Oct. 12, 1948. F. C. BRAUN 2,451,194

ADHESIVE-CONTAINING SUCTION CUP

Filed Oct. 3, 1945

Fig. 1.

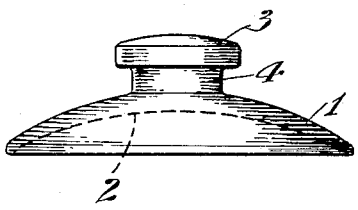


Fig. 2.

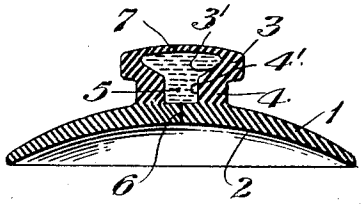


Fig. 3.

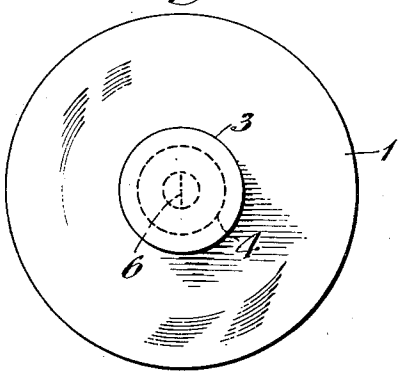
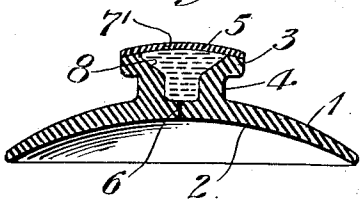


Fig. 4.



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ADHESIVE-CONTAINING SUCTION CUP

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3 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 means for attachment to some object which it is desired to support on the surface.

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.

The principal object of this invention is to provide an improved suction device or suction cup that will adhere to the surface to which it is applied more firmly and more permanently than the usual type of suction cup. A further object is to provide a suction cup which will adhere to the surface to which it is applied with enough tenacity and permanence to permit relatively heavy objects to be supported by it for a long period of time.

According to the invention the usual cupped disc portion of the suction device carries a part within which there is a reservoir that contains a small quantity of a 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 device to the surface to which it is to be attached, the user causes some of the adhesive to be extruded through the slit to the concave face of the cupped disc, in the manner hereinafter described, and then spreads it over the face. The adhesive at the edge portion of the cupped disc functions to seal the suction and thereby insures a permanent and strong adhesion of the suction device to the surface.

The invention is illustrated in the accompanying drawing, in which:

Figure 1 is a side elevation of a suction device or suction cup embodying the invention;

Fig. 2 is a vertical section of the suction cup shown in Fig. 1;

Fig. 3 is a top plan view of the suction cup of Fig.1; and

Fig. 4 shows in vertical section a modified way in which the adhesive reservoir may be formed.

As will be seen from Fig. 1 the suction device, in its preferred form, has the same outward appearance as a well-known type of rubber suction cup having a button or knob to which the object to be supported by the suction cup may be attached. It has a cupped disc 1 with a concave suction face 2 and a button or knob 3 at the convex side of the disc connected to the disc by means of a shank portion 4. The entire device is preferably made of rubber or some other similar resilient material.

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As is well understood, the usual suction cup is applied to a smooth surface by pressing the concave suction face of the disc against the surface by means of the knob, the suction created under the disc being relied upon to retain the suction cup affixed to the surface.

In accordance with the preferred form of my invention I utilize the knob 3 and its shank for the above-mentioned adhesive reservoir. For this purpose the knob is made hollow as shown at 3' in Fig. 2 and the shank 4 is also made hollow, i. e. is provided with a passage 4' which leads from the chamber in the knob to the convex side of the disc. The reservoir formed within the knob and shank is filled with an adhesive 5. The disc 1 is provided with a slit 6 which communicates with the adhesive reservoir and opens through the concave face 2 of the disc. The resiliency of the rubber keeps the slit normally closed, or sufficiently so, to prevent the adhesive in the reservoir from flowing through it. For convenience in manufacturing the device the knob and shank may be formed separately from the disc, as shown in Fig. 2, and vulcanized to it. The adhesive may be placed in the reservoir before the parts are vulcanized together, or it may be injected into the reservoir through the slit 6 after the device is otherwise completed.

To apply the suction cup to the surface to which it is to be attached some of the adhesive is first forced from the reservoir to the concave face of the cupped disc and spread uniformly thereon. This may be conveniently accomplished by bending the edges of the cupped disc backwardly by the thumbs and forefingers while exerting pressure on the top of the knob 3 with one of the other fingers. The top wall 7 of the knob is made relatively thin, as shown in Fig. 2, so that it will yield to the pressure exerted by the finger. The backward bending of the edges of the disc will open the slit 6 and the pressure exerted on the top of the knob will extrude some of the adhesive through the slit to the concave face of the disc. The adhesive may then be spread evenly over the concave face of the disc 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. After the adhesive has been extruded to the concave face of the disc it will clog the slit 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. The adhesive around the edge portion of the concave face of the disc will seal the suction or vacuum and prevent 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 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 knob. Preferably, the adhesive is of a type which will remain fluid or flowable when confined within the adhesive 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.

Fig. 4 shows a modified form of the suction cup in which the disc, knob and shank are molded in one piece, the knob and shank being made hollow, as previously described, but the top wall 7' of the knob being formed separately and later positioned by cementing or vulcanizing it in place. As shown, this upper wall of the knob is preferably made thinner than the side walls so that it will readily yield to the pressure required to extrude the adhesive from the reservoir. The interior surface of the knob where it meets the top wall 7' is preferably cut back to form a bevel or clearance, as shown at 8, to permit a relatively large amount of inward movement of the top wall when it is depressed to extrude the adhesive.

In both forms of the invention the knob and shank portion have sufficient lateral rigidity to enable them to support a relatively heavy object on the surface to which the suction cup is affixed, even though the top of the knob is sufficiently flexible to permit it to be depressed with the finger for the purpose of extruding some of the adhesive as above described.

I claim:

1. A suction cup comprising a cupped disc, a knob on the convex side of the disc, a shank portion connecting the knob to the disc, all of said parts being made of resilient material, said knob and shank being hollow to form an adhesive reservoir, adhesive in the reservoir, a slit in the disc communicating with the adhesive reservoir and opening through the concave suction face of the disc, said slit normally being maintained closed by the resiliency of the disc material, and the top wall of the knob being adapted to yield under pressure to extrude some of the adhesive through the slit to the concave face of the disc.

2. A suction cup made of resilient material and comprising a cupped disc, a projecting portion on the convex side of the disc, said projecting portion being hollow to form an adhesive reservoir, adhesive in said reservoir, and a slit in said disc communicating with the adhesive reservoir and opening through the concave suction face of the disc, said adhesive reservoir extending upwardly to near the top end of said projecting portion whereby the top wall of the projecting portion is thin enough to yield under pressure applied to it by the thumb or finger to extrude some of the adhesive through said slit to the concave side of the disc.

3. A rubber suction cup comprising a cupped disc, a hollow projecting portion on the convex side of the disc, and a top wall on said projecting portion, said projecting portion being integral with one of the other two parts and vulcanized to the second, the hollow interior of said projecting portion constituting an adhesive reservoir, adhesive in said reservoir, and a slit in said disc communicating with the adhesive reservoir and opening through the concave suction face of the disc, said adhesive reservoir extending upwardly to near the top end of said projecting portion whereby said top wall is thin enough to yield under pressure applied to it by the thumb or finger to extrude some of the adhesive through said slit to the concave side of the disc.

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