be noted that the flared portion 9 of the collar 6 allows the upper cup to be nested in the lower cup in such a way as to readily allow the lower cup to be withdrawn from the stack.

In use a hot liquid is poured into the cup 1 to make a beverage from the dried ingredient, not shown, contain in space 12. The user can then grip the cup by means of the collar 6. The arrangement of the shape and rigidity of the collar is such that when the cup is gripped under normal pressures the collar remains spaced from the upwardly extending portion of the wall 3. The air within this space is a reasonably good heat insulator and thus to all intents and purposes heat is only conveyed from the hot beverage to the user's fingers by conduction of the heat from the liquid up the upwardly extending portion of the wall 3, through the lip 5 and down the collar 6.

It will be appreciated that the length of this path is considerably greater than the thickness of a normal thermoplastics cup and therefore the cup is considerably more comfortable to hold than a traditional thermoplastics cup.

It will be appreciated that the shape and thickness of the collar may be considerably varied from that shown in Figures 1 and 2 and that the rib 7 may be omitted. The essential requirement for the collar 6 is that when it is gripped by a user it remains spaced from the upwardly extending portion of the wall 3.

Figures 3 and 4 illustrate an alternative embodiment of the cup 1. In this embodiment the collar 6 has an outwardly extending and downwardly inclined shoulder 13 between the upper portion 8 and lower portion 9. It will be noted in this case that the lower portion 9 extends vertically. The provision of the shoulder 13 increases the rigidity of the collar and indeed the provision of such a shoulder alone, without the ribs 7, can provide sufficient rigidity in the collar 6.

The lower portion 9 of the cup, may be provided with indents, not shown, which provide gripping points for the user's fingers and increase the rigidity of the lower portion 9 of the collar 6.

It will be noted that in all of the constructions the lip 5 offers an improved drinking surface over that of many of the prior art cups, in particular because there is no need when making the cups to roll the rim which is normally an additional operation in those cups which are manufactured by thermoforming.

The drinking surface can be further improved if the ribs 7 are omitted and preferably the upper portion 8 of the collar 6 should extend for at least 5mm, before any rib or shoulder is provided.

Figures 5 and 6 show a method of thermoforming the cups of Figures 1 and 2. In Figures 5 and 6 a sheet of thermoplastics material 14 is positioned under a heater 15, which heats the sheet 10 radiantly. This is shown in position A. The sheet of material 10 is then gripped

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at its edges by means not shown, projected forward into a position above a water cooled female mould 16 (position B).

5 A clamp 17 is then applied around the cavity 18 of the mould 16. The position of clamp 17 in relation to mould 16 depends on whether the material from an area of sheet larger than that of the mould aperture is required to make the forming. The mould 16 is then moved upwardly towards the sheet material 14 and during this operation air is blown from both inside and
10 outside the mould 16. Air vents, not shown, are provided in the mould 16 for this purpose. The air pressure forces the sheet of material 14 into a position shown at C. A heated mechanical punch (not shown) shaped to the interior of the mould forces the material 14
15 down into the mould 16 where it adopts the shape of the interior of the mould. Air is expelled from the mould to the air vents (not shown). If desired, the expulsion of air can be assisted by the use of vacuum exhaustion.

20 During a further stage D the forming 19 is cut from the sheet 14 and the remaining part can be reprocessed. The process described is an intermittent process and whilst one part of a sheet of material is being heated another part is being thermoformed and in another part formings are being cut from the sheet.

25 It will be appreciated that it is the unitary construction of the cups 1 which facilitate their easy construction.

It will further be appreciated that alternatively the cups can be formed by injection moulding or injection
30 blow moulding.

CLAIMS

1. A nestable cup formed of thermoplastics material comprising a base (2), a wall (3) integral with and upstanding from the base (2) to define therewith a liquid reservoir and a collar (6) circumjacent the wall (3), the collar (6) being attached to and spaced from the wall (3) such that when, in use, the collar (6) is gripped by the user it remains spaced from the upwardly extending portion of the wall (3) characterised in that the free end (4) of the wall (3) is turned over to form the collar (6) and in that the collar (6) extends downwardly and outwardly.
2. A nestable cup as claimed in claim 1 further comprising an outwardly extending and downwardly inclined shoulder (13) formed in the collar (6).
3. Nestable cup as claimed in claim 1 or claim 2 characterised in that it further comprises an inwardly extending shoulder (10) on the wall (3) which shoulder (10) is capable of supporting a like cup (1), and defining with the base (2) of the like cup (1) a space (12) for one or more ingredients.
4. A cup as claimed in any one of the preceding claims characterised in that the size and shape of the collar (6) is such that when the cup (1) is nesting in said like cup (1), the collar (6) overlaps the collar (6) in said like cup (1).
5. A cup as claimed in claim 4 in which the upper part (8) of said collar (6) is parallel with the adjacent part of the upwardly extending portion of the wall (3).

6. A cup as claimed in any one of claims 1 to 3 characterised in that the size and shape of the collar (6) is such that when the cup (1) is nesting in said like cup (1) its collar (6) overlaps the collar (6) of said like cup (1).
7. A cup as claimed in claim 6 characterised in that a part of the collar (6) is parallel with or tapers inwardly towards the upwardly extending portion of the wall (3) of the cup (1).
8. A cup as claimed in any one of the preceding claims characterised in that the volume of the space for beverage ingredients is in the range 5 ml to 40 ml.
9. A cup as claimed in any one of the preceding claims characterised in that the collar (6) is formed with ribs (7) and/or indents.
10. A method of making a cup as claimed in any one of the preceding claims and substantially as hereinbefore described.
11. A stack of cups as claimed in any one of claims 1 to 9, each cup containing one or more ingredients for beverage.

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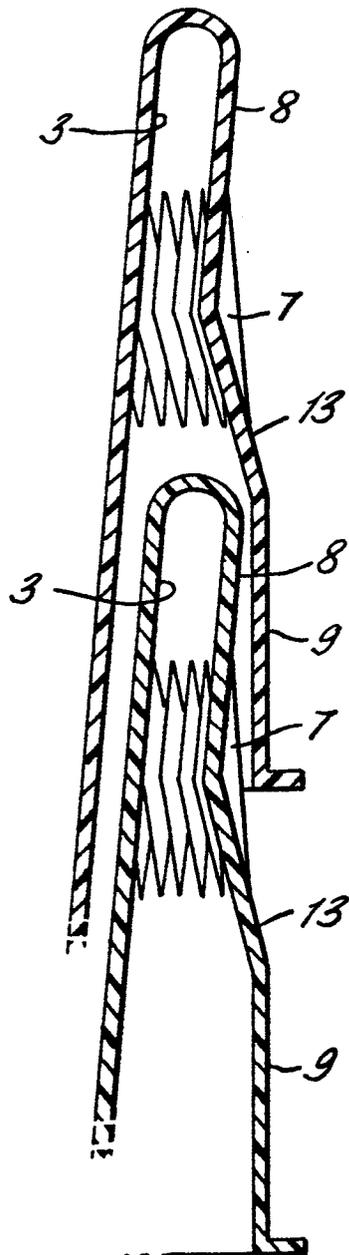
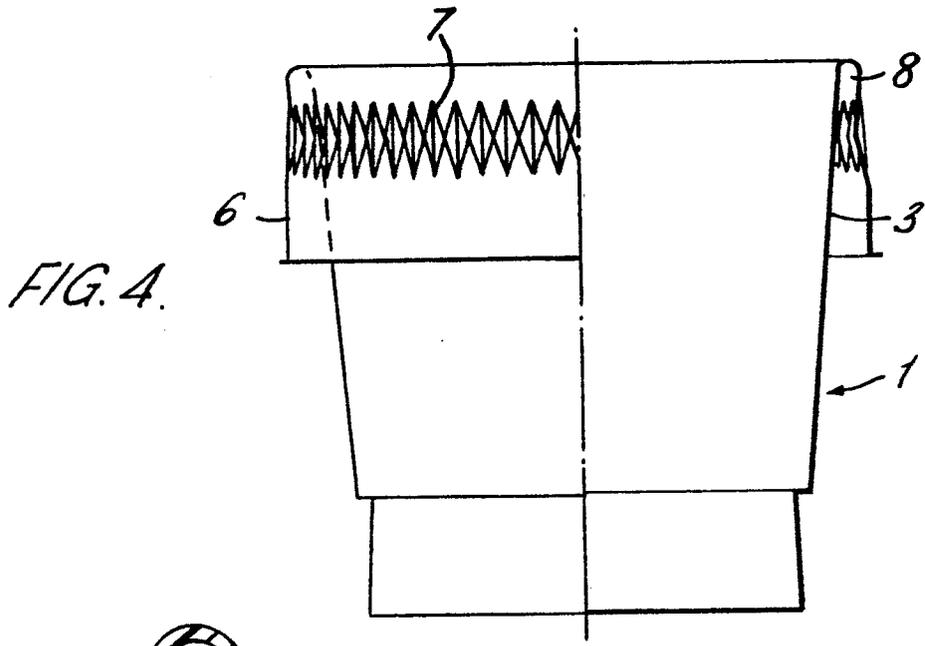
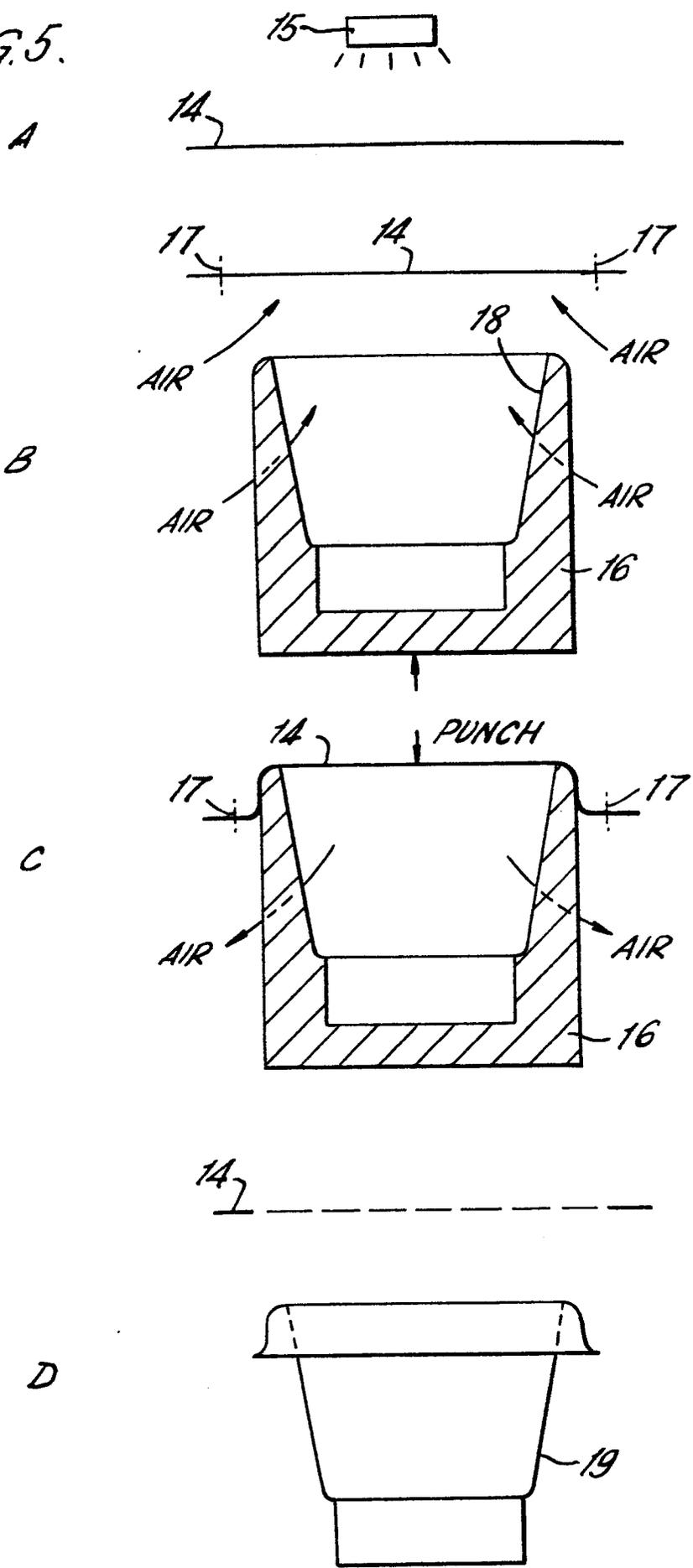
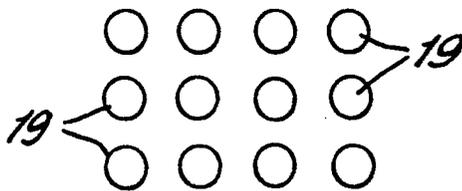
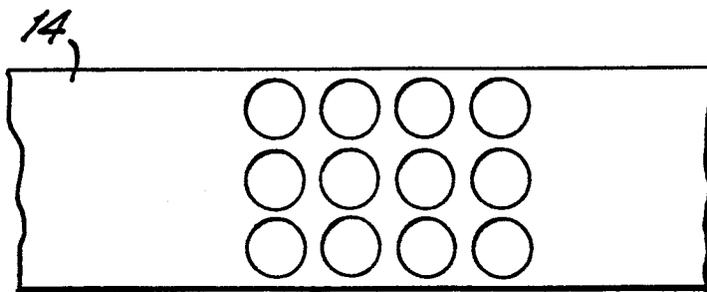
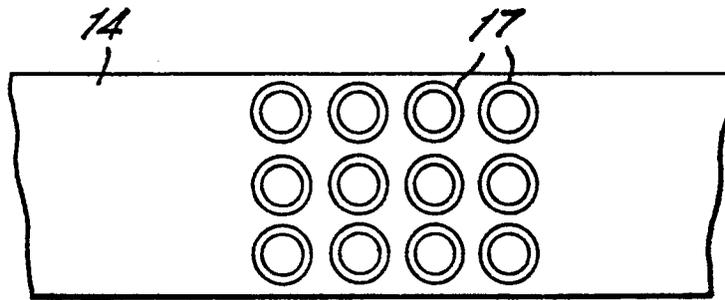
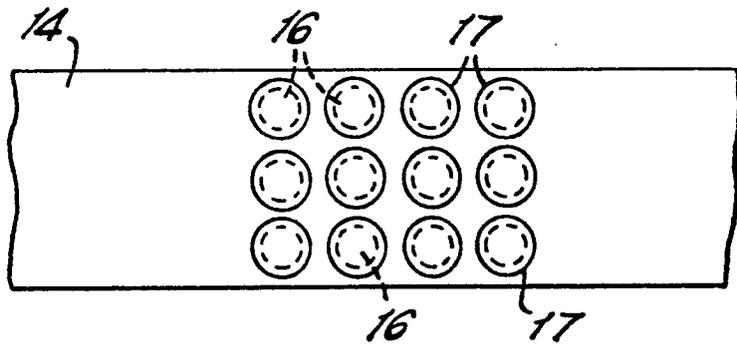
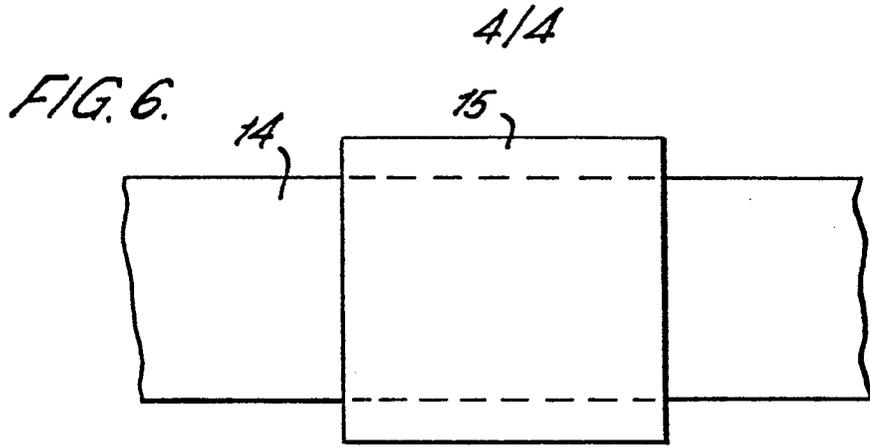


FIG. 3.

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FIG. 5.







DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (Int. Cl.?)
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	
X	<u>BE - A - 703 364</u> (P. BLYWEERT) * Page 2, paragraphs 4 and 5; page 3, last paragraph - page 4, paragraph 2; figures 1 and 6 * --	1,4,6, 7,11	B 65 D 1/26
X	<u>FR - A - 2 003 527</u> (CALMEC EXTRU-FORM LTD) * Page 4, line 3 - page 5, line 20; claim 11; figures 1,2 * --	1,3,5, 7,9,10	
			TECHNICAL FIELDS SEARCHED (Int.Cl.?)
X	<u>US - A - 2 493 633</u> L.T. MART) * In its entirety * --	1,4,6, 7	B 65 D A 47 G
X	<u>GB - A - 1 325 230</u> (S.A. JACOBS) * In its entirety * --	1,4,6, 7	
	<u>FR - A - 1 376 764</u> (ILLINOIS TOOL WORKS INC.) * Page 2, right-hand column, last paragraph - page 3, right-hand column, paragraph 3; figures 1-4 * --	1,2,3	
	<u>FR - A - 2 310 733</u> (COMPACT INDUSTRIES INC.) * Page 4, line 14 - page 5, line 16; figures 1,2,3 * ----	1,3,11	
			CATEGORY OF CITED DOCUMENTS
			X: particularly relevant A: technological background O: non-written disclosure P: intermediate document T: theory or principle underlying the invention E: conflicting application D: document cited in the application L: citation for other reasons
			&: member of the same patent family, corresponding document
The present search report has been drawn up for all claims			
Place of search	Date of completion of the search	Examiner	
The Hague	10-08-1979	MARTENS	