Jan. 4, 1927. 1,613,158

F. C. BREWER

BATH MAT AND THE LIKE

Filed March 28, 1925

Fig. 1.

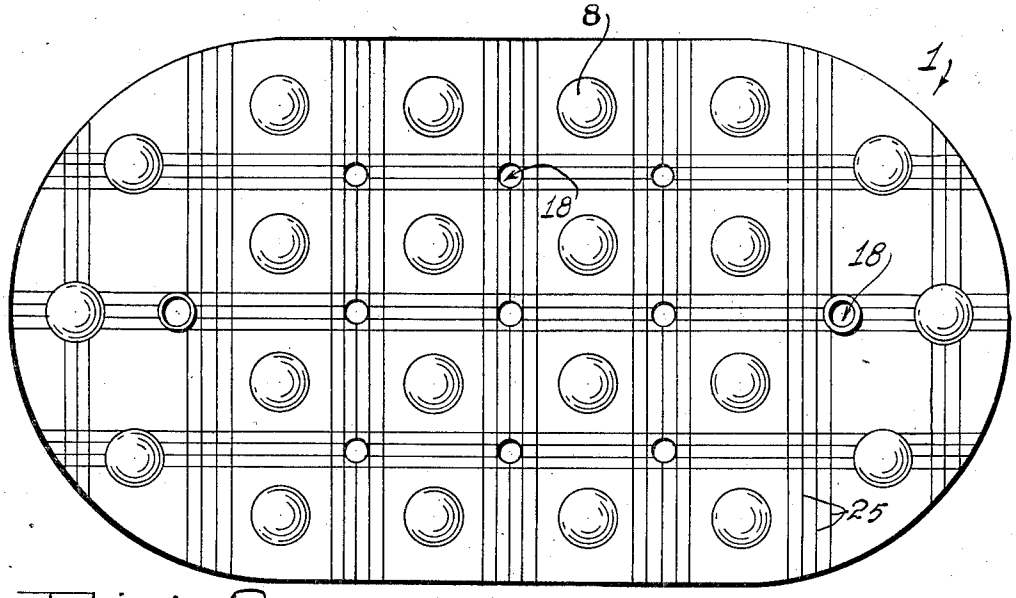


Fig. 2.

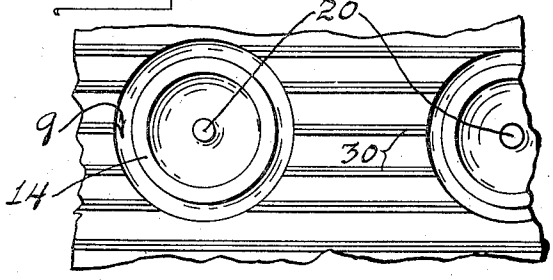
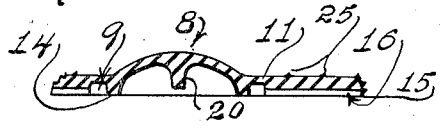


Fig. 3.



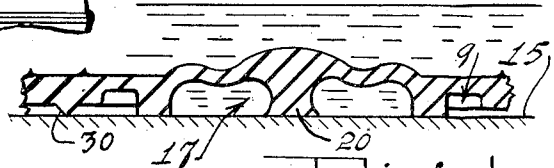


Fig. 4.

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UNITED STATES PATENT OFFICE.

FREDERICK C. BREWER, OF LOS ANGELES, CALIFORNIA.

BATH MAT AND THE LIKE.

Application filed March 28, 1925. Serial No. 19,018.

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.

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 embodiment 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 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 affected by the nature of the mixture used.

The mat is provided with a plurality of perforations to allow it to sink rapidly and as straight downward as practical.

It is a recognized fact about the ordinary fly foot or vacuum cup, that its tendency to adhere to a surface, particularly under water, is only as great as is its tendency to return to its normal shape; or, in other words, when a vacuum cup is applied to a surface, it must be depressed somewhat so that the volume of space under the cup or dome is decreased effectively. The resiliency of the dome or cup produces an appreciable tendency to return to normal position and increase the volume of the cavity with the result that a suction effect or partial vacuum is produced. The stronger the vacuum cup is the greater the suction effect produced. Under water the slightest increase in volume produces an immediate pressure difference, because the water is comparatively non-expanding as compared to air.

Now it is an object of the present invention to provide a submersible vacuum cup for a bath mat and for other purposes, which is so designed that it is comparatively weak, easily depressed or collapsed and which, in spite of such weakness, will pull a strong vacuum and have an unusually strong suction. Realizing that a bath mat should attach itself firmly to the bottom of a bath tub even by the slightest touch on one vacuum cup, I have provided the novel feature about to be described.

The vacuum cups or domes are each comparatively thin walled and very easily depressed. If, for instance, the entire weight of a person's foot falls on points intermediate of the cups while some portion of the foot, such as a toe, touches a cup lightly, said cup will be collapsed, partially at least, because its wall is thin and quite yieldable.

In conformance with a salient feature of my invention, each dome is provided with a central depending stem 20. Said stem is so arranged that when the cup is in normal position it does not quite touch the surface on which the mat is resting.

In the operation of the device it is found that slight pressure applied to a dome will cause it to be depressed slightly so that the stem 20 is brought into contact with the said surface. Since the stem is of small diameter and of comparatively soft rubber, it is obvious that very slight pressure will cause it to be depressed and mushroomed out as shown.

It will be apparent now that when the stem is compressed as shown, its resiliency, or tendency to return to normal length, will cause an upward thrust on the dome, and said thrust will be truly centrally of the dome. Thus the compressed stem tends to force the dome upwardly and evenly coaxially. Such induced tendency for the dome is obviously better than if the resiliency of the dome alone were depended upon. In fact, it is not essential that the dome itself be elastic or resilient. Obviously a thin walled dome of soft rubber may sometimes be depressed without showing any tendency to return to normal sufficient to produce a suction effect.

The mat is provided underneath with integral inverted triangular ribs 30. The suction produced by the vacuum cups tends to compress these thin ribs appreciably (not shown particularly in the drawings) so that sliding of the mat along the surface to which it is applied, is rendered more difficult.

It will be apparent now that I have provided a vacuum cup which provides or produces a high degree of vacuum without requiring the usual amount of pressure to apply it and which vacuum cup, applied in multiple to a bath mat, will produce a mat in which the slight pressure of even the toe of a child's foot will be sufficient to cause the mat to adhere to a bath tub surface or the like.

I claim:

1. In combination with a resilient mat having upper and lower surfaces, integral domes arched above the upper surface and presenting unoccupied cavities, and integral solid stems; one for each dome, depending into the corresponding cavity and terminating on a plane above the lower surface of the mat.

2. In combination, a mat having upper and lower surfaces and resilient domes incorporated in said mat; said domes being slightly arched to protrude above the upper surface of the mat and presenting unoccupied cavities in the lower surface of the mat, resilient stems; one depending coaxially downward in each dome and terminating on a plane above the plane of the lower surface of the mat; the total depth of each dome being less than the diameter thereof.

FREDERICK C. BREWER.