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Moller

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[54] **ROOM MODULES WITH SANITARY DEVICES**

[76] Inventor: **Hans Gunter Moller,** Oldenburger Landstr. 50, 287 Delmenhorst, Germany

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[52] **U.S. Cl.** **4/2;** 4/146; 4/173

[51] **Int. Cl.²** **A47K 4/00**

[58] **Field of Search** 4/1–5, 146, 4/147, 148, 160, 162, 173, 191; 52/34, 35, 79

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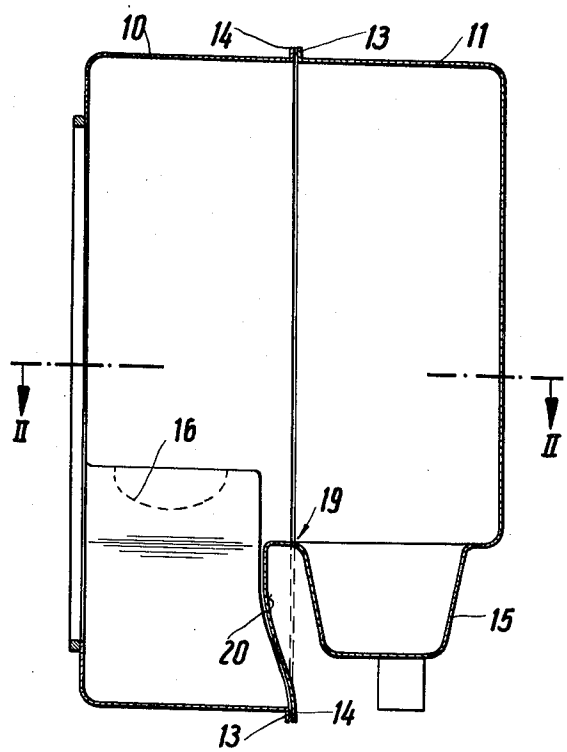
Primary Examiner—Henry K. Artis

Attorney, Agent, or Firm—Sughrue, Rothwell, Mion, Zinn & Macpeak

[57] **ABSTRACT**

A method for producing mouldings, more particularly parts of room modules with sanitary devices, so-called sanitary cells, from thermoplastics panels by deep-drawing in a deep-drawing device in which the plastics panel is clamped along its edge, the moulding having integrally moulded parts, more particularly sanitary parts wherein the clamped plastics panel is initially preformed against the deep-drawing deformation in the zone of outwardly projecting parts, more particularly sanitary devices, which project outwardly beyond the plane defined by the clamped edge of the plastics panel, and is then deep-drawn.

4 Claims, 5 Drawing Figures



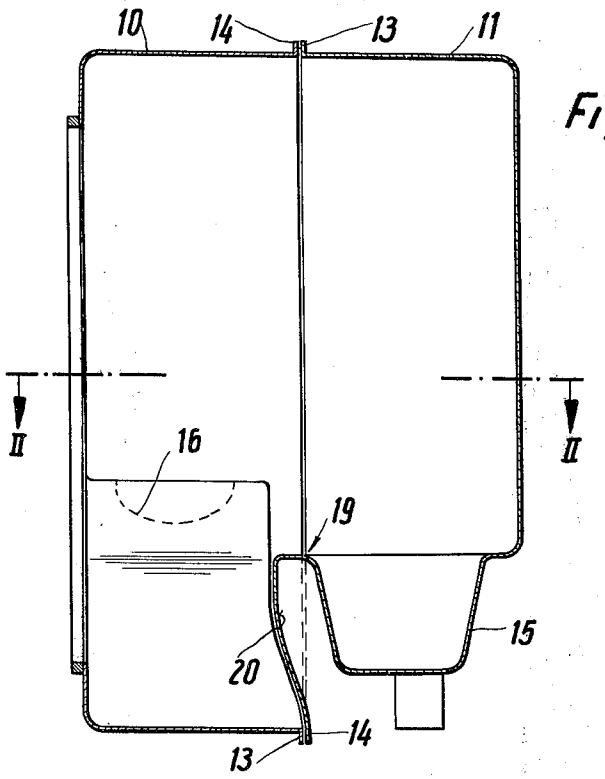


Fig. 1

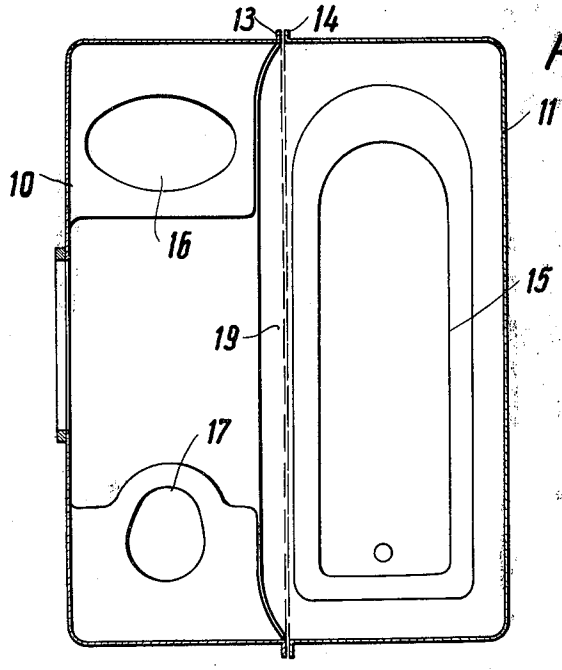


Fig. 2

Fig. 3

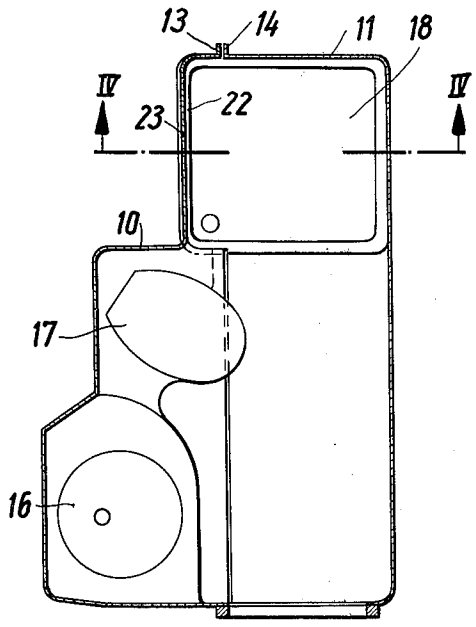


Fig. 4

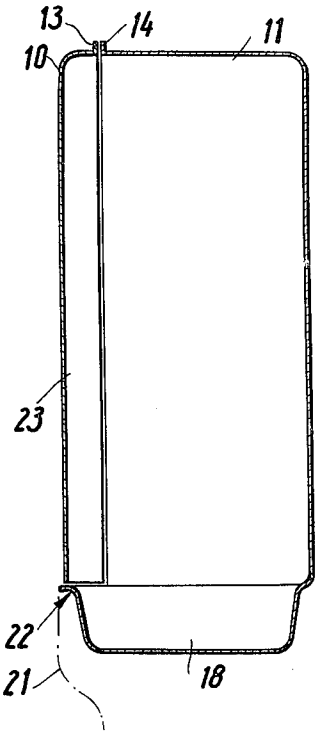
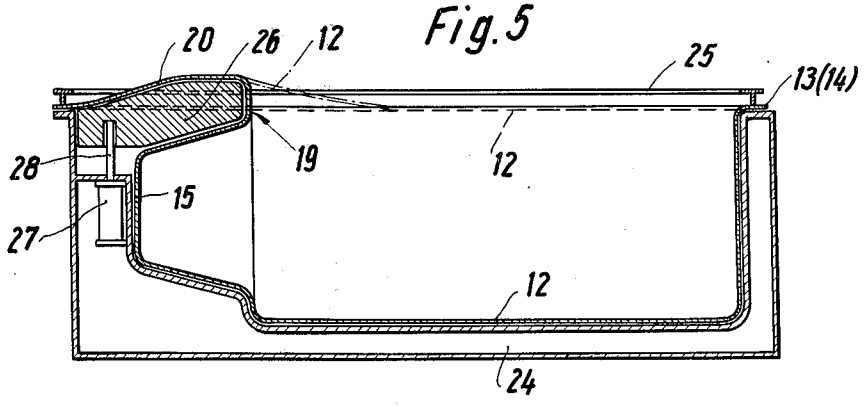


Fig. 5



ROOM MODULES WITH SANITARY DEVICES

The invention relates to a method and apparatus for the production of mouldings, more particularly parts of room modules with sanitary devices, of thermoplastics panels by deep drawing in deep-drawing apparatus in which the thermoplastics panel is clamped along its edge, the moulding having integrally moulded parts, more particularly sanitary devices. The invention also relates to a deep-drawn moulding, namely a room half for a room module with sanitary devices.

The invention relates principally to the construction and production of deep-drawn mouldings of large volume of the kind employed in sanitary engineering. More particularly, it relates to the production of parts such as halves for forming room modules with integrally moulded sanitary devices. Complete bathrooms and shower rooms of plastics material are formed by a proven method from two room halves which are produced by deep-drawing. The desired sanitary devices namely bath tubs, shower trays, wash basins, W.C. pans are integrally moulded when the aforementioned dish-shaped room parts of large volume are deep-drawn. The room halves formed in this manner are joined to each other along an approximately central vertical plane of the room module along a flanged edge of the moulding produced during the deep-drawing operation. The flanged edge results from the perimetric clamping of the plastics panel.

Since the room halves have only a limited depth, namely a depth which corresponds approximately to half the width or depth of the complete room module, the width or depth respectively of the sanitary devices which are integrally moulded during the deep-drawing operation is also subject to light limitations because the maximum dimension of the sanitary device in question cannot exceed the depth of the room half.

Since the depth or width respectively thus defined for the sanitary devices which are to be integrally moulded is frequently insufficient, more particularly in the case of bath tubs and shower trays, it is the object of the invention to propose measures by means for which the width or depth respectively of the integrally moulded parts, more particularly sanitary devices, may be dimensioned irrespective of the depth of the room half and despite the limited depth of the mouldings.

To solve this problem, the invention proposes a method in which the plastics panel which is clamped in the deep-drawing mould and is in the mouldable state is initially preformed against the deep-drawing deformation in the zone of parts, more particularly sanitary devices, which project outwardly beyond the plane defined by the clamped edge of the plastics panel, and is then deep-drawn. Preforming of the projecting zones of the mouldings is preferably preformed by movable mould parts of the deep-drawing mould.

In the method according to the invention, the plastics panel is formed in two directions in the deep-drawing mould after being plasticized namely initially out of the deep-drawing mould in the zone of the projecting parts and then in the usual manner by deep-drawing, namely inward drawing into the deep-drawing mould. The moulding thus produced has zones which project beyond the plane defined by the clamped edge.

The deep-drawing mould according to the invention for performing this method is provided with mould parts which are movable and may be locked in the limiting positions in accordance with the number and shape of zones which are to be performed.

The invention may be employed with particular advantage for the production of bath tubs and shower trays which are to be integrally moulded into the room half. It is proposed that the jacketed side member of the bath tub or shower tray respectively, nearest to the adjacent room half, is moulded by deformation of the outer wall of the said side member beyond the zone of the median parting plane of the room module. A bath tub or shower tray respectively of the required dimension will then be produced on room modules which are relatively small or narrow respectively.

Embodiments of mouldings constructed in accordance with the invention and of the deep-drawing mould will now be explained hereinbelow by reference to the accompanying drawings in which

FIG. 1 is a vertical section through a room module with sanitary devices assembled from mouldings according to the invention,

FIG. 2 is a horizontal section along the line II—II of FIG. 1,

FIG. 3 is another embodiment of a room module shown as a horizontal secton,

FIG. 4 is a vertical section IV—IV of FIG. 3,

FIG. 5 is a longitudinal section through a deep-drawing device according to the invention.

The invention relates principally to the production of room modules with integrally moulded sanitary devices. Room units of this kind, in which sanitary devices are provided at the works with the necessary fittings and connections, are referred to as "sanitary cells". Such sanitary cells are delivered ready for use to the location at which they are to be employed and are merely connected at such location, namely in the building structure, to the local services which are already available.

The room modules preferably comprise two room halves **10** and **11** each formed by deep-drawing of a thermoplastics panel **12** (FIG. 5). The room halves **10** are joined to each other, for example by adhesive fixing, welding or the like, along a flanged edge **13** or **14** respectively. The edge **13** of **14** respectively is formed by clamping the thermoplastics panel **12** into the deep-drawing mould.

The room halves **10** and **11** are provided during production by deep-drawing with integrally moulded sanitary devices, for example with a bath tub **15**, a wash basin **16**, a W.C. pan **17**, shower tray **18** and the like. Since such parts of the mouldings can be formed in only one of the room halves **10** and **11**, the depth of such room halves **10** or **11** respectively is frequently insufficient to permit optimum dimensioning of the parts, more particularly of the bath tub **15** and of the shower tray **18**.

This problem is eliminated in the room halves **10** and **11** which are constructed in accordance with the invention namely in that the moulding halves, preferably the bath tub **15** and the shower tray **18**, which are to be dimensioned to a greater width than the depth of the room halves **10** and **11**, are moulded beyond the imaginary median plane, defined by the edges **13** and **14** which are joined to each other, into the zone of the appropriate adjacent room half **10** or **11** respectively.

As may be seen particularly by reference to FIG. **1**, the side member **19**, associated with a bath tub **15** and being disposed nearest to the adjacent room half **10** is

correspondingly shaped, more particularly the outermost wall **20.** The latter is provided with an indentation, namely outside the perimetric edge **14** or **13** respectively. This produces a recess on the bath tub **15** which is desirable for the freedom of movement within the sanitary cell because the bath tub or its outer wall **20** respectively returns into the plane of the edge **14** in the floor zone.

The shower tray **18** in the embodiment illustrated in FIGS. **3** and **4** is similarly constructed. However, since it is difficult to install the service connections below the floor of the shower tray in the particular construction thereof the outer wall **21** of the side member **22,** initially formed when the shower tray is moulded, is subsequently cut off as far as the upper edge of the side member in order to provide easier access from that side to the underside of the shower tray **18.** A vertical wall **23,** formed in the zone of the adjacent room half **10,** is disposed in the plane of the side member **22** and forms a butt joint with the upper edge of side member **22.** The shower tray **18** is therefore accommodated in the sanitary cell with optimum dimensions and in a space-saving manner.

The room halves **10** and **11,** constructed in this way, are produced in a specially constructed deep-drawing mould, one embodiment of which is illustrated in FIG. **5.** The thermoplasics panel **12,** initially plane, is clamped on the upper edge of a rigid mould box **24** along its edge **13** or **14** respectively, for example by means of a perimetrically extending clamping frame **25.** The mould box **24** contains mould parts which correspond to the shape of the moulding which is to be produced. Individual mould parts are movably supported. In the illustrated embodiment a mould part **26,** adapted to form the side member **19** of a bath tub, is movably disposed in the deep-drawing mould. The mould part **26** may be moved beyond the plane defined by the clamped plastics panel **12** (dash-dot line) by actuating means, namely a pressure medium jack **27,** which is disposed in the deep-drawing mould, the plasticized plastics panel **12** being correspondingly raised in this zone. This is followed by the remaining part of the plastics panel **12** being formed by deep-drawing. To this end, the plastics panel **12** is drawn completely into the deep-drawing mould, namely into the mould box **24** and thus surrounds at least partially the mould part **26** to produce the hollow, double-walled side member **19.**

In the illustrated embodiment the mould part **26** is detachably supported on the piston rod **28** of the pressure medium cylinder **27.** When the finished moulding is stripped and because of the shape of the side member **19** thus formed, the mould part **26** is initially removed from the deep-drawing mould with the moulding and is subsequently removed from the zone of the side member **19.**

Appropriately constructed rise and fall mould parts which correspond to the mould part **26** and which may be interchangeable are provided for the production of other pre-drawn moulding zones.

I claim:

1. A moulding comprising a deep-drawn thermoplastics panel with integrally moulded sanitary devices such as a bath tub, shower tray, W.C. pan and the like for forming room modules or so-called sanitary cells by the assembly of two room halves along a longitudinal median plane defined by the outer edged of each half characterized in that at least one of the integrally moulded sanitary devices has an outer wall which projects outside the outer edge beyond the longitudinal median plane defined by the edges which are joined to each other.

2. A moulding as claimed in claim **1** wherein the outer side member is associated with the bath tub and the shower tray and being disposed nearest to the adjacent room half projects beyond the longitudinal median plane.

3. A moulding as claimed in claim **2** wherein the outer wall of a double-walled side member projects into the zone of the adjacent room half, beyond the longitudinal median plane.

4. A moulding as claimed in claim **2** wherein the outer wall of the side member, more particularly associated with the shower tray, is cut off to the upper edge of the side member and a vertical wall of the adjacent room half is mounted on the upper edge of the side member and is joined thereto.

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