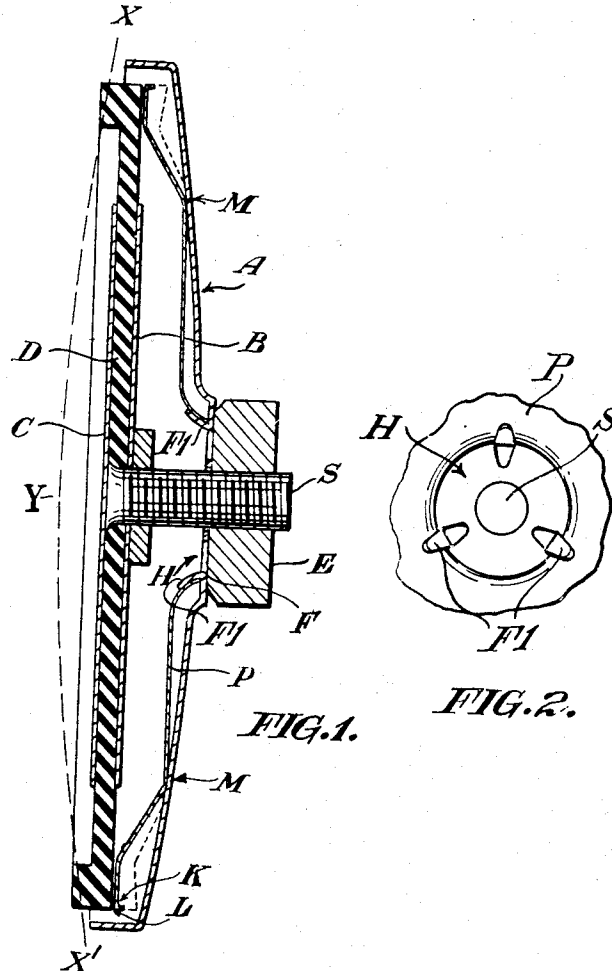


Nov. 3, 1953

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PNEUMATIC SUCTION DEVICE

2,657,893

Filed April 9, 1951



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UNITED STATES PATENT OFFICE

2,657,893

PNEUMATIC SUCTION DEVICE

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Application April 9, 1951, Serial No. 220,049

5 Claims. (Cl. 248—206)

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This invention relates to pneumatic suction devices of the kind comprising a flexible diaphragm member having a rim portion, the face of which rim portion is applied to the surface to which the device is to adhere and a rigid casing, within which the diaphragm member is longitudinally movable to effect adherence or release.

Suction devices of the type set out have a special application to windscreens of motor vehicles as a means of attachment for licence holders and mirrors. With the advent of curved windscreens, difficulties have occurred in securing good adherence for any length of time due to leakages and it is the object of this invention to provide a suction device capable also of use on curved surfaces.

According to the present invention, in a suction device comprising a rigid casing or housing and a diaphragm supported therein, there is provided between the casing and diaphragm an element of flexible material capable of accommodating itself to the curvature of the surface to which the device is to be applied.

The flexible element which may be dome shaped, is formed of thin metal and is preferably provided with a circumferential flat against which the perimeter of the diaphragm member bears.

The invention is illustrated in the accompanying drawing

Figure 1 is an axial sectional view through the device, parts being shown in elevation; and

Figure 2 is a fragmentary inside face view of a portion of the device showing the adjusting nut and associated elements.

Referring to the drawing, A indicates a lenticular casing of metal of comparatively robust gauge mounting a rubber suction diaphragm or cup indicated at D. The diaphragm D is held between plates B and C, the outer plate C of which is fast on a screw stud S. An adjusting or control nut E is mounted on the screw S, the nut E engaging a flat F formed on the back of the casing A so that by tightening or slackening the nut, it will produce a displacement of the diaphragm D to create or release the vacuum.

With the advent of the modern windscreen which is curved, difficulty has been experienced in securing a good adhesion between the diaphragm D and the curved surface of the windscreen.

This difficulty I have overcome, according to the present invention, by introducing between the casing A and the diaphragm D an element P of a flexible nature, the element having a central aperture H through which the screw S is

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threaded and preferably as shown, being of dome-like construction with a marginal flat K adapted to engage the rear face of the diaphragm D immediately in rear of a peripheral flat L thereon.

The flexing action and operation of the flexible element P is improved by shaping the dome as to produce a proud section having points of contact, as indicated at M, within the perimeter of the outer casing A.

Nothing in this shallow dome element P is operative from the circle or points A' of contact M to the centre line of the screw, this portion only functioning to permit safe anchorage of the element.

It must be understood that the element P only bears on the contact circle M and is freely attached to the casing so as to permit of movement in relation thereto.

The action of the element P is that when the licence holder is placed against a curving windscreen, as shown dotted at XX', two opposite sides of the rubber suction diaphragm press the thin shallow dome element back, as shown dotted, and in practice, this causes the two other parts of the element to rise at point Y, and the corresponding point 180° away, and at all intermediate points in pro-rata ratio.

This ensures that a perfect seal is obtained at the edge of the rubber suction or diaphragm even by quite light application. In actual practice good results have been obtained using an element which is .010" thick and less.

In use, it will be found that the dome element will compensate for the curvature of the windscreen, so that the diaphragm will bed itself evenly against the surface to which it is to be applied with equal pressure over its entire perimeter whether the surface be plane or curved.

In order to centre the element P in relation to the casing A, the flat F may be formed with lugs F' (see Figure 2) for engagement with the central aperture H, which is preferably enlarged for this purpose. By anchoring the element P to the casing A, it ensures that any local deformation in the surface to which the diaphragm is attached is transferred through the flexing of the element P to an opposite point of the diaphragm so that the latter will snugly hug the surface, to which it is to be applied.

I claim:

1. The combination with a casing, a diaphragm of resilient material therein, by which the casing is caused to adhere by suction to an attaching surface, and a control member for producing

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displacement of the diaphragm, of an element formed of flexible material having direct contact with said casing and with the diaphragm around its perimeter.

2. The combination with a casing, a diaphragm of resilient material therein including a rim attaching portion, by which the casing is caused to adhere by suction to an attaching surface, and a control member for producing displacement of the diaphragm, of a dome shaped element formed with a marginal flat having direct engagement with said casing and with said rim portion on the reverse side thereof.

3. The combination with a casing, a diaphragm of resilient material therein including a central and rim attaching portion, by which the casing is caused to adhere to an attaching surface, of a control screw anchored to the central portion and extending through an aperture in the casing, an actuating nut mounted on said control screw, and a dome shaped element of resilient material freely mounted on the screw within the casing, said element having a marginal flat directly bearing on the rim portion of the diaphragm and being formed with a bend to provide annular contact between said element and the casing.

4. A pneumatic suction device comprising a suction cup of circular form having an annular surface-engaging flange projecting from one side thereof, an annular support for said cup

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at the other side thereof, and a control member interposed between said cup and said support, said control member being circular in form and of plate-like cross sectional shape, said member being resilient and having a peripheral portion directly bearing against said cup adjacent the periphery and at said other side thereof, said member having an annular portion spaced radially inwardly of said peripheral portion and spaced substantially radially outwardly of the axis of said support and bearing against said support to cause the peripheral portion of said member to urge said flange toward the surface to be engaged.

5. A device constructed in accordance with claim 4 wherein said peripheral portion of said member is flat and normally co-planar with the portion of said cup which it engages.

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References Cited in the file of this patent

UNITED STATES PATENTS

25	Number	Name	Date
	2,047,658	Zaiger	July 14, 1936
	2,146,859	Seklehner	Feb. 14, 1939

FOREIGN PATENTS

30	Number	Country	Date
	667,733	Great Britain	Mar. 5, 1952