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F. C. BRAUN

2,432,719

ADHESIVE-CONTAINING SUCTION CUP

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Fig. 1

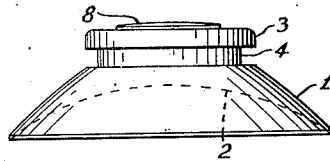


Fig. 2

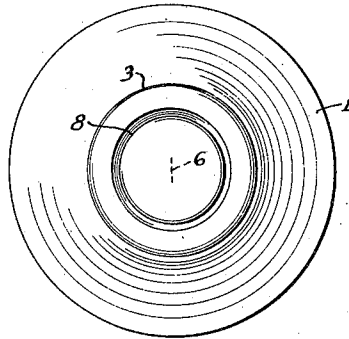


Fig. 3

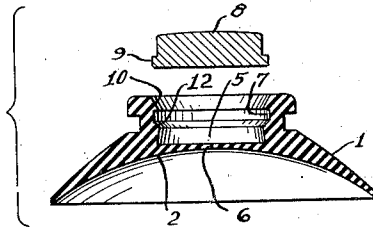


Fig. 4

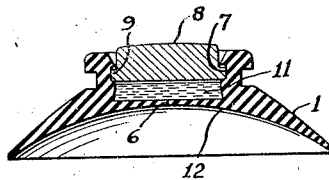
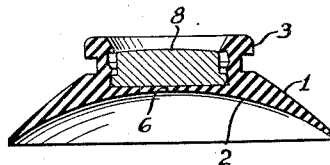


Fig. 5



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ADHESIVE-CONTAINING SUCTION CUP

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4 Claims. (Cl. 248—206)

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This invention relates to suction devices or so-called suction cups of the kind that will adhere by suction to a smooth surface when pressed against it and that have a knob or other projecting portion by means of which some object

can be attached to and supported by the suction cup. The usual type of suction cup cannot be relied upon to maintain its suction indefinitely and is likely to lose its grip on the surface to which it is applied at any time, and moreover it does not usually adhere to the surface with enough tenacity to permit relatively heavy objects to be supported by it.

My copending application Serial No. 620,065, filed October 3, 1945, discloses a suction cup that overcomes these objections to the conventional type of suction cup. The knob and shank portion of the suction cup is made hollow to form an adhesive reservoir which contains a small quantity of fluid adhesive. A small slit in the rubber wall of the cupped disc portion communicates with the adhesive reservoir and opens through the concave face of the cupped disc. This slit normally remains closed sufficiently to prevent escape of the adhesive from the reservoir, but before applying the suction cup to the surface to which it is to be attached, the user bends the cupped disc backwardly to open the slit while simultaneously exerting pressure on the top of the knob with one of the fingers or the thumb. The top wall of the knob over the adhesive reservoir is made thin enough so that it will yield to the pressure exerted on it and extrude some of the adhesive through the slit to the concave face of the disc. The adhesive is spread evenly over the entire concave face of the disc with the finger and the suction cup is then pressed in the usual way against the surface to which it is to be attached. The adhesive around the edge portion of the concave face of the disc seals the suction or vacuum and prevents ingress of air into the space between the disc and the surface to which it is attached, thus making the grip of the disc on the surface strong and practically permanent.

The principal object of the present invention is to provide an adhesive-containing suction cup of the general type disclosed in the above-mentioned copending application but having certain improvements which facilitate the extrusion of the adhesive from the adhesive reservoir and make it possible to extrude it more completely so that all of the adhesive originally stored in the reservoir can be utilized for its intended purpose.

According to the invention the adhesive reservoir is in the nature of an open top recess, preferably cylindrical in shape, formed in the rubber in the knob and shank portion of the suction cup. A rigid button, preferably circular in

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shape, is releasably retained in the upper portion of the recess by a flange, or rib, on the edge of the button which normally engages in a groove in the inner wall of the recess near the top thereof. The button closes the adhesive reservoir and lies over a quantity of fluid adhesive contained in the reservoir. When, just prior to attaching the suction cup to a surface, the cupped disc portion is bent backwardly as above described and pressure is simultaneously exerted on the button with one of the fingers or the thumb, the button is forced out of its retaining groove and is pressed bodily to the bottom of the reservoir, thus extruding practically all of the adhesive from it by a piston-like action.

A suction cup embodying the invention is illustrated in the accompanying drawing, in which:

Figure 1 is a side elevation of the suction cup;

Fig. 2 is a top plan view thereof;

Fig. 3 is a vertical section showing the rubber portion of the suction cup and the rigid button prior to being assembled;

Fig. 4 is a similar vertical section showing the button and the rubber portion of the suction cup assembled and the adhesive reservoir filled with adhesive; and

Fig. 5 is a view corresponding to Fig. 4 but showing the position of the button after it has been depressed to extrude the adhesive.

As will be seen from Fig. 1, the suction cup, in its preferred form, has the same general outward appearance as the conventional type of rubber suction cup having a cupped disc 1 with a concave suction face 2 and a knob 3 at the convex side of the disc connected to the disc by means of a shank portion or neck 4. These parts are preferably made of rubber or some other resilient material.

As shown in Fig. 3 the knob and shank portion of the suction cup is provided with a recess 5 which extends down almost to the concave face 2 of the cupped disc. Preferably the recess is generally cylindrical in shape. It has an open top, as clearly shown in Fig. 3. The cupped disc 1 is provided with a slit 6 which communicates with the recess 5 and opens through the concave face 2 of the disc. The inner wall of the recess has an annular groove 7 spaced from the bottom of the recess 5. A rigid disc or button 8, shown separated from the rubber portion of the suction cup in Fig. 3, has a rib or flange 9 projecting radially from the lower portion of its edge wall. The button may be made of any suitable rigid or hard material but is preferably made of transparent plastic. When the button 8 is assembled with the rubber portion of the suction cup the flange 9 engages in the annular groove 7 as shown in Fig. 4. If desired, the wall of the recess 5 just above the annular groove 7 may be bevelled as indicated at 10 (Fig. 3) to facilitate

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the operation of positioning the button in the rubber portion of the suction cup. When the parts are assembled the top of the button lies substantially flush with the top of the knob 3 or projects only slightly above it as indicated in Fig. 1.

The space below the button 8 is filled with a fluid adhesive shown at 11 in Fig. 4. The recess 5 may be filled to the proper level with the adhesive before the button is positioned, or the button may first be positioned and the space under the button filled with adhesive by injecting it through the slit 6. The resiliency of the rubber keeps the slit 6 normally closed, or sufficiently so, to prevent the adhesive in the reservoir from flowing through it.

To apply the suction cup to the surface to which it is to be attached, the cupped disc 1 is bent backwardly and pressure is simultaneously applied to the button 8 with a finger or the thumb. This forces the button out of its retaining groove 7 and causes it to slide down to the bottom of the adhesive reservoir as shown in Fig. 5, thus extruding the adhesive from the reservoir to the concave face of the cupped disc. The flange 9 on the button preferably has a fairly tight fit in the annular groove 7 to exclude air from the interior of the adhesive reservoir to preserve the fluid condition of the adhesive. To make the button readily depressible when pressure is applied to it despite the fairly tight fit of the flange 9 in the groove 7 the lower edge of the groove may be bevelled if desired as indicated at 12 in Fig. 3. After the adhesive has been extruded to the concave face of the cupped disc as above described it is spread evenly over the face with the finger, or with any suitable instrument, care being taken to see that the adhesive is spread over the face of the disc all the way to its extreme edge. A portion of the extruded adhesive will clog the slit 6 and a suction will be created under the disc in the usual way when the disc is pressed against the surface to which it is to be affixed. After the suction cup has been applied to a surface the adhesive around the edge portion of the concave face of the rubber disc will seal the suction or vacuum and prevent ingress of air into the space between the rubber disc and the surface, thus making the grip of the rubber disc on the surface strong and practically permanent.

The adhesive employed may be of any suitable fluid type provided it is not so thin as to leak through the slit 6 and is not so thick as to make it difficult to extrude it through the slit when pressure is applied to the button. Preferably, the adhesive is a type which will remain fluid or flowable when confined within the reservoir but when applied to the suction face of the disc will dry after a short period of time around the peripheral edge portion of the disc and firmly cement it to the surface to which the suction cup is attached.

It will now be seen that by applying pressure to the button 8 it can be moved bodily all the way to the bottom of the recess or adhesive reservoir to extrude practically all of the adhesive from it with a piston-like action. When the button is pressed to the bottom of the adhesive reservoir it will then stick there due to the film of adhesive on the bottom of the button and on the bottom wall of the adhesive reservoir.

I claim:

1. A suction cup comprising a cupped disc made of resilient material, a projecting portion

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on the convex side of the disc, said projecting portion having an interior adhesive reservoir, adhesive in said reservoir, a slit in said disc communicating with the adhesive reservoir and opening through the concave suction face of the disc, and a button normally held in the upper part of said projecting portion and closing said adhesive reservoir, said button being bodily slidable down into the reservoir upon the application of pressure to it to extrude some of the adhesive through said slit to the concave face of the disc.

2. A suction cup comprising a cupped disc made of resilient material, a projecting portion on the convex side of the disc, said projecting portion having an interior cylindrical adhesive reservoir, adhesive in said reservoir, a slit in said disc communicating with the adhesive reservoir and opening through the concave suction face of the disc, the interior wall of said reservoir having an annular groove spaced from the bottom of the reservoir, and a circular button having an edge portion fitting in said annular groove, said button normally closing the top of the adhesive reservoir but being bodily slidable down into the reservoir upon the application of pressure to it to extrude some of the adhesive through said slit to the concave face of the disc.

3. A suction cup comprising a cupped disc made of resilient material, a projecting portion on the convex side of the disc, said projecting portion having an interior cylindrical adhesive reservoir, adhesive in said reservoir, a slit in said disc communicating with the adhesive reservoir and opening through the concave suction face of the disc, the interior wall of said reservoir having an annular groove spaced from the bottom of the reservoir, and a circular button having a peripheral radially extending flange fitting in said annular groove, said button normally closing the top of the reservoir but being bodily slidable down into the reservoir upon the application of pressure to it to extrude some of the adhesive through said slit to the concave face of the disc.

4. A suction cup comprising a cupped disc made of resilient material, a projecting portion on the convex side of the disc, said projecting portion having an interior cylindrical adhesive reservoir, adhesive in said reservoir, a slit in said disc communicating with the adhesive reservoir and opening through the concave suction face of the disc, the interior wall of said reservoir having an annular groove spaced from the bottom of the reservoir the lower edge of which is bevelled, and a circular button having a peripheral radially extending flange fitting in said annular groove, said button normally closing the top of the adhesive reservoir but being slidable out of said groove and past its bevelled lower edge and down into the reservoir upon application of pressure to it to extrude some of the adhesive through said slit to the concave face of the disc.

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The following references are of record in the file of this patent:

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