March 23, 1926. 1,577,608

F. C. BREWER

BATH MAT AND THE LIKE

Filed Sept. 4, 1924

Fig. 1.

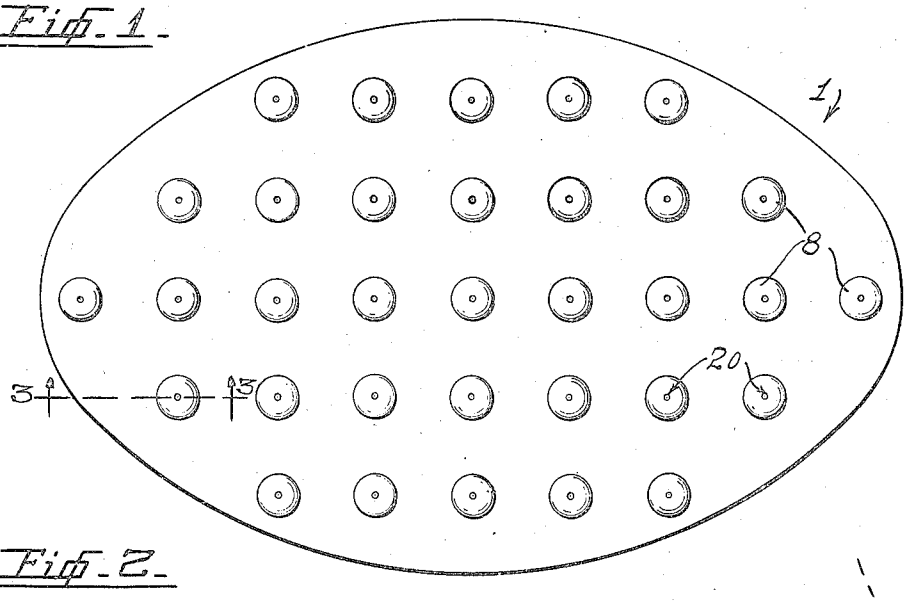


Fig. 2.

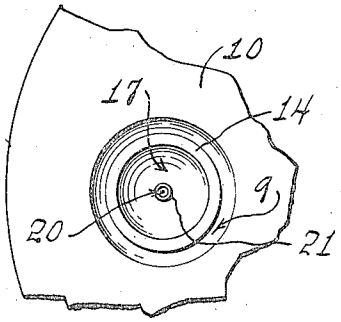


Fig. 5.

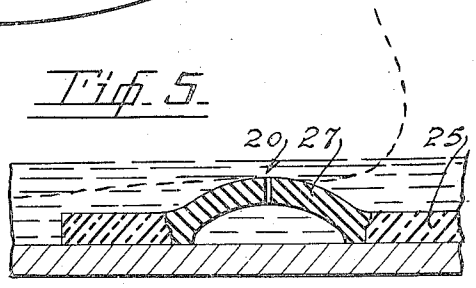


Fig. 6.

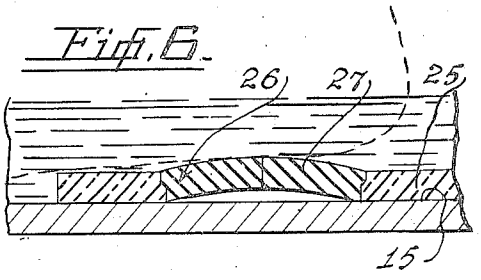


Fig. 3.

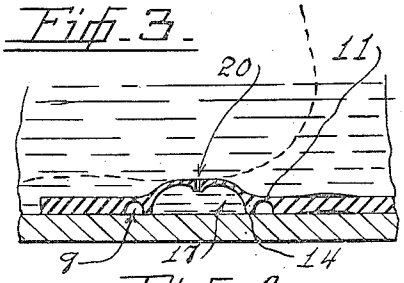
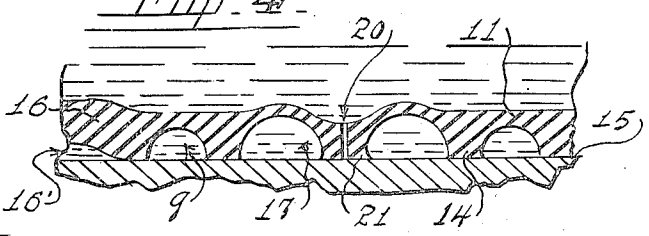


Fig. 4.



Frederick C. Brewer,
Inventor.

J. W. Shelley
Attorney.

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UNITED STATES PATENT OFFICE.

FREDERICK C. BREWER, OF LOS ANGELES, CALIFORNIA.

BATH MAT AND THE LIKE.

Application filed September 4, 1924. Serial No. 735,877.

To all whom it may concern:

Be it known that I, FREDERICK C. BREWER, a citizen of the United States, and a resident of Los Angeles, in the county of Los Angeles and State of California, have invented new and useful Improvements in Bath Mats and the like, of which the following is a specification.

My invention relates to mats for use in connection with bath tubs, shower baths and the like, to insure safe footing upon enameled and like surfaces in the presence of water. The invention has for its principal object the provision of a mat which may be caused to adhere to, or frictionally engage, such a surface.

Another object of the invention is to provide a mat which will employ external or atmospheric pressure to hold it detachably secured to a smooth or wet surface.

Another object of the invention is to provide a mat which, while capable of adhering strongly against lateral movement, may be readily removed even by a child or invalid.

Another object of the invention is to provide an improved "vacuum cup" attaching means for mats and the like.

Still another object of the invention is to provide a mat which may be caused to adhere to a submerged wet surface without effort on the part of the user. It will be understood in the consideration of this invention that usual bath mats when thrown into a tub of water do not gravitate to correct position, but tend to skid over into the corner of the tub. Furthermore, when the usual bath mat is at the bottom of the tub, it takes voluntary and even skillful effort on the part of the user to make same adhere suitably.

It is therefore another object of my invention to provide a mat of the character described which will prove to be somewhat automatic in so far as attachment is concerned.

Still another object of my invention is to provide a vacuum cup means for attaching same, which is simple, economical of manufacture and long lived.

Still other objects and advantages of my invention will appear hereinafter.

I have illustrated by the accompanying drawings one practical embodiment of my invention.

In the said drawings,

Figure 1, is a plan view of a bath mat which includes the salient features of my invention;

Figure 2, is a view in bottom elevation of a fragmentary part thereof;

Figure 3, is an enlarged detail section through one of a plurality of improved vacuum cups, such as are integrally incorporated in my improved mat;

Figure 4, is a view similar to Fig. 3, showing a vacuum cup in operative position; Figure 5, is a view in section of a part of a modified form of mat, and Figure 6, is a similar view showing the mat in applied position.

In carrying out my invention in its application to bath mats, I provide an integral moulded mat 1, of a suitable material, such as rubber or composition. The composition and structure of mats for submergence in soapy water and the like is well understood by those skilled in the art and need not be discussed herein. The only requisite, in so far as the action of the mat is concerned, is that the material have substantial resiliency throughout its structure, or at certain required points, as will appear hereinafter.

In moulding the mat it is provided with a plurality of suitably spaced and arranged concavo-convexities, or domes 8. While each dome is, at least in the embodiments shown in Figs. 1 to 4, inclusive, an integral part of the mat, an encompassing annular groove 9 is provided in the undersurface 10, for each dome. Thus the dome is in effect a complete member in itself connected to the mat by the thin annular bridge of rubber at 11.

The bridge and annular groove have several purposes and functions. The groove particularly because of the thin bridge of rubber permits of displacement and distortion of the dome without resistance on the part of the body of the mat. The existence of the groove provides a well defined annulus or annular lip 14, on which the dome stands, and it assures of slight pressure moving the dome firmly and evenly into

contact with an underlying surface, such as 15, even should the adjacent portions of the mat tend to rest unevenly on the said surface. In fact, the flexibility provided by the thin bridge will permit of the intermediate portions of the mat, such as 16, being warped away from the underlying surface without tendency to pull the dome away from the surface. Such a condition is shown graphically exaggerated in Fig. 4. In fact, water occupying the space 17 in the dome might even be displaced therefrom to points underlying portions, such as 16', while leaving the dome or vacuum cup in perfect contact with the underlying surface.

The accompanying drawing, Fig. 4, is just twice the actual scale of a successful embodiment of my invention, but of course the proportions of the parts and the relative thickness of the rubber at different points are all effected by the nature of the mixture used.

Now, it is a recognized fact that one of the prime objections to the ordinary vacuum cup, or fly-foot, or like device, is that it requires voluntary effort to apply same, if not some skill, and in a bath mat all the domes would have to be applied, or pressed into suction position, before it would be safe to step upon the mat. If this is not done, the first weight coming upon a dome will cause water to squirt out from under same, and there is a tendency for the mat to skid during this time. If a small number of vacuum cups of large area are used it is very difficult to remove the mat.

Therefore, in conformance with one salient feature of my invention, I provide a comparatively large number of small vacuum cups so that the mat is effective in adhering, but is readily removed because the vacuums are broken one at a time. It is true of my mat, that by virtue of the slight connections between the mat proper and the vacuum cups, water may be displaced from the cup cavity into spaces which may occur under portions 16, without skidding the mat, and without reacting on the vacuum cup. However, I do not depend upon such possibility, and in conformance with the invention and the objects thereof, each dome is provided with a central outlet aperture 20.

Aperture 20 may be of practically any reasonable diameter in the embodiment shown in Figs. 1 to 4. Said aperture provides an easy outlet for the concavities. Preferably, though not essentially, a depending annular lip 21 is provided around the aperture. The domes are evenly distributed over the mat and of course one or more will be stepped upon without fail the instant a person's foot comes in contact with the mat. In Fig. 3 I have shown in broken outline a human heel just coming into contact with a dome.

The operation and application of the mat just described is as follows:—It may be thrown into a tub or the like (not shown) containing water. Because of the apertures in each dome it will sink easily, rapidly, and even straight downward. As the mat descends, water will flow upward through the domes, and long before the mat has sunk all air will be excluded.

Now, when any object, such as convexities of the human foot, come in contact with a dome, the dome will be flattened and part of the contained water displaced will escape through the dome. This is true, even should the object come quite directly over the aperture. If of course the object is applied so centrally as to close the aperture then the displaced water will flow out under a portion of the mat, such as at 17, but any buckling of such portion will not affect the dome.

Now, when the inner annulus and the outer annulus are both in contact with the surface of the tub, the result is an annular vacuum cup. The two annuli are of course compressed slightly, and the entire structure of the dome, tending to resume normal position will create a pressure reduction in the normal annular concavity. Because of the absence of air, the pressure reduction is considerable, with the slightest return movement of any part of the dome structure. The resultant vacuum holds the vacuum cup to the surface with a peculiar tenacity that resists lateral movement in a thorough and practical manner.

In the form of the invention shown in Figs. 5 and 6, I provide a less resilient, and substantially non-displaceable material for the body of the mat 25. Said material may be a semi-hard rubber or like composition. The body is provided with a plurality of large apertures 26, and in each there is provided a single apertured dome 27, made of a higher grade and a more resilient material, such as gum. Now it will be apparent that when the dome is stepped upon, as shown by Fig. 6, the gum will be all crowded into the space below the pressing object and within the aperture of the mat. As a consequence the compressed rubber will fill the large aperture to the complete exclusion of the aperture in the dome. With water excluded from below the dome, natural resiliency of the dome will maintain a diminished pressure under the dome and the usual vacuum cup advantages will be realized.

While I have shown and described specific construction and arrangements of parts, I do not limit myself thereto, and while I have illustrated the vacuum cup invention as applied to a mat, I do not limit myself to such application, and I may employ other constructions and arrangements for the parts shown, and may apply my invention to any

article for attachment to a smooth surface, without enlarging the scope of my invention, within the appended claims.

I claim,

1. A vacuum cup comprising a resilient dome provided with a central aperture, an outer annular lip for suction engagement with a smooth surface, and an inner annular integral lip immediately surrounding said aperture; the dome being adapted for depression to bring said inner lip into contact with a smooth surface on which the outer lip rests and the inner lip being resilient and adapted for suction engagement with such surface.

2. In a device of the class described, a mat adapted for submergence and with a plurality of vacuum cups; each vacuum cup comprising a resilient dome provided with a central aperture, an outer annular lip for suction engagement with a smooth surface, and an inner annular integral lip immediately surrounding said aperture; the dome being adapted for depression to bring said inner lip into contact with a smooth surface on which the outer lip rests and the inner lip being resilient and adapted for suction engagement with such surface.

3. A bath mat comprising a sheet of submersible material provided with a plurality of substantially integral concavo-convex rubber domes, each having a lower annular lip adapted for suction engagement with a smooth surface; the upper central part of each dome being provided with a central aperture and adapted to be depressed to bring that portion of the rubber surrounding said aperture into contact with a surface on which the outer lip is resting.

4. A bath mat comprising a sheet of submersible material provided with a plurality of rubber domes; each dome provided with a central aperture and being sufficiently shallow and resilient as to allow for that portion which surrounds the aperture being depressed until in suction contact with a surface on which the mat is then reposing.

FREDERICK C. BREWER.