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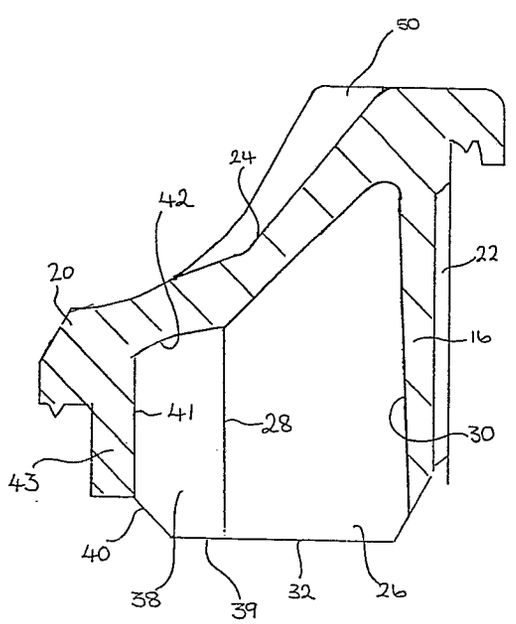
(54) **Polymeric containers.**

(57) A polymeric container, particularly for paint, has a lid ring (18) in which a lid is fitted by a snap-fit or clipping action. The lid ring has at least one region (32, 34, 36) of relatively higher stiffness at which a de-lidding tool may be applied by means of a guide (50). The side walls (16) of the container are of relatively reduced material content. Buckling of the side walls is reduced by improved load transfer between successive containers in a stack. This is achieved by provision of a moulded annular stiffening zone (60) extending round at least a portion of the periphery of the bottom edge of the container and located within the interior angle between the bottom (62) and side (64) surfaces of the container, and providing a smooth annular internal surface (66) connecting the bottom and side walls, internally. The stiffening zone incorporates spaced generally wedge-shaped stiffening webs (76).



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Description

POLYMERIC CONTAINERS

This invention relates to polymeric containers. For example the invention concerns polymeric containers having a lid ring in which a lid is received, the lid being releasable by application of a suitable de-lidding tool. However, the invention is not restricted to lever lidded polymeric containers, and another aspect of the invention concerns the base region of a polymeric container, as more fully explained below.

Considering first the lid region of a polymeric container, it has been proposed to provide a lid ring for such a container having rib means to stiffen the lid ring.

Problems which arise in relation to the stiffening of lid rings for polymeric containers include the following.

Firstly, the provision of a polymeric lid ring having adequate stiffness has been achieved. However, depending on the design of the lid ring, it is found that the insertion of the lid after filling the container can be difficult. In practice, this arises more in those cases where the lid ring incorporates a non friction-fit lid such as a lid which fits by a clipping action.

A further problem which arises in relation to lid rings for polymeric containers concerns de-lidding by the end user. This can be difficult. For example, sometimes the application of a screw driver or like de-lidding tool does not easily free the lid. Again, this problem is more noticeable where the lid is a clip fit.

Viewed from one aspect the present invention provides a lid ring for a polymeric container having means providing a variation in stiffness of the ring in the circumferential direction, whereby lid releasing means may be applied to a region of relatively high stiffness of the ring.

In an embodiment of this aspect of the invention as described below, the lid ring is provided with locally higher stiffening than elsewhere, whereby both insertion of a polymeric lid and removal of the same are facilitated. The extra stiffness is provided at at least one location where it is desired to apply a de-lidding force. The variation in the stiffening of the lid ring is arranged so that the region of relatively lower stiffness is such that flexing is facilitated in the direction necessary for insertion of a lid. Moreover, the stiffening of the ring locally is arranged so that the stiffness necessary to resist distortion when a de-lidding tool is applied, is increased.

Turning now to a second aspect of the invention, this concerns principally the questions of the strength of such containers, the amount of polymeric material used therein, and their tendency to buckle under sustained load during storage.

It will be understood that when polymeric containers, such as paint containers, are stored for long periods in a stacked condition, for example on pallets, there is sustained application of relatively high loads arising from the weight of the containers. This weight is of course a maximum for the bottom containers in any given stack.

This tendency to buckle is a considerable problem, and is aggravated by the commercial need to reduce as far as possible the amount of polymeric material used in any given container design. Obviously, it would be relatively simple to strengthen the walls of such containers by using more material. However, in practice, the commercial requirement is actually to reduce the amount of material used in the load-transmitting walls of such containers. This, of course, actually increases the tendency for buckling to occur.

Viewed from a further aspect the present invention provides a polymeric container having bottom and side walls defining bottom and side surfaces of the container, and having a stiffening zone extending around at least a portion of a periphery of the container at the bottom edge thereof, said stiffening zone being located within the interior angle between said bottom and side surfaces of the container and providing an internal surface connecting the walls defining said bottom and side surfaces.

In an embodiment of this aspect of the invention as described below, a stiffening zone is provided in the base region of the container. This zone extends around at least a portion of the periphery of the container. The stiffening zone is located at the bottom edge of the container, and is located within the interior angle between the bottom and side surfaces of the container, as seen in a vertical cross-section through the container. The stiffening zone itself provides an annular internal surface connecting the bottom and side surfaces of the container.

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

Fig. 1 shows a partly sectioned perspective view of a paint container, viewed from below;

Fig. 2 shows, on a larger scale, a plan view of the container of Fig. 1, as seen in the direction indicated by arrow II in Fig. 1, with the top opening of the container shown open without the presence of a lid;

Fig. 3 shows a section through the lid ring of the container, the section being taken on the line III-III in Fig. 2;

Fig. 4 shows a bottom view of the container, the direction of viewing being indicated by arrow IV in Fig. 1; and

Figs. 5, 6 and 7 show sectional views through a reinforcement or stiffening zone in the base region of the container, the sections being taken on the lines indicated by arrows V-V, VI-VI and VII-VII respectively in Fig. 4.

As shown in Figs. 1,2, and 3, a paint container 10 of polymeric material comprises a base region 12 and a lid receiving region 14, together with a cylindrical side wall 16.

Welded onto the container body side wall 16 is a lid ring 18 in which a lid (not shown) is received. The lid ring is separately moulded and welded to side wall 16 ultrasonically, or in any other suitable way. The lid

is a positive clip fit into the inner lip region 20 of lid ring 18.

As shown in Fig. 3, lid ring 18 comprises an outer portion 22 which is of cylindrical form and which in the welded-up state abuts the upper portion of the container side wall 16. The lid ring further comprises an inner portion 24 which extends inwardly and downwardly with respect to portion 22 at an acute included angle with respect thereto. Inner portion 24 has at its inner end the lip region 20 to receive the lid (not shown).

The container 10 and the lid ring 18 are separately moulded in the same polymeric materials, for example polypropylene for water based paints and polyester for solvent based paints.

The load bearing capability of the assembled container is enhanced by the provision of stiffening means in the lid ring 18. The stiffening means comprises ribs or flanges 26 provided at regular intervals all around the circumference of the lid ring. In Fig. 2, only a representative number of the ribs 26 are shown. The ribs 26 provide a stiffening effect between the inner and outer portions 24 and 22, respectively, of the lid ring 18.

The form of the ribs 26 is shown in Fig. 3. Each rib has radially inner and outer extremities 28 and 30, and a lower edge 32. The extremity 30 is integral with the wall 16. At its upper extremity each rib extends into the join between portions 22 and 24 of the lid ring.

With the arrangement of the ribs 26 as described above, at the regular intervals indicated in Fig. 2, the degree of flexibility of lip region 20 of lid ring 18 is such that the lid insertion or lidding process is accomplished relatively easily.

As shown in Fig. 2, at three locations around the periphery of lid ring 18 there are provided regions of relatively higher stiffness 32, 34 and 36. In these regions, three adjacent ones of the ribs 26 are formed integrally with an extension portion 38 shown in Fig. 3, which serves to provide further stiffness for lip region 20. The rib extension portion 38 is defined by exposed edges 39 and 40, profile 42 of lip region 20, and non-exposed extremities 28, 41. The extremity 41 is formed integrally with a flange 43 extending circumferentially in the higher stiffness regions only.

As shown in Fig. 2, ribs 26 are provided with the rib extension portions 38 and flange 43 on three only of the ribs, designated 44, 46 and 48, at each of the locations 32, 32 and 36. The extra stiffening thus provided enables de-lidding to be performed relatively easily.

For this latter purpose, at each of the locations 32, 34 and 36 there is provided tool-receiving means in the form of a screwdriver slot 50. This enables easy introduction of a screwdriver for application of a suitable de-lidding force to the lid. A slight modification of the profile of the lid ring 18 is provided in this region, as shown in Fig. 3. The extra stiffness provided by the rib extension portions 38 enables the lip region 20 to resist the load applied by the screwdriver to the lid, whereby de-lidding is easily performed.

It will be understood that the ribs 26 which are not provided with the stiffening extensions 38 may be regarded as stiffened ribs which have been relieved by the removal of the said extensions.

Turning now to Figs. 4 to 7, the base 12 of container 10 is formed with a stiffening zone 60 extending, in annular form, around the periphery of the base. The stiffening zone is located within the interior angle defined between the bottom and side surfaces 62, 64 respectively, of the container. Moreover, the stiffening zone provides an internal surface 66 connecting the walls defining the bottom and side surfaces, namely bottom wall 68 and side wall 16.

Surface 66 is provided by an extra wall 70 interconnecting bottom wall 68 and side wall 16. Extra wall 70 thus provides a smooth and inclined connection between these walls, which latter thus terminate in the downward and outward directions respectively at the edges 72 and 74 of annular surface 66.

Within stiffening zone 60 are spaced stiffeners 76 in the form of ribs or flanges located on the outer side of extra wall 70 and being of generally wedge-shaped cross-section defined between the surface 78 forming the bottom of the container, inner surface 80 of wall 16 at its lowermost portion, and sloping inner surface 82 of extra wall 70.

Figs. 5 and 6 of the drawings show a locator channel 84 which is moulded in the base of the container. The channel 84 has a depth which smoothly increases to a maximum, and terminates in an end wall. The channel is provided for assembly purposes. Its internal surface provides a smooth continuation of the surface 66 of wall 70.

The above embodiments provide the following notable advantages. As regards the lid ring, there is of course the improved ease of lidding and de-lidding, and such improvements are achieved without major change in the design of the lid ring itself. The lid ring is both more flexible so far as lid insertion is concerned, and locally strengthened to facilitate lid removal. Moreover, simple identification is provided for the location at which a screwdriver or like de-lidding tool should be applied. Also, the consumption of polymeric material is somewhat reduced, for manufacturing purposes.

Also, in relation to the stiffening zone in the base region of the polymeric container, the following advantages are provided by the above embodiment. These include the fact that no change is provided in the exterior dimensions of the container. There is an insignificant effect on the internal dimensions of the container. Moreover, tests show that the extra stiffness provided by the stiffening zone provides a more uniform weight transfer between stacked containers whereby a reduction in side wall thickness can be achieved while maintaining resistance to buckling. Also, the stiffening ribs or flanges provided in the stiffening zone are able to exert their stiffening effect while nevertheless the container still has a smooth internal surface. The stiffening zone is provided while nevertheless maintaining economy of polymeric material used.

Amongst other modifications which could be made in the above-described embodiments while

remaining within the scope of the invention are the following:

1. The variation in the stiffness of the lid ring could be achieved in a variety of ways not necessarily involving the use of spaced webs or ribs.

2. The stiffening zone at the base of the container could be welded or secured by adhesive within an otherwise conventional container.

3. The provision of a stiffening zone may be beneficial even to non-cylindrical containers.

4. The stiffening zone need not be of wedge-shaped cross-section. For example, a rectangular section may be beneficial, or indeed other polygonal sections.

5. The web or rib means provided in the lid ring may include formations such as rods or the like extending axially of the container and provided one for each web or rib and formed integrally therewith. The relieved portion of a web or rib in a lower stiffness zone is located radially inwardly of the rod. Equally, the extension portion of the web or rib in a higher stiffness zone is also located radially inwardly thereof.

It is to be clearly understood that there are no particular features of the foregoing specification, or of any claims appended hereto, which are at present regarded as being essential to the performance of the present invention, and that any one or more of such features or combinations thereof may therefore be included in, added to, omitted from or deleted from any of such claims if and when amended during the prosecution of this application or in the filing or prosecution of any divisional application based thereon. Furthermore the manner in which any of such features of the specification or claims are described or defined may be amended, broadened or otherwise modified in any manner which falls within the knowledge of a person skilled in the relevant art, for example so as to encompass, either implicitly or explicitly, equivalents or generalisations thereof.

Claims

1. A lid ring for a polymeric container having means providing a variation in stiffness of the ring in the circumferential direction, whereby lid releasing means may be applied to a region of relatively high stiffness of the ring.

2. A lid ring according to claim 1, wherein the said stiffening means comprises web or rib means, said web or rib means having differing forms in said regions of differing ring stiffness.

3. A lid ring according to claim 2, wherein said differences of web or rib form include having a relieved portion in said webs or ribs which are located in a zone of lower stiffness.

4. A lid ring according to claim 2 or claim 3, wherein a circumferential flange is provided at said region of higher stiffness.

5. A lid ring according to any of the preceding claims, wherein there is provided more than one region of relatively high stiffness.

6. A lid ring acording to claim 5, wherein the said regions of relatively high stiffness are equally circumferentially spaced around the said ring.

7. A lid ring according to any of the preceding claims, including visual identification means for said region of higher stiffness.

8. A lid ring according to claim 7, wherein the said visual identification means includes tool receiving means on said lid ring to receive a de-lidding tool.

9. A polymeric container including a lid ring according to any claims 1 to 8.

10. A polymeric container having bottom and side walls defining bottom and side surfaces of the container, and having a stiffening zone extending around at least a portion of a periphery of the container at the bottom edge thereof, said stiffening zone being located within the interior angle between said bottom and side surfaces of the container and providing an internal surface connecting the walls defining said bottom and side surfaces.

11. A container according to claim 10, wherein the said stiffening zone has an extra wall interconnecting said bottom and side walls of the container.

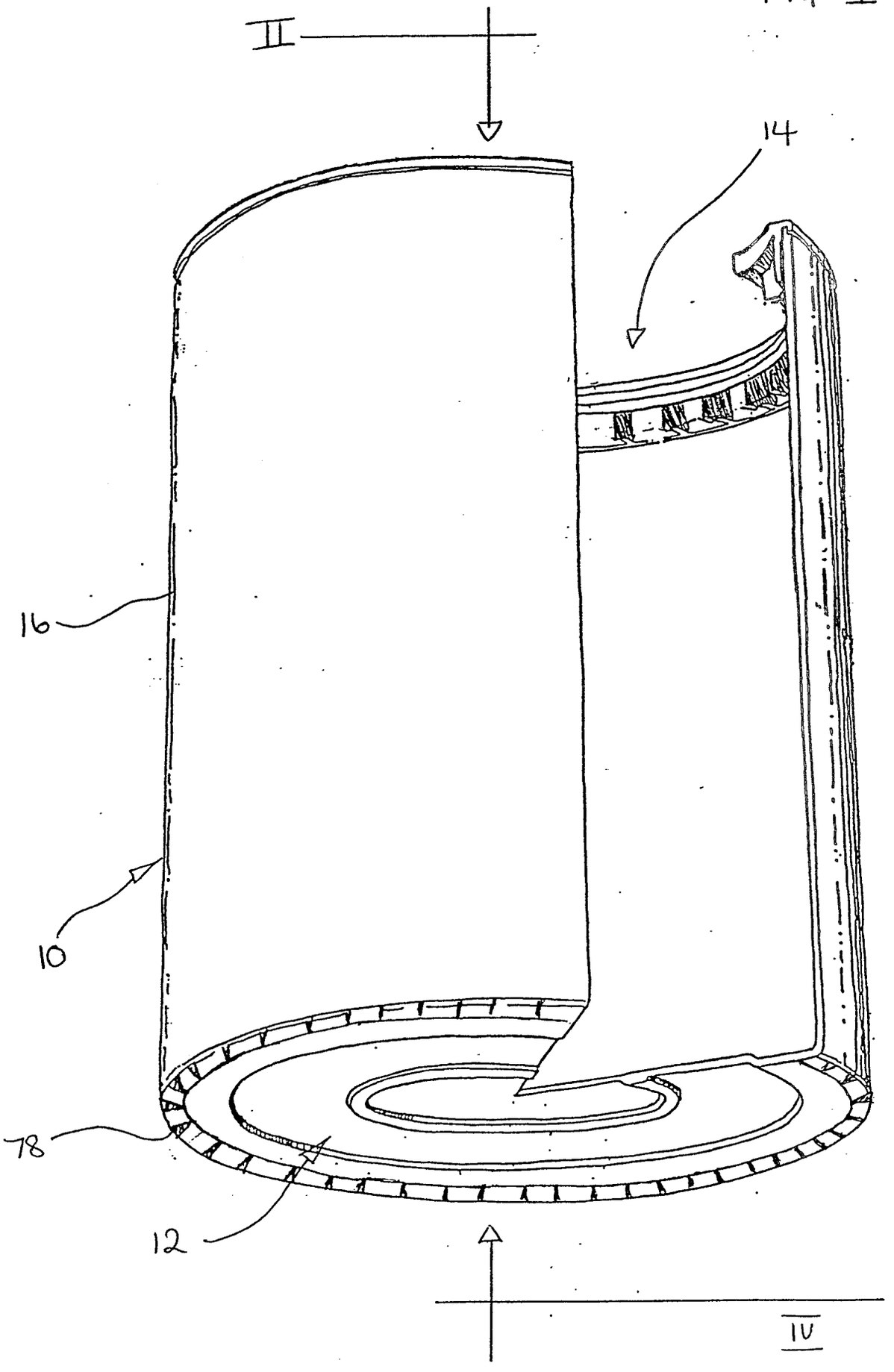
12. A container according to claim 10 or 11, wherein the said bottom and side walls terminate in the downward and outward directions, respectively, at the edges of said internal surface of said stiffening zone.

13. A container according to any of claims 10 to 12, wherein the said stiffening zone comprises spaced stiffeners.

14. A container according to any of claims 10 to 13, wherein the said stiffening zone has a generally wedge-shaped cross-sectional shape.

15. A container according to any one of claims 10 to 14, wherein the said stiffening zone is generally annular in form.

FIG 1



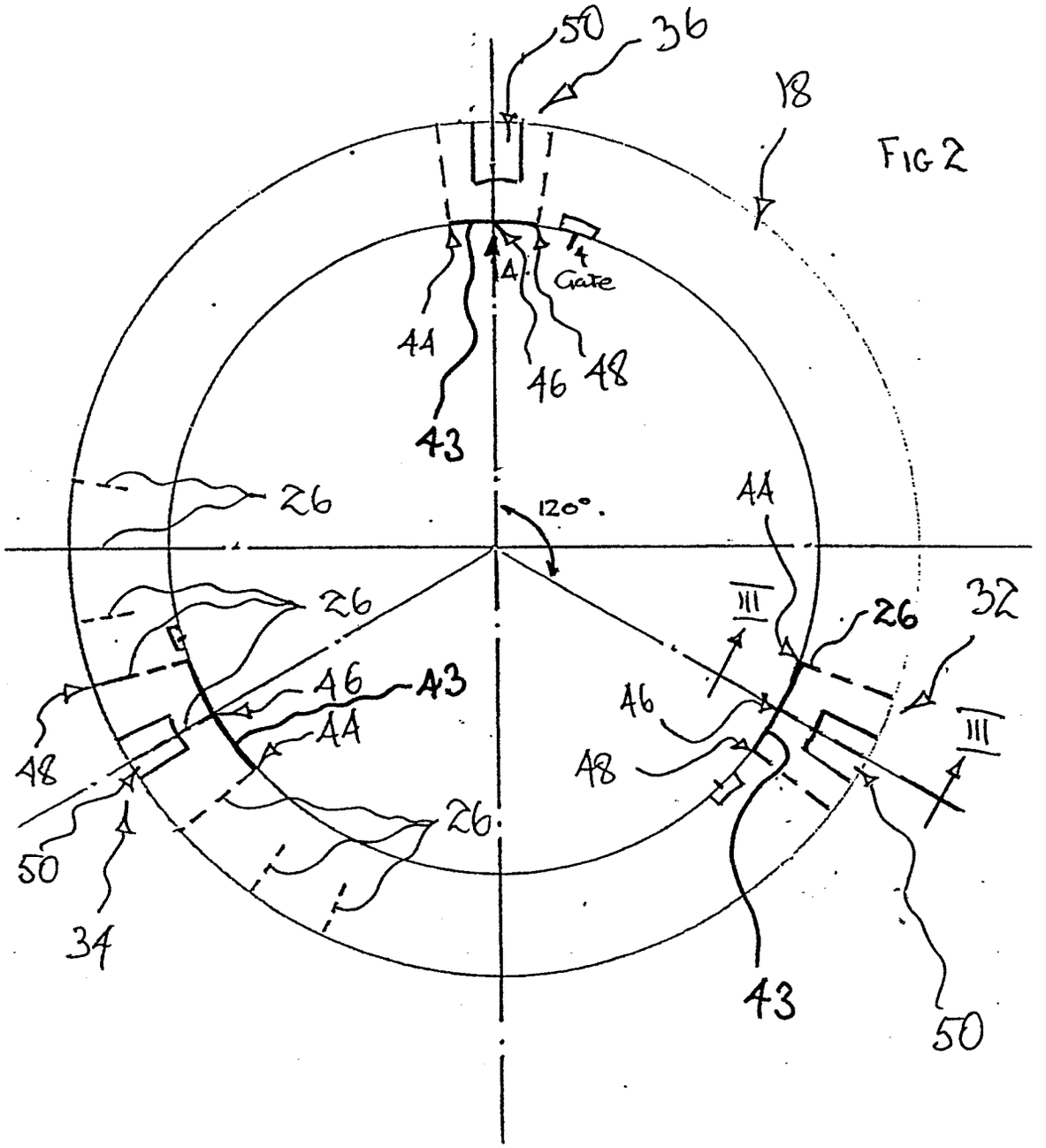


FIG 2

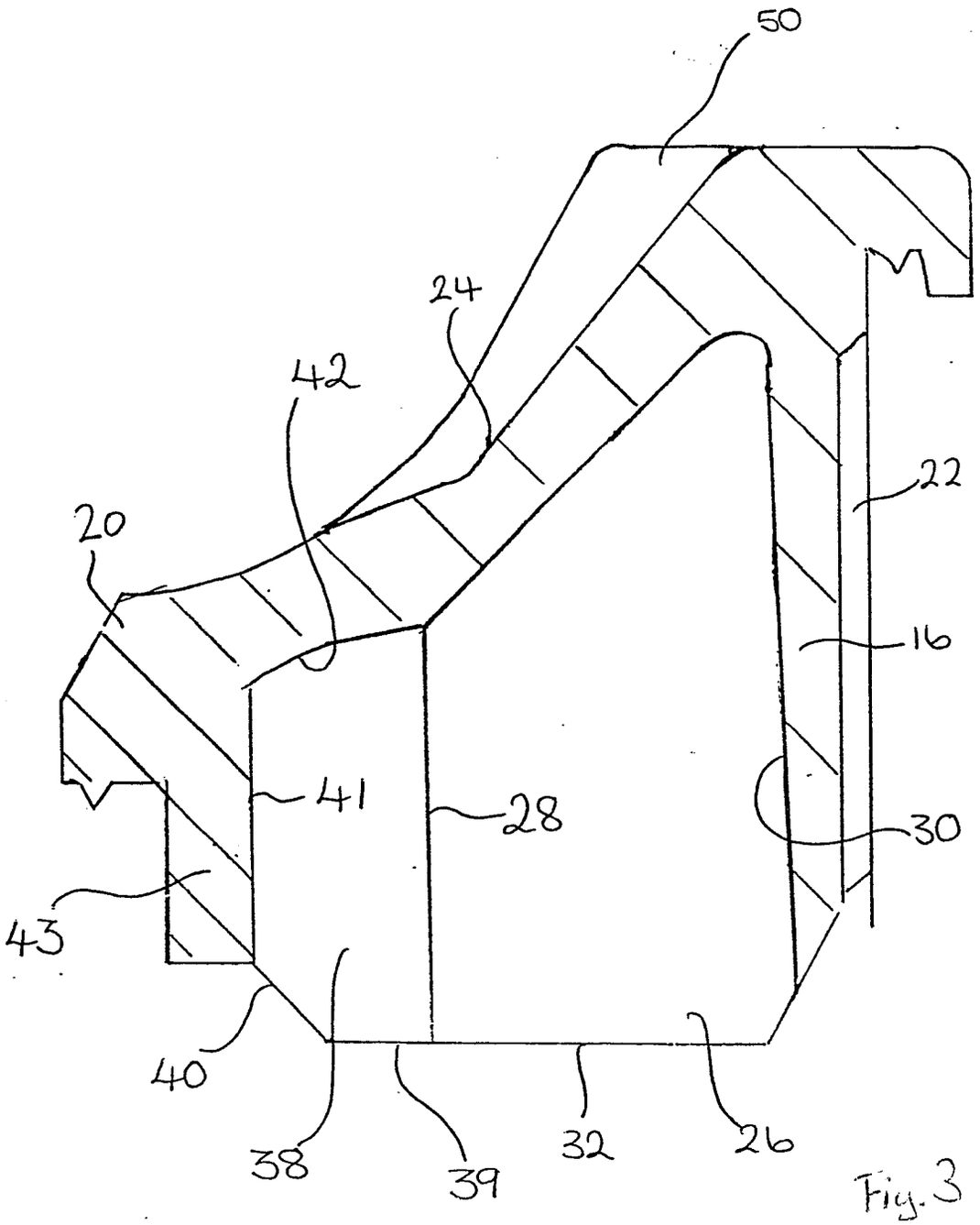


Fig. 3

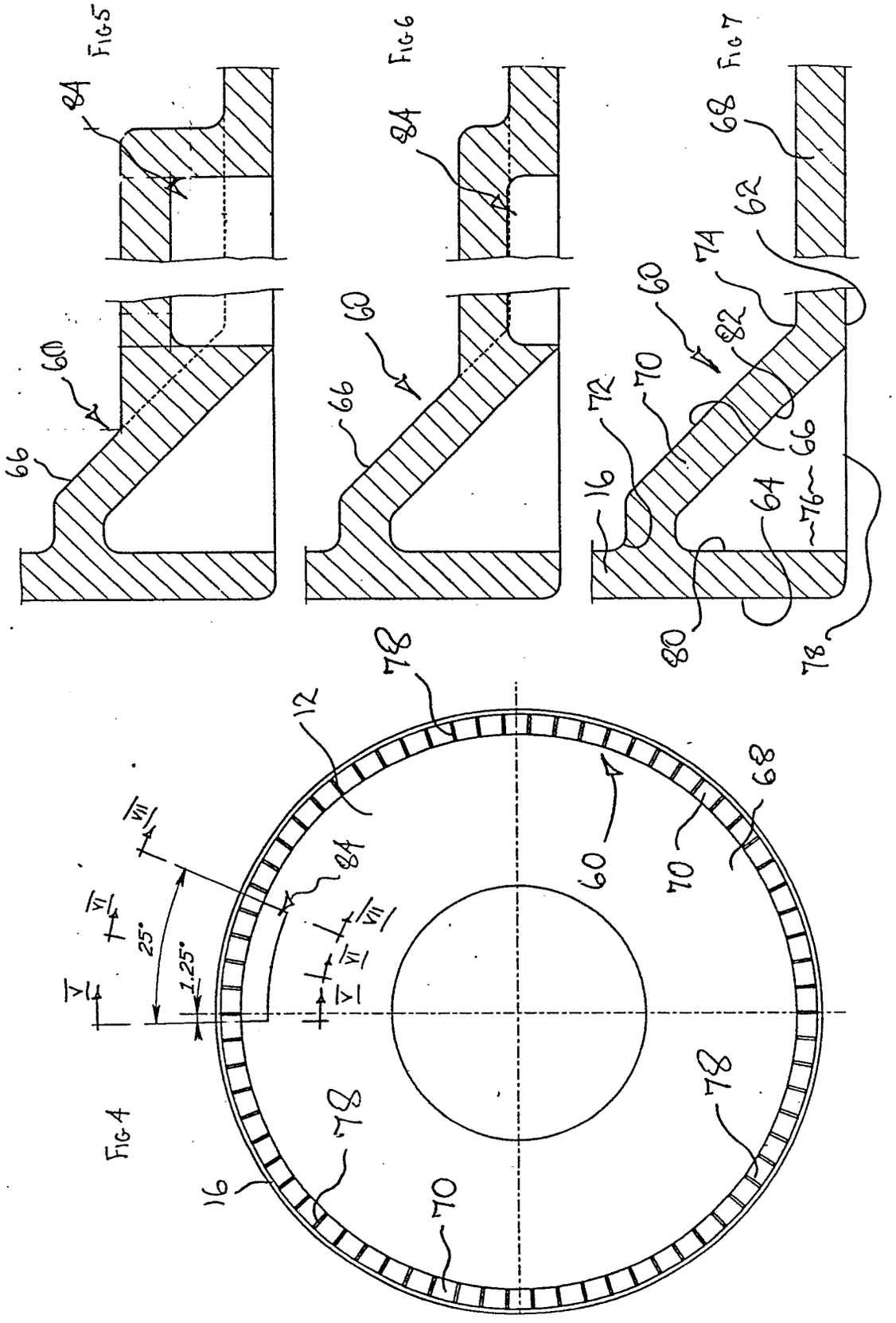


FIG 5
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FIG 6
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FIG 7
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FIG 4
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EUROPEAN SEARCH REPORT

Application Number

EP 89 30 8054

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	EP-A-0 144 197 (RAYNER) * Page 6, lines 1-13; page 10, last line - page 11, line 11; figures 1-3,13,14 *	1-3	B 65 D 43/04
A	WO-A-8 805 015 (BOXALL) * Page 5, line 13 - page 6, line 4; page 7, last paragraph; figures 1-3 *	1-9	
X	EP-A-0 050 000 (PRIOR) * Page 11, last line - page 12, line 6; figure 1 *	10-15	

TECHNICAL FIELDS SEARCHED (Int. Cl.5)

B 65 D
B 44 D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	16-10-1989	VANTOMME M.A.

CATEGORY OF CITED DOCUMENTS

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