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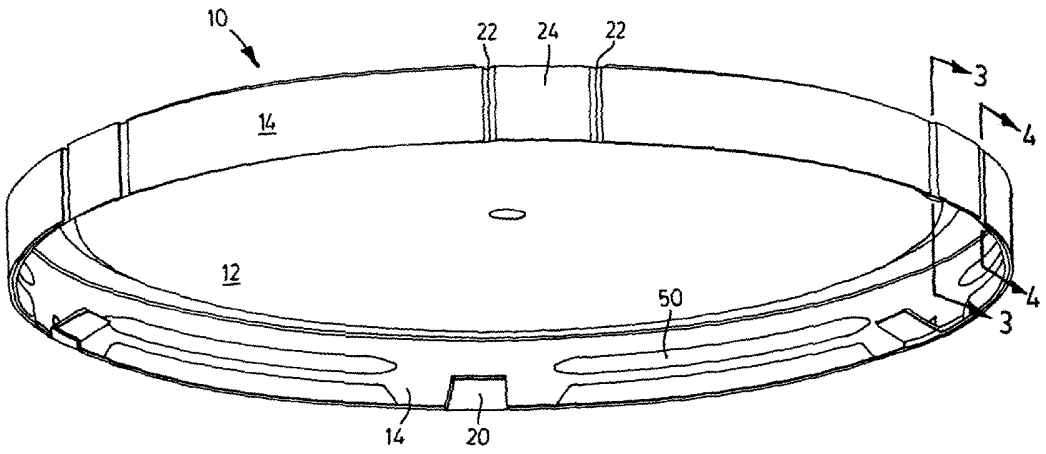
(54) Title: HOOK STYLE TAMPER EVIDENT LID



(57) Abstract: A tamper evident lid (10) is provided for mounting over an opening of a container having sidewalls (30) with a lip (32) extending outwardly therefrom to define the opening (34). The lid (10) has a base (12), a rim (14) extending about a perimeter of the base (10) for receiving the lip (32) and a plurality of fingers (20) extending upwardly from the rim (14) and toward the base (12) for engaging an underside of the lip (32). A respective membrane (22) is provided on opposite sides of each of the fingers (20) to define respective finger regions about the rim (14) and to facilitate outward tearing of the finger regions away from the sidewalls (30). Each finger (20) has a length exceeding the distance between an inside of the lip (32) and the sidewall (30).

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TITLE: HOOK STYLE TAMPER EVIDENT LID

FIELD OF THE INVENTION

This invention relates generally to injection molded containers and their lids. More specifically this invention relates to tamper evident lids which may be applied to standard containers.

BACKGROUND OF THE INVENTION

Tamper evident (TE) features are very important in the packaging industry. Unfortunately, packages having tamper evident features generally require specific container and lid designs wherein the container and the lid are a unique combination. A disadvantage to this type of design is that expensive molds are required not only for the container but for the lid and the molds are often limited in design to a single product.

Many applications in the food packaging industry currently use "standard" container sizes, which can be purchased from a multitude of suppliers. The containers are generally filled with packaging machinery adapted to those container sizes. If special containers and lids are to be used, it may be necessary to install additional machinery in a filling line to accommodate assembly limitations caused by the special tamper evident containers.

It is an object of the present invention to provide a tamper evident lid which may be applied to a standard container. Preferably the lid may be applied onto such a container using conventional packaging equipment currently available in most automated filling lines.

SUMMARY OF THE INVENTION

The present invention provides a tamper evident lid having a plurality of tear tabs in its rim. Each of the tear tabs has an inwardly and upwardly extending finger for interacting with a container lip.

More particularly, a tamper evident lid is provided for mounting over an opening of a container having sidewalls with a lip extending outwardly therefrom to

define the opening. The lid has a base, a rim extending about a perimeter of the base for receiving the lip and at least one finger extending inwardly from the rim and preferably toward the base for engaging an underside of the lip. A respective membrane is provided on opposite sides of each of the fingers to define respective tear tabs about the rim and to facilitate outward tearing of the tear tabs away from the sidewalls. Each finger has a length exceeding the distance between an inside of the lip and the sidewall.

DESCRIPTION OF DRAWINGS

Preferred embodiments of the present invention are described below with reference to the accompanying illustrations in which:

Figure 1 is a perspective view from below of a tamper evident lid according to the present invention;

Figure 2 is a perspective view from above of the lid of Figure 1;

Figure 3A is a perspective sectional view taken at line 3-3 of Figure 1;

Figure 3B is a view corresponding to Figure 3A but taken from the inside rather than from the outside of the lid;

Figure 4 is a perspective sectional view taken on line 4-4 of Figure 1;

Figure 5 is an axial section of an outer portion of a lid according to the present invention illustrating how it mounts over a container;

Figure 6 is an axial sectional view of a lid according to the present invention being molded and illustrating the associated mold components; and

Figure 7 is a schematic view of an injection molding arrangement for forming a lid according to the present invention.

DESCRIPTION OF PREFERRED EMBODIMENTS

A tamper evident lid ("lid") according to the present invention is generally illustrated by reference 10 in the accompanying illustrations. The lid 10 has a base 12 and a rim 14 which extends about the perimeter of the base 12.

Discrete fingers 20 extend from an inside of the rim 14. The fingers extend radially inwardly and toward the base 12 (inwardly and upwardly as illustrated in the figures).

The lid 10 is intended for mounting over a "standard container" as illustrated in Figure 5. A portion of a sidewall of such a container is shown in dashed lines at reference 30. As typical with such containers which are commonly used for food and other applications, the sidewall 30 terminates in an outwardly and downwardly extending lip 32. The lip 32 defines an opening 34 over which the lid 10 may be mounted.

Each of the fingers 20 has a length which exceeds the distance or "gap" between the inside of the rim 14 and the outside of the sidewall 30 as illustrated at reference 40. The length of the fingers 20 exceeds the breadth of the gap as illustrated by arrow 44. Accordingly, when the lid 10 is forced over the lip 32, the fingers 20 flex toward a retracted position against the inside of the rim 14. Once fully past the lip 32, the fingers flex inwardly, away from the rim 14, to rest against the sidewall 30. In order to enable the flexing of the fingers 20, the material of the lid 10 must have a desired degree of resiliency which is characteristic of the type of plastics typically used for such lids (polyethylene for example). Basically the fingers must be able to flex without breaking off.

Once in place, removal of the lid 10 from the container is resisted by the fingers 20 engaging an underside 36 of the lip 32. As the ends of fingers 20 rest against the sidewall 30, the fingers 20 can rely on the sidewall 30 for support and accordingly a tremendous amount of strength is not required from the fingers 20. This proves advantageous in stripping the lid 20 from an injection molding assembly, as discussed below.

To either side of the fingers 20 is a frangible membrane 22 formed in the rim 14 to define "tear tabs" 24. The tear tabs 24 may be pried away from the sidewall 30 by tearing the frangible membranes 22 to either side to move the fingers 20 out of engagement with the lip 32. This enables removal of the lid 10 from the container but only by leaving evidence in the form of torn frangible membranes.

A membrane hinge 26 may be provided at the top of the tear tabs 24 to maintain the tear tabs 24 affixed to the remainder of the lid 10 after tearing of the frangible membranes 22. This avoids having to tear the tear tabs 24 out entirely in order for the fingers 20 to be disengaged from the lip 32. Without the hinge 26, the resiliency of the lid 10 might otherwise keep urging the fingers 20 into engagement with the lip 32 even with the frangible membranes 22 torn.

Alternatively the membrane hinge may be substituted for a further frangible membrane to allow complete removal of the tear tabs 24.

An inwardly extending rib 50 may be provided about the rim 14 of the lid 10 between the break tabs 24. The ribs 50 serve to further secure the lid 10 over the opening 34.

Preferably the rim 14 at the tear tabs 24 is thinner below the finger 20 (distal the base 12) than above the finger 20 (proximal the base 12) by an amount corresponding to the thickness of the fingers 20. This forms a recess 28 which accommodates the fingers 20 during a stripping stage of the lid 10 in an injection molding operation.

Figures 6 and 7 illustrate a mold assembly for plastic injection molding of a lid 10. The mold assembly includes a cavity 100 which receives a two-part mold core made up of a removing core poppet 102 and a core base 104. A stripper ring 110 extends about the core base to engage a lower edge 18 of the rim 14 of the lid 10. The cavity 100 and moving core poppet 102 are movable in opposite relative directions as are the core base 104 and moving core poppet 102.

After injection and solidification of a molten resin to form the lid 10, the formed lid 10 will typically shrink onto the moving core poppet 102 and core base 104

enabling the lid 10 in combination with the core poppet 102 and core base 104 and stripper ring 110 to be moved away from the cavity 100 as the mold is opened. Next, the core poppet 102, stripper ring 110 and lid 10 move away from the core base 104 toward the cavity 100. The core poppet 102 stops moving and the stripper ring 110 pushes the lid off of the poppet.

As shown by dashed lines in Figure 6, the finger 20 flexes away from the base 12 of the lid 10 and is accommodated by the recess 20 as the lid 10 is lifted off of the moving core poppet 104.

The fingers 20 will generally retain enough "memory" to resiliently flex toward their original position as the formed lid coops after stripping. Alternatively the fingers 20 may be configured to cool so as to point away from the base 12 ("down") and be pushed into an "upwards" position mechanically after molding.

Although six tear tabs 24 are illustrated, other numbers are possible. Generally it is expected that six to eight will prove an optimal compromise between security and effort to remove the lid 10. It may be possible to have as few as one tear tab 24 if it is broad enough. Two or more is preferable. It is generally not necessary to lift away all of the tear tabs 24 for removal of the lid 10. Lifting away the tear tabs 24 about half the perimeter and sometimes less will generally prove sufficient to enable removal of the lid 10.

The above description is intended in an illustrative rather than a restrictive sense. Variations may be apparent to those skilled in the relevant art without departing from the spirit and scope of the invention as defined by the following claims:

WE CLAIM:

1. A tamper evident lid for mounting over an opening of a container having sidewalls with a lip extending outwardly therefrom to define said opening, said lid comprising:

a base;

a rim extending about a perimeter of said base for receiving said lip;

at least one resiliently flexible finger extending inwardly from said rim and toward said base for engaging an underside of said lip;

a respective frangible membrane on opposite sides of each of said at least one finger to define respective tear tabs disposed about said rim and to facilitate outward tearing of said tear tabs away from said sidewalls; wherein,

each said finger has a length exceeding the distance between an inside of said lip and said sidewall.

2. The tamper evident lid of claim 1 having:

a plurality of said at least one resiliently flexible finger.

3. The tamper evident lid of claim 2 wherein:

a membrane hinge is provided between said tear tabs and a remainder of said tamper evident lid to facilitate tearing of said frangible membranes while maintaining said tabs affixed to said valance of said lid.

4. The tamper evident lid of claim 3 wherein:

said rim has a recess adjacent said fingers and distal said base to accommodate said fingers to facilitate stripping of said lid in an injection moulding process.

5. The tamper evident lid of claim 4 wherein:

from six to eight of said tear tabs are provided.

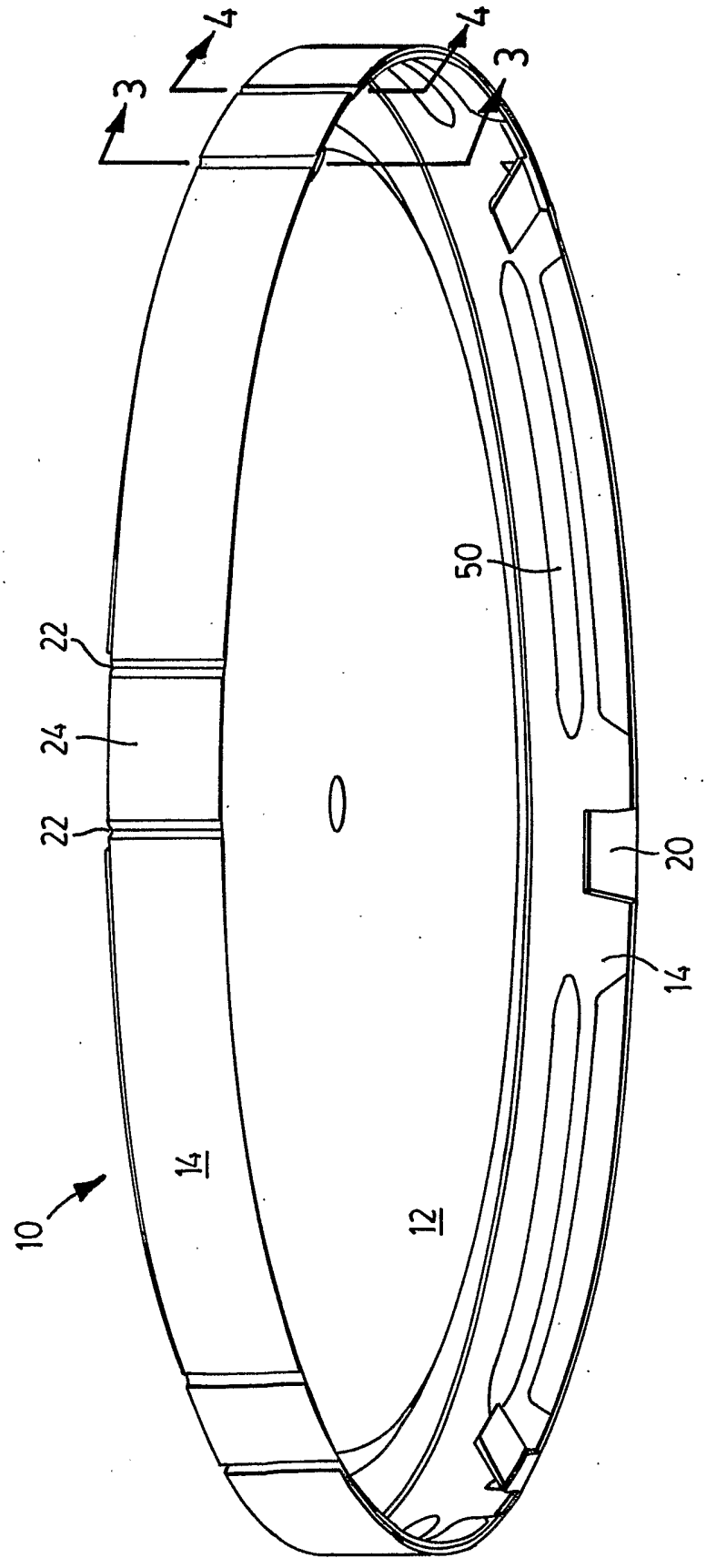

FIG.1

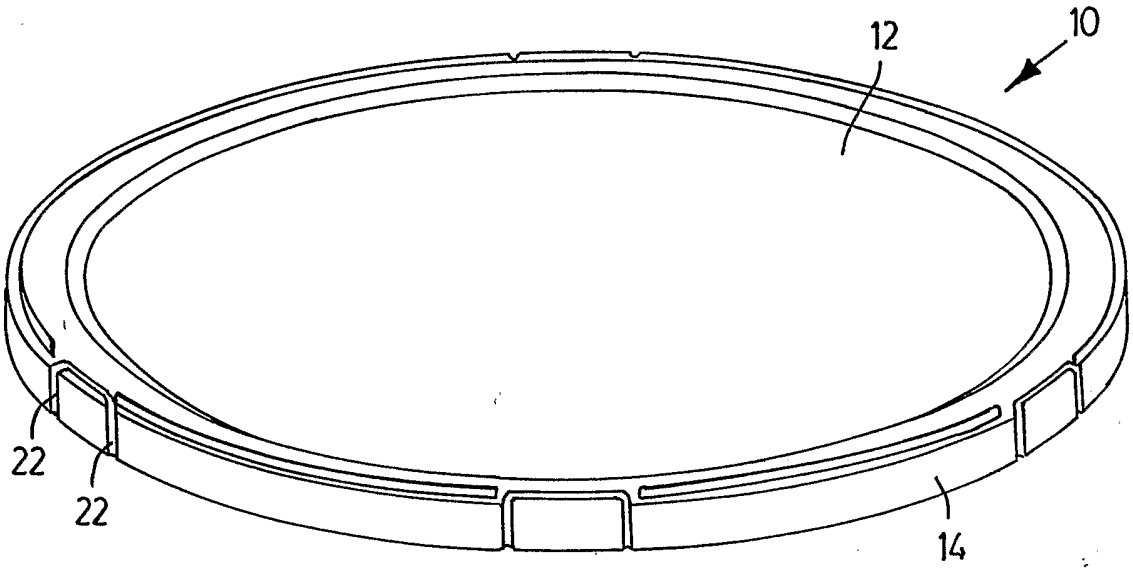

FIG. 2

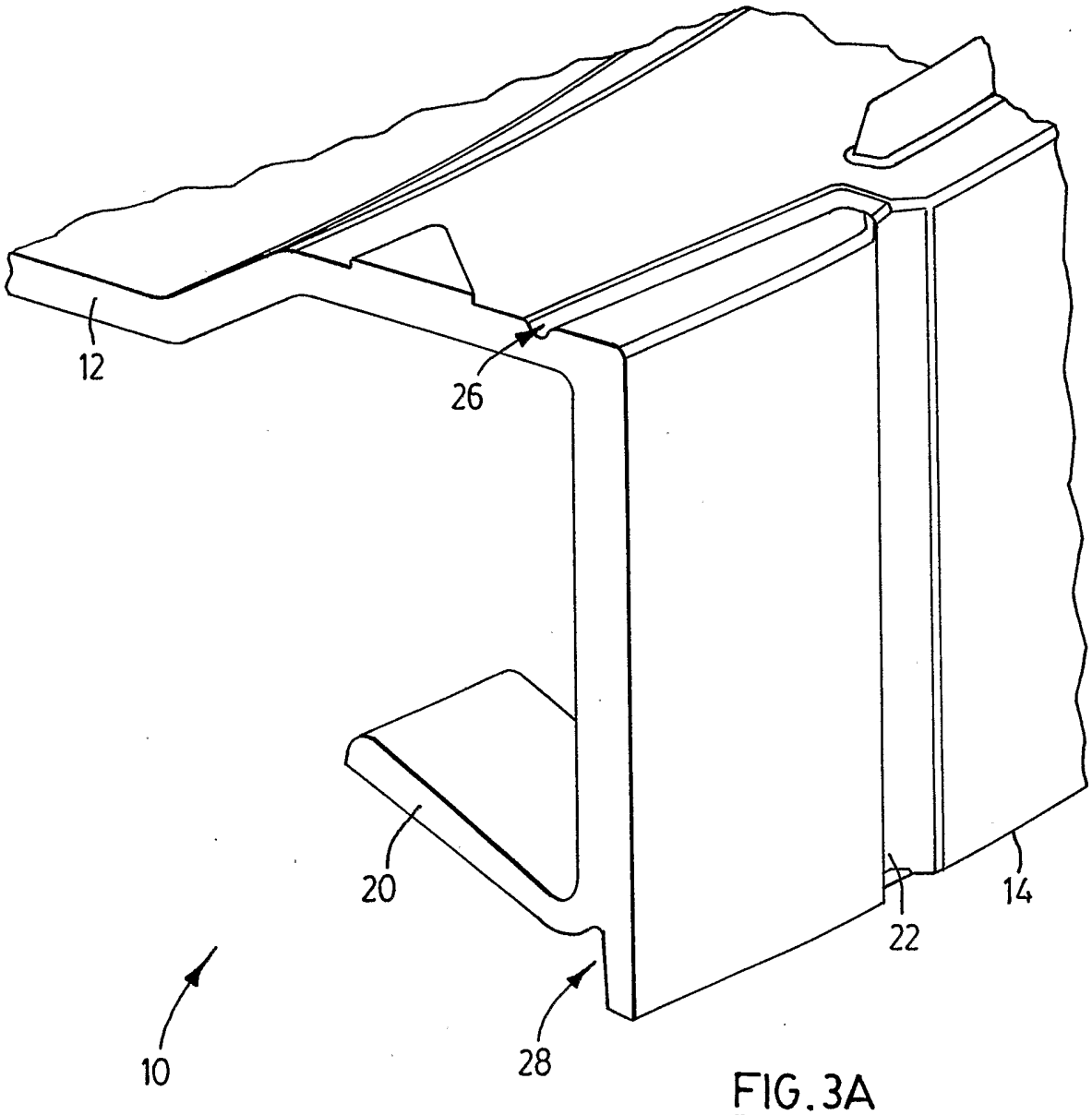

FIG.3A

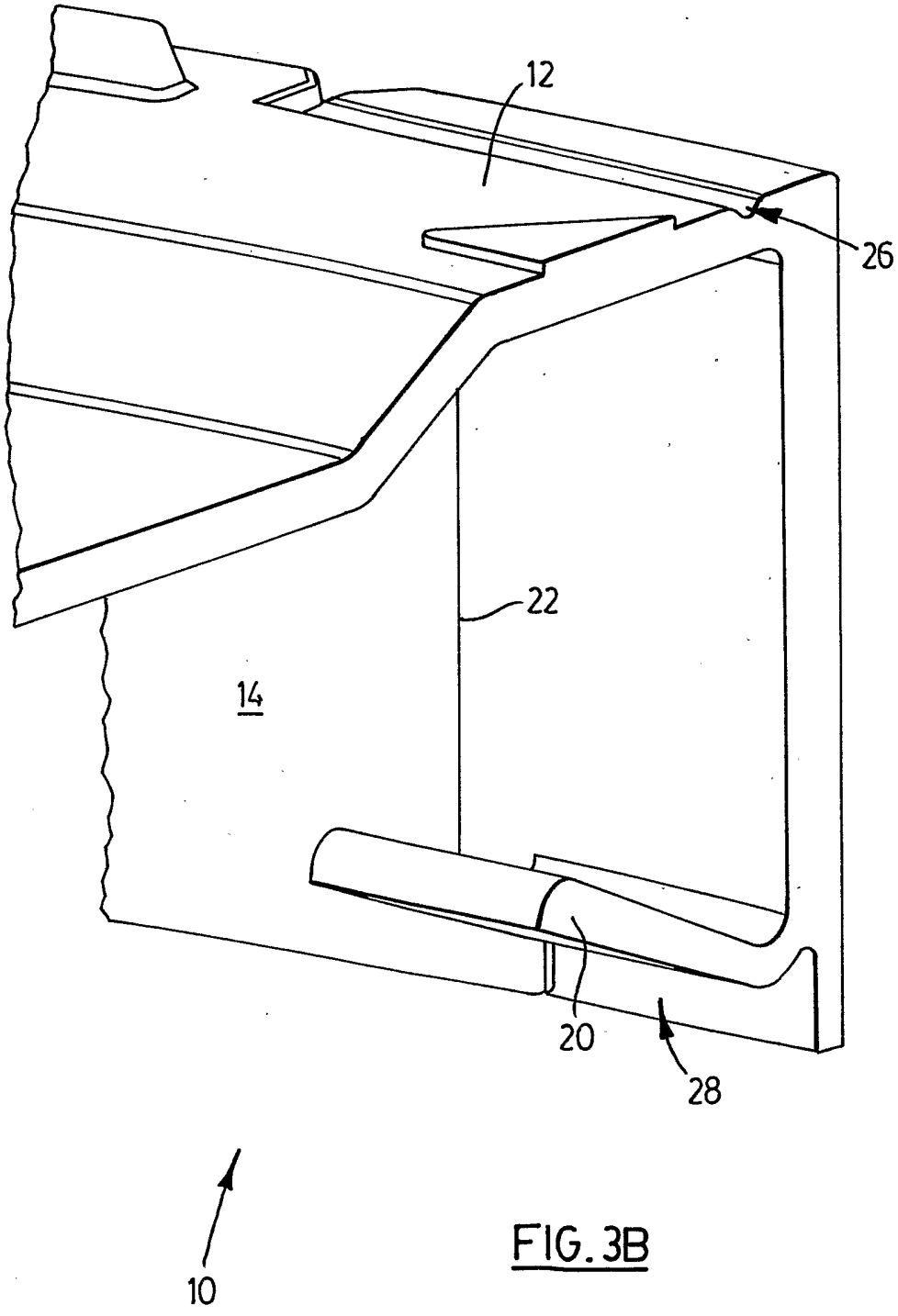

FIG. 3B

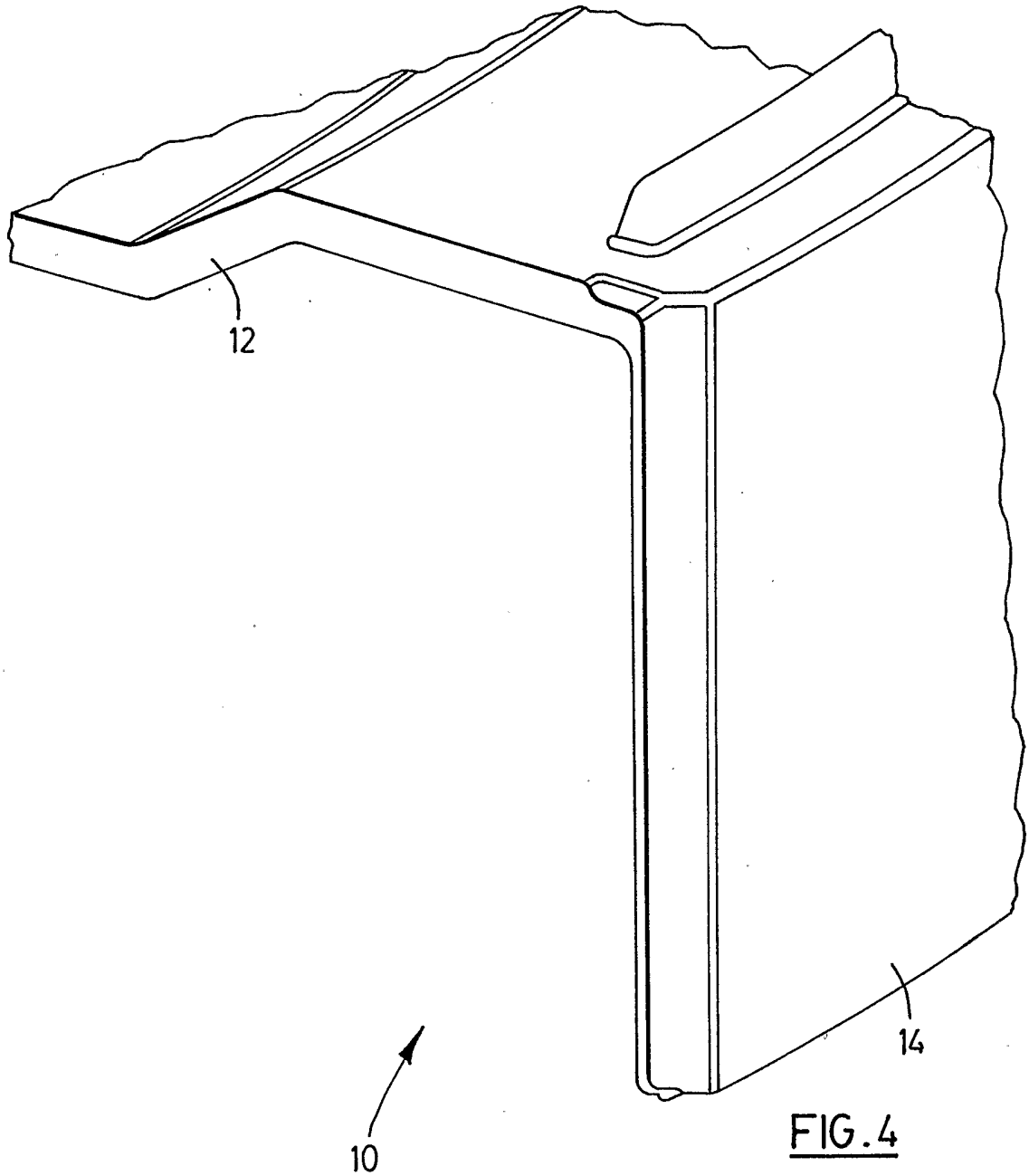

FIG.4

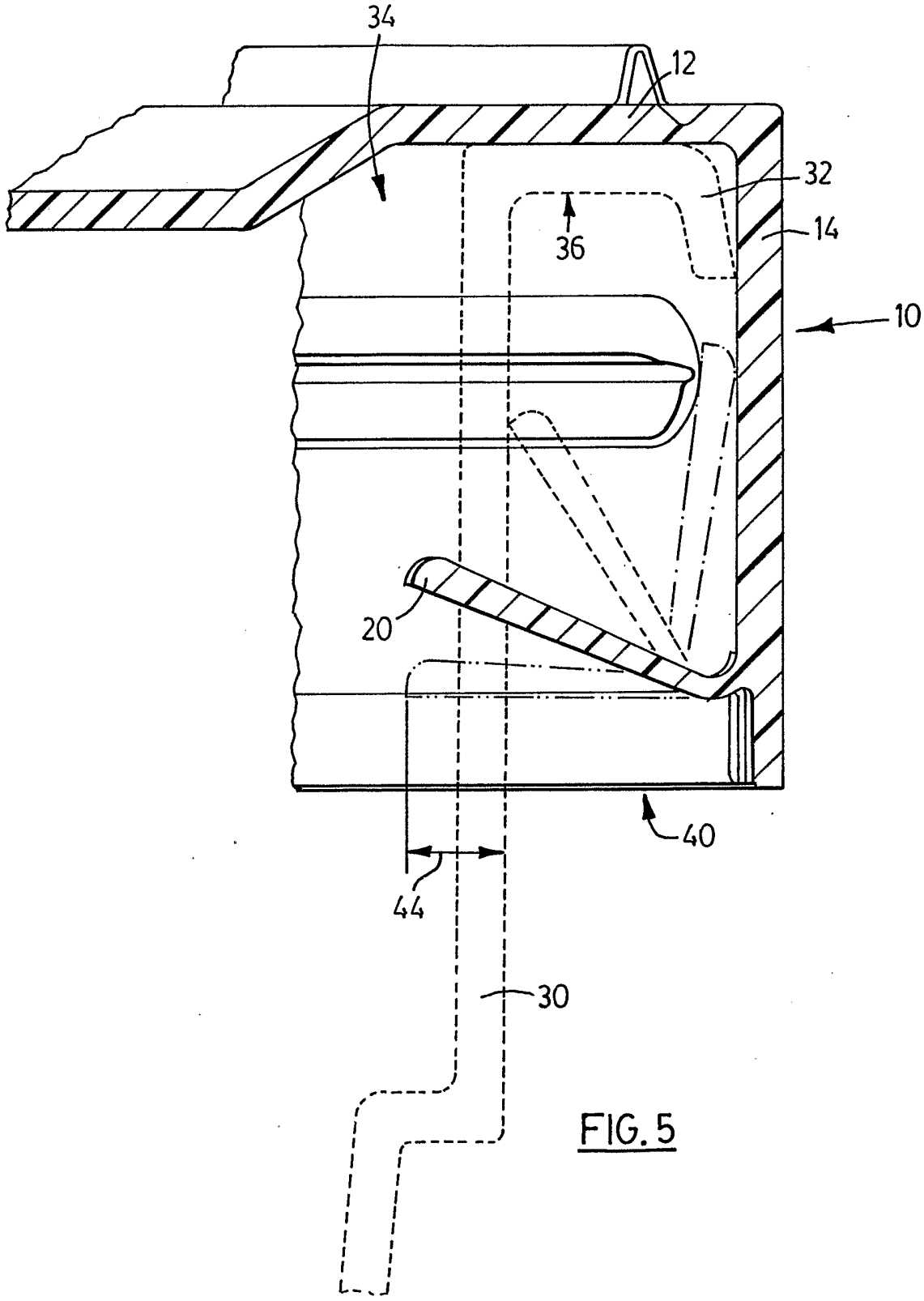

FIG. 5

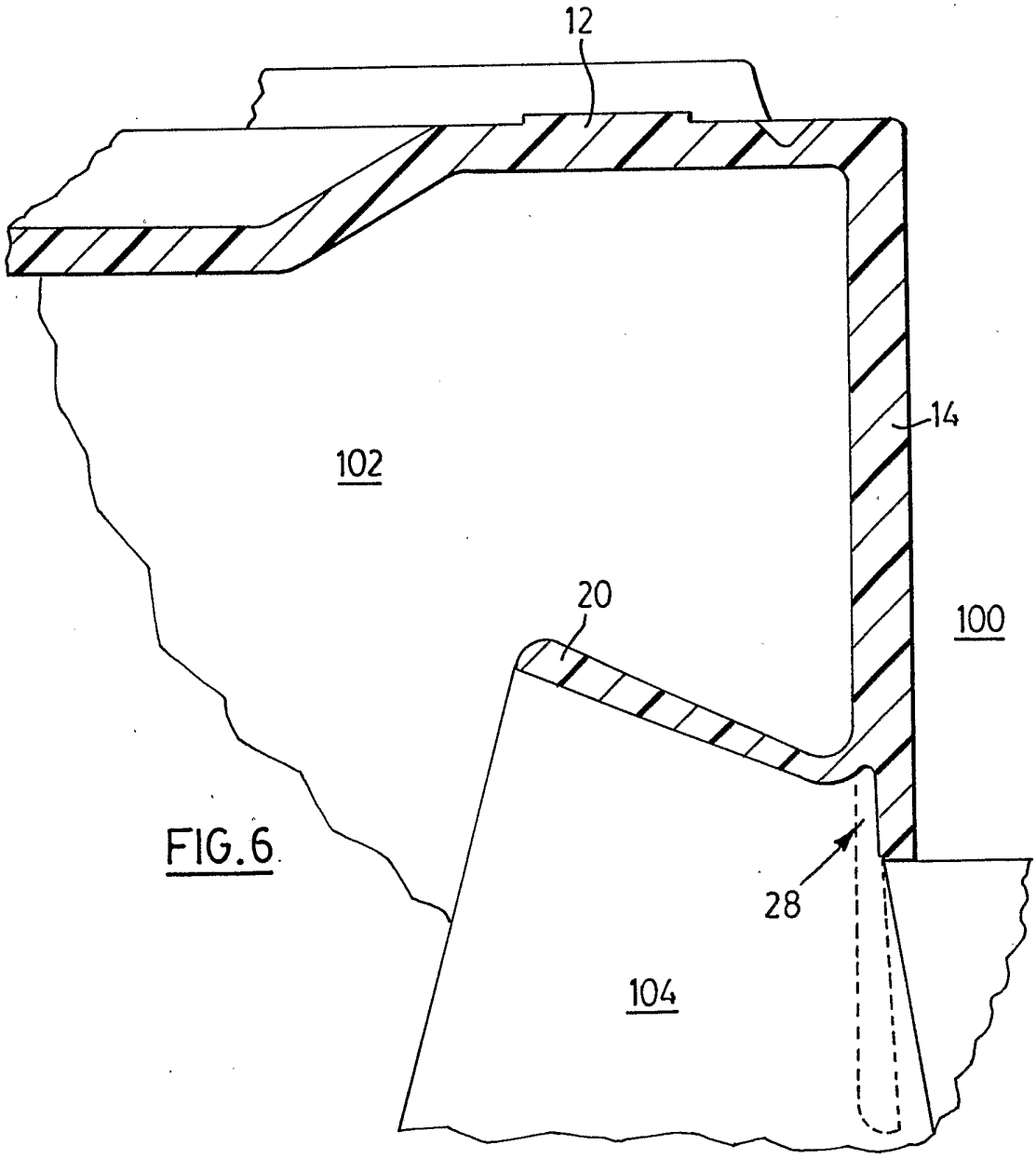

FIG.6

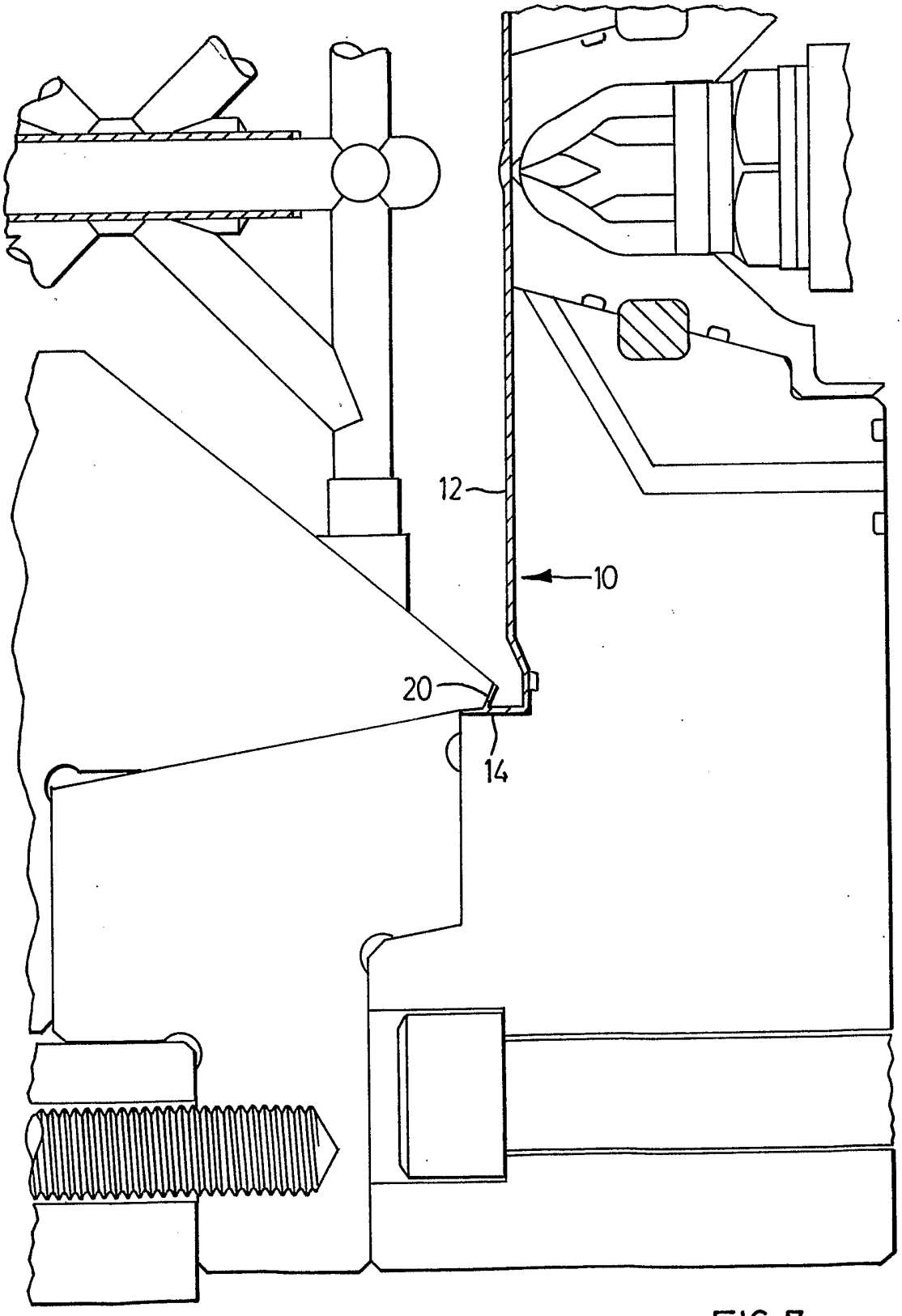

FIG.7

INTERNATIONAL SEARCH REPORT

National Application No
PCT/CA 02/01311

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 B65D43/02

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 B65D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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Y		3,5

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A		1

Y	DE 38 03 153 A (HERMANN FINK KUNSTSTOFF SPRITZ) 25 August 1988 (1988-08-25) column 2, line 55-65 figures 1,2	5
A		1,2

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[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

° Special categories of cited documents :

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"O" document referring to an oral disclosure, use, exhibition or other means

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
14 February 2003	04/03/2003

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Kakoullis, M

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PCT/CA 02/01311

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

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Information on patent family members

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