May 7, 1963 R. H. LONG 3,088,124

BUILT-IN PLASTIC BATH TUB STRUCTURE

Filed June 8, 1961 2 Sheets-Sheet 1

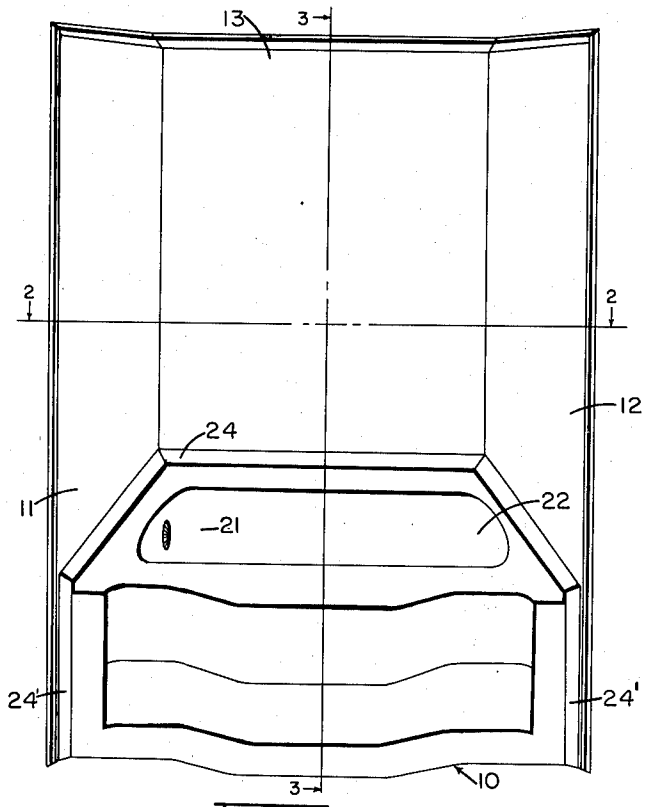


FIG 1

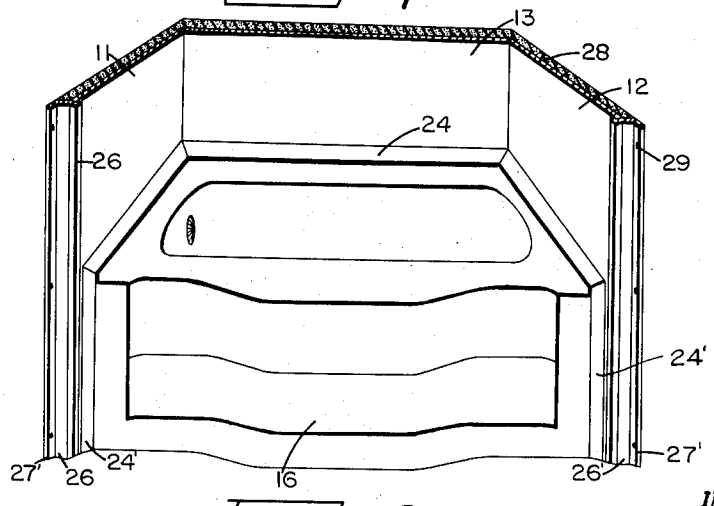


FIG 2

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BUILT-IN PLASTIC BATH TUB STRUCTURE

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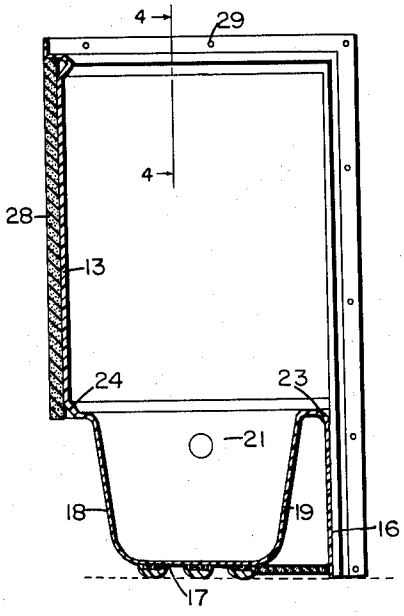


FIG 3

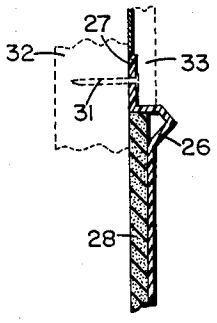


FIG 4

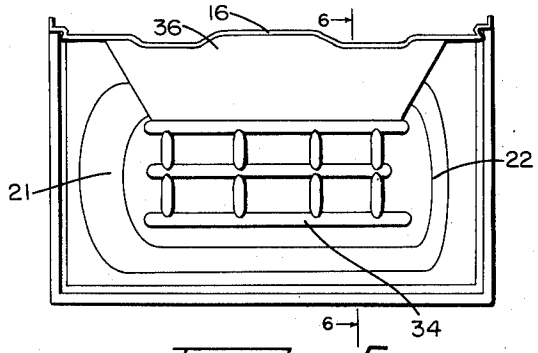


FIG 5

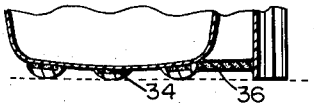


FIG 6

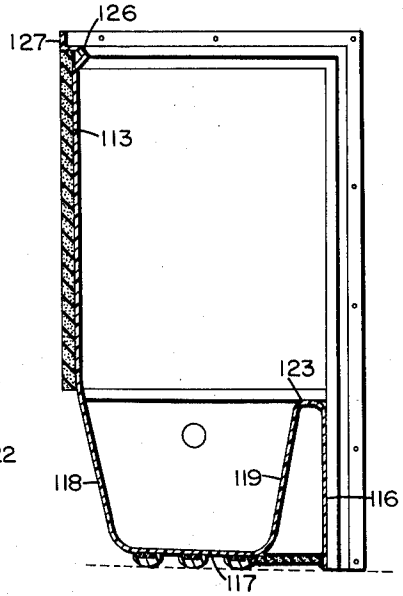


FIG 7

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BUILT-IN PLASTIC BATH TUB STRUCTURE

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2 Claims. (Cl. 4—173)

With the advent of modern plumbing and daily bathing, bath tubs became a subject of intensive development to produce an effective piece of equipment at a relatively reasonable price. As a consequence, bath tubs have for the last several decades generally comprised a cast or fabricated ferrous structure with a coat of fired porcelain enamel. At one time bath tubs were separate from the room in which they were used, and were supported on a suitable base set on the floor; but, with the advent of modern plumbing conveniences including combination tubs and showers, bath tubs have been designed to be mounted directly onto the floor and built into the room itself, so that only a curtain along one side is necessary to prevent splashing of shower water onto the floor.

In the so-called "built-in" tub, the tub itself is first roughed in and a layer of tile is then commonly set around three sides of the tub, the tile usually extending from the top edge of the tub to a suitable height—usually five or six feet above the floor line. Such tile not only has the effect of providing a pleasing appearance, but it is functional in protecting the wall of the bathroom by draining all water splashed from the tub or shower back into the tub itself for eventual drainage. Because of this arrangement there has usually been a cementitious joint between the bottom course of tile and the tub to prevent water leakage between the tile and tub. A tiled bath not only is relatively costly, but it has the further disadvantage that in the course of time the relative expansion and contraction of the various parts of the installation will gradually cause the cementitious material between the tub and tile to crack and thus permit water leakage around the top of the tub.

It is accordingly a principal object of my present invention to provide an improved built-in bath tub.

Another object is the provision of an improved built-in bath tub in which there is no differential expansion of contiguous members such as to cause cracking and leakage.

A further object is the provision of an improved built-in bath tub which can be installed at greatly decreased cost as contrasted with built-in bath tubs of the prior art.

Other specific objects and features of my invention will be apparent from the following detailed description taken with the accompanying drawings: wherein

FIG. 1 is an isometric view showing a preferred form of bath tub of the present invention;

FIG. 2 is a plan sectional view taken on the line **2**—**2** of FIG. 1 looking in the direction of the arrows;

FIG. 3 is a longitudinal vertical sectional view taken on the line **3**—**3** of FIG. 1;

FIG. 4 is a slightly enlarged fragmentary sectional view showing a structural feature;

FIG. 5 is a bottom plan view;

FIG. 6 is a fragmentary sectional view taken on the line **6**—**6** of FIG. 1, and

FIG. 7 is a sectional view similar to FIG. 3, but showing a modification.

In accomplishing the objects of the invention I produce a single piece unitary plastic structure including a tub member **10**, side members **11** and **12**, and a rear wall **13**. The tub **10** is preferably finished in white to have the appearance of white porcelain, although other colors may be utilized simulating types of colored porcelain enamels. The walls **11** through **13**, while having other features

and functions, generally provide the same function and may have the same appearance as the commonly provided tile which is normally laid on the wall around and above the tub. As mentioned, this is a single piece unitary body which is merely set into a suitable space provided in the bathroom and the entire structure mounted permanently in place as will be described.

Before referring to structural features I wish to explain briefly the manner in which the unitary body is produced. A mold is first formed which is the mirror image or reverse of the finished portion of the unitary device. Looking at FIG. 1, the mold would fit within the area there shown. It should be noted further that, from the device shown in FIG. 1, a mold can be formed by spraying the exterior smooth face of the unitary device with a suitable plastic material, permitting it to set suitably, and then removing it. Because of the stresses and strains incident to molding, however, the mold is suitably reinforced, all in accordance with methods known in the plastic industry.

Once the mold has been produced and has had its surface against which the plastic is to be applied finished with extreme smoothness, a coat of wax or other material to form a parting film is applied to it to prevent sticking and the portion of the mold which will form the tub **10** is then suitably masked to prevent the initially applied plastic material from reaching it. The portion of the mold forming the walls **11** through **13** is then sprayed with a clear plastic, such as a clear polyester resin. This clear coating is then sprayed or otherwise treated to form the design or finish which will be desired on the walls. This finish can simulate tile; it can be a solid color, or it may be broken up to form a "fleck" appearance, depending upon the overall design. The exact manner of forming the decorative exterior wall surface under the clear plastic depends to a considerable extent on the type of surface desired. Whatever the method of application, the clear plastic coat and the decorative coat preferably are first applied to the walls while the tub portion is masked to prevent accidental application of an undesired color thereto.

The next step is to remove the masking material from the tub portion of the mold and spray the entire exterior of the mold with a dense white plastic, of which several commercial products are available. I have found that the product known as "Gel Coat" white, in which very finely divided titanium dioxide is the color medium, is very suitable for the purpose. After the white coating has been applied and permitted to set for a short time, I then apply a coating of black or colored plastic, using a polyester as in the previous applications. The colored coating has the effect of showing up any irregularities such as bubbles which might have developed during the spraying of the white coating.

The next step is to spray a so-called fiberglass coat consisting of glass fibers and polyester resin at relatively high pressure over the entire surface, followed by a finish coat of polyester resin. In general, the fiberglass coat is approximately $\frac{1}{32}$ inch thick, and the finish coat $\frac{1}{8}$ inch thick at the sides and $\frac{3}{16}$ inch thick at the tub portion, although these dimensions may vary somewhat. I also employ certain reinforcing features, but the details of such reinforcement will be explained after a more detailed description of the structure as a whole.

Looking now first at the tub portion, it includes a front skirt **16**, and a tub portion consisting of a bottom wall **17**, tapered back and front side walls **18** and **19**, and tapered end walls **21** and **22**. As may be seen particularly in FIG. 3, the front skirt **16** is connected to the front side wall **19** by a rounded top rim portion **23**, and this rounded top portion runs entirely around the tub to simulate a standard porcelain tub shape. The skirt **16** is shaped

to reinforce the structure and improve its appearance as FIGS. 1 and 2 show. The rounded upper rim portion **23** runs entirely around the top of the tub, and while generally identical in shape and appearance as the top rim of an ordinary porcelainized metal tub, it connects directly to the walls **11** through **13**. The walls **11** through **13** communicate with this rim through an integral angle strip **24** which acts as a reinforcement and has the general appearance of the usual cementitious joint between the tub and wall tile.

As shown particularly in FIG. 4, the periphery of the walls **11** through **13** at the top and sides has an integral projecting angular portion **26**, with an integral offset projection **27** displaced from the plane of the wall proper approximately the thickness of a polyurethane backing strip **28**. The offset projection **27** may be provided with a plurality of holes **29** for the passage of nails **31** to secure the entire device in place by attachment to the studding of the room in which the tub is installed. In FIG. 4 I indicate a section of such studding at **32** to show the manner in which nails may be driven through the attachment to secure the entire unitary bath tub assembly in place. After the bath tub assembly of the present invention is nailed or otherwise secured in position, plaster or plasterboard **33** is applied so that there is a finished appearance throughout the entire periphery, and the walls **11** through **13** project slightly from the wall in the general manner of tile.

In the preceding paragraph I described the projecting angular portion **26** and offset projection **27** which acts as an attachment strip. Looking at FIGS. 1 through 3 it will be noted that both the said angular projection **26** and the attachment strip **27** extend peripherally entirely around the structure except for the bottom of the skirt **16**. The angle strip **24** between the tub and side walls also extend around to the front portion of the structure. For convenience of identification this extension of the angle strip **24** is indicated by the reference character **24'** as it extends vertically upwardly and the contiguous end of the angular projection **26** and attachment strip **27** are identified by the reference characters **26'** and **27'** respectively. It is obvious that unlike the tile in most built-in bath tub installations the integral side walls **11** and **12** extend somewhat in front of the tub **10** so that the attachment strip **27** assists in maintaining a very rigid assembly, but it also extends under the plaster clear down to the floor or baseboard line and produces a much improved installation, as contrasted with the conventional installations of the prior art.

To reinforce the tub at the bottom I provide a plurality of reinforcing strips **34** arranged to form a grid. The strips are preferably about ¾ inch thick and about two inches wide, and may comprise various types of material. I have found a material like polyurethane foam plastic particularly suitable for the purpose. When a material like polyurethane foam plastic is used for the strips its function primarily is to produce the equivalent of a void in the structure so that a spaced strip structure having a cantilever-like action is produced without adding substantially to the weight. In applying the strips the tub is first finished with a layer of fiberglass and a layer of plastic to a total thickness of about 3/16 inch, after which the strips are set on the still wet plastic to secure them in position. A fiberglass layer is then applied over the entire area to incapsulate the strips completely, and this may be followed with a finishing plastic layer to produce the final structure. I may also apply the strips by means of a resinous adhesive after the plastic coating has dried, and then cover them with the incapsulating layers, or I may also apply the strips over the relatively thin fiberglass layer, covering the entire area with plastic, then another layer of fiberglass and finally with the finishing plastic coating. I may also but less advantageously use a material which in itself has considerable reinforcing action, such as a relatively thinner fiberglass strip, but the foam-type strip is preferred and appears to give the most rigid construction with the least weight.

To reinforce the bottom of the skirt **16** I utilize a reinforcing strip **36**, and this may also be a strip of polyurethane foam, which is applied in position after the strips **34** are partly incapsulated, the final coating of polyester resin being applied over the entire bottom surface including the reinforcing strip **36** to serve the effect both of holding it in position and of partly strengthening it.

With further reference to the production of the unitary built-in bath tube of the present invention, it should be understood that the mold is shaped to extend within the tub and in contact with the faces forming a continuation of the interior of the tube as they appear particularly in FIG. 1. During the molding operation, therefore, the parts will occupy a position reverse to that shown in FIG. 1. In other words, the bottom of the tub will be at the top and the upper rim of the side walls **11** through **13** at the bottom. This makes it impossible to completely finish the bottom of the tub with the reinforcing strips **34** and **36** as they appear in FIGS. 5 and 6 before the structure is removed from the mold. It will be noted that the peripheral angular projection **26** is, as a result, partly recessed or "under cut." Since the walls are relatively more flexible, however, they can be sprung away from the mold if care is employed to prevent cracking, it being obvious that for most efficient use of molds the completed tub must be removed before the plastic has reached its maximum set. I have found that by forcing water between the mold and the finished casting the latter may be "floated" away from the mold and freely removed without damage to its surface or basic structure. Other fluids comprising other liquids and gases under pressure can be used in the same way to separate the plastic coating from the mold.

In general it is preferable that the backing strips **28** be applied after the casting has been removed from the mold. These backing strips are a suitable cushioning, strengthening and sound-deadening material, and polyurethane foam in sheet form is very suitable for the purpose. The thickness of the backing strips **28** is such that when the offset projection **27** is nailed to the studding or lathing the backing strips **28** will be engaged between the structure of the building and the walls **11** through **13**. This makes a very firm and finished structure after permanent installation.

In FIG. 7 I show a modification in which the upper rim **123** extends only along the front side of the tub between the skirt **116** and the front side **119** of the tub. For convenience and to shorten the description I have applied the same reference characters to the modification as employed in the main embodiment with, however, the prefix "1" to indicate modification. Those skilled in the art will understand that the ordinary porcelain-covered iron or steel tub must have the top rim running entirely around the tub to satisfy structural requirements and to provide a surface against which the tile can abut when the tub is installed. As FIG. 7 shows, my invention permits the tub to be a direct continuation of the side wall without a break if desired, or with any type of discontinuity which may be desired from a straight appearance standpoint, rather than from the standpoint of function. This feature permits the over-all cost of the device to be reduced, makes possible the provision of a given tub size with less over-all space requirement, or actually the provision of a larger tub without the loss of space. The tub assembly shown in the main embodiment in other words is in general and in a fashion a replica of an installation comprising a porcelain-covered metal tub with tiled walls around it, but the unitary tub assembly of the present invention actually permits considerable simplification and improvement of actual installations by simple attachment of a complete unitary body within a building space shaped to receive it.

While the terms used in the specification in general have their customary meaning, I employ the term "built-in" in the title and in the claims to identify a tub unit adapted to be built into a house, rather than one which is already built in. The term, therefore, is used as an adjective in the instances noted.

I have described my invention in detail so that those skilled in the art may understand the manner of practising the same, but the scope of the invention is defined by the claims.

I claim:

1. A built-in bath tube comprising a unitary plastic body having a tube portion and three unitary wall members extending upwardly from the tub, said wall members having a laterally rearwardly displaced attachment strip running entirely around the periphery of the wall members and continuing on down at sides of the tub to a floor line, and padding material adhesively secured to rear faces of said walls.

2. A built-in bath tube comprising a unitary plastic structure having a tub portion with bottom, back and front side, and end walls, a skirt connected to the front side wall by a rounded top rim, a grid shaped reinforcement body on a bottom outer surface of said tub bottom, said reinforcement body resting directly on a bathroom floor a reinforcing strip above the floor between said front side and a bottom portion of said skirt, said rear side wall and end walls of the tub portion being shaped to form rounded top rims comprising continuations of said rounded top rim between said skirt and said front side, and end walls, a skirt connected to the front forming generally right angular continuations of the end walls and rear side wall top rims, an integral peripheral angular forward projection from said side walls extending downwardly at side edges of the tub skirt, an integral peripheral attachment strip displaced laterally from said integral peripheral projections and rearwardly from the wall members, said peripheral attachment strip adapted for attachment as by nailing to building structural members, and adapted to be covered by plaster and a cushioning backing strip secured to the rear of the room wall members and lying between the said room wall members and building structural members when the attachment strip has been secured in place.

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