

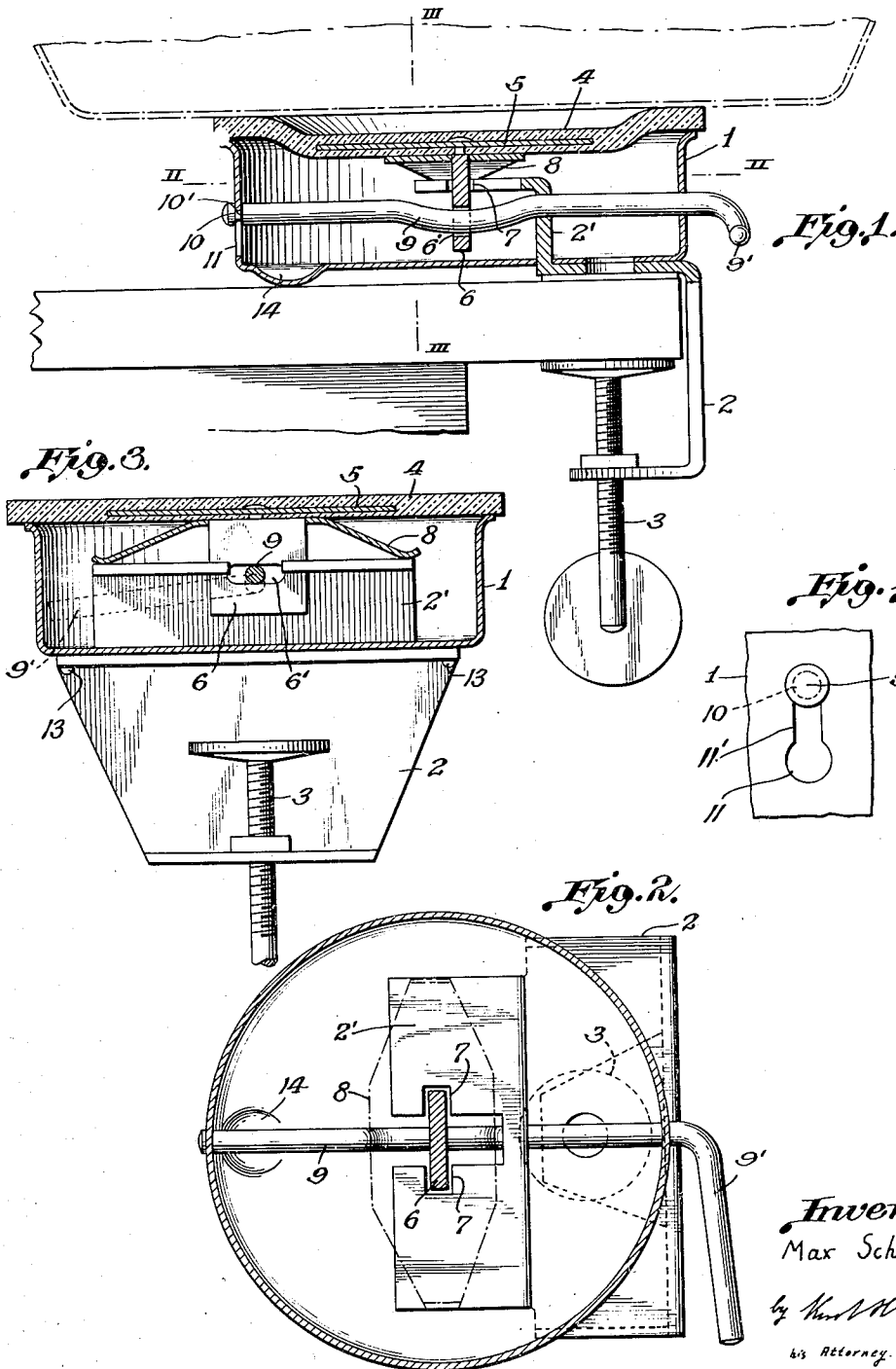
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HOLDING DEVICE

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HOLDING DEVICE

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This invention relates to holding devices and particularly to holding devices provided with rubber plates to receive the surface to be held.

The well-known rubber suction cups that are attached to show windows or the like have a diameter not exceeding 2". In order to maintain a firm seat for said suction cups in their engaging surfaces the margins of the suction cups require pre-moistening with water or glycerine. The adhesion capacity of said suction cups is limited, if the moist condition of the suction margin ceases for any reason. Furthermore, if holding devices to attach pots and pans to tables are provided with rubber suction cups to receive said pots and pans, there are difficulties encountered, as pots often are warm, so that the moisture evaporates on the suction cup margin and the adhesion capacity decreases.

It has been found, that a suction cup having a considerably larger diameter than ordinary suction cups does not require its margin to be moistened. The reason for this is the following: While the periphery of the suction margin increases in direct proportion to the increasing diameter, the suction power increases by the square of the diameter. Said increasing of the suction power results in an increasing of the pressure per unit of area at the suction margin and this increasing is proportional to the square of the diameter. And that considerable increasing of the pressure per unit of area insures intimate contact between the sheet of glass and the suction margin even in the absence of moisture.

Preferably special means is provided in addition to the mentioned enlargement of the suction member surface to create a vacuum between the suction member surface and the surface to be held corresponding to the enlarged suction surface.

An object of this invention is to provide a holding device comprising a suction plate to receive the surface to be held and means to cup the plate to create a vacuum between the latter and said surface.

Another object of this invention consists in the arrangement of a cap supporting said suction plate, a cam arranged within said cap to cup the plate to create a vacuum between the latter and said surface, and clamping means secured to said cap to attach the device to a support.

Vessels or bowls of usual types may be firmly attached to tables or other supports by means of the holding device according to this invention without any damage to the vessel or bowl. The holding device is destined especially for use in

the household. As the pots, bowls or the like are held absolutely firmly, it is not necessary that the housewife, for example, kneading dough, holds the bowl by her hands, she may use, however, both hands to knead the dough and may work alternatively using the right hand and the left hand.

In case the vessel, bowl or the like to be held, has a rough bottom surface it is preferable to furnish the bottom surface with a smooth covering or to attach to said bottom surface a special plate, preferably of sheet iron, by cementing, to insure a good suction surface.

Furthermore, the invention relates to particular methods to produce cheaply the holding device in mass production by simple means. These details are best understood by means of the example of the invention shown in the drawing, in which

Fig. 1 is a longitudinal sectional view of the holding device attached to an edge of a table, the parts being in working position;

Fig. 2 is a sectional view according to line II—II of Fig. 1;

Fig. 3 is a sectional view according to line III—III of Fig. 1, the parts, however, being in rest position.

Fig. 4 is a fragmentary elevational view taken from the left of Fig. 1.

Referring to the drawing, the device includes the cap 1 connected to the hand screw clamp 2, 3 having a prolongation 2' extending at an angle through a slot in the bottom of the cap 1. The superposed portions of the hand screw clamp 2, 3 and the cap 1 are connected together by suitable means, such as spot-welding.

The suction plate 4 rests on the cap 1 and is made of an elastic material, such as rubber. In the body of said suction plate is vulcanized a metallic plate 5 which is riveted to the guiding member 6 having a slot 6'.

The horizontal portion of the prolongation 2' of the clamping means 2, 3 is provided with lateral notches 7 to receive the guiding member 6. A plate-spring 8 is arranged between the horizontally bent portion of the prolongation 2' and the suction plate 4.

A rod 9 passes through the cap 1 and extends outwardly on one side thereof; the extending end 9' is bent at an angle to the main part and serves as an operating lever or handle. The opposite end portion 10 has an annular groove 10', and there is an opening 11, 11' in the cap wall to receive this end portion 10. This opening has the shape of a circular hole 11 intersected by a

smaller vertical slot 11' having a width equal to the diameter of the annular groove 10'. In assembling the parts the end portion 10 is inserted into the hole 11 and then urged upward with the groove 10' in the slot 11', so that the end portion 10 is supported in form of a bayonet-catch.

The plate-spring 8 arranged between the prolongation 2' and the suction plate 4 tends to pull the rod 9 upward with its end 10 in a locked position thereby securing said position. The intermediate portion of the rod 9 is formed with a crank, which engages the slot 6' in the guiding member 6.

The horizontal portion of the prolongation 2' of the hand screw clamp 2 has recesses, which are arranged laterally above the crank portion of the rod, so that during a rocking movement the crank may enter into the space provided by the recesses. This reduces the height of structure 20 of the cap 1.

The hand screw clamp 2 is provided with beads 13 on each outer end of its portion engaging the table surface when mounted. Furthermore the bottom of the casing 1 has a depression 14, which in connection with said beads 13 provides a three-point support. Thus the holding device is very firmly secured to the edge of the table.

In the operation the holding device is screwed on the table by turning the screw 3. The parts are in the position, as shown in Fig. 3. Then the vessel, bowl or the like is put on the suction plate. Now the lever 9' together with the crank 9 are rocked thereby pulling the plate 4 in the cupped position, as shown in Fig. 1 and creating a vacuum between the plate and the surface of the vessel.

It has been found, that the described device is adapted to create an extremely high suction force due to the considerably large diameter of the suction cup in combination with the special means to cup the plate, which means is easy to operate by means of the lever 9'. Even heavy bowls can be firmly held by the device. It is possible to pull or push violently on the bowl without releasing it. Therefore the holding device facilitates considerably the work of the housewife or workman.

Preferably, the holding device is sold together with a piece of sheet iron, the diameter of which corresponds at least to the diameter of the suction plate; this sheet iron may be secured to a bowl by cement, if said bowl has a rough bottom surface.

It appears from the drawing, that in spite of its simple structure the entire device consists of parts easy to manufacture and simple to assemble, so that the device may be easily produced in great quantities.

I claim:

1. In a holding device of the character described the combination of a rubber suction plate to receive the surface to be held, said rubber plate having a metallic plate incorporated therein and vulcanized thereto, a cap supporting said rubber plate, a connecting member secured to said metallic plate said connecting member projecting from said rubber plate and having an aperture, and a crank rod with a handle journaled in said cap and engaged with said aperture.
2. In a holding device of the character de-

scribed, the combination of a suction plate to receive the surface to be held, a cap supporting said suction plate, a crank rod arranged within said cap, a bayonet-catch on the cap supporting one end of the crank rod, the other end of the latter extending outwardly through the cap to provide a handle, a connecting member between said plate and said crank and resilient means to secure the locked position of the crank rod.

3. In a holding device of the character described, the combination of a suction plate to receive the surface to be held, a cap supporting said suction plate, a crank rod with a handle journaled in the walls of said cap, a connecting member between said plate and said crank, and clamping means secured to said cap and provided with a prolongation extending through a slot into the cap and supporting said rod and guiding said connecting member.

4. In a holding device of the character described, the combination of a suction plate to receive the surface to be held, a cap supporting said suction plate, a crank rod arranged within said cap, a bayonet-catch on the cap supporting one end of the crank rod, the other end of the latter extending outwardly through the cap and provided with a handle, a connecting member between said plate and said crank, clamping means secured to said cap and provided with a prolongation extending through a slot into the cap and supporting said rod and guiding said connecting member, and a resilient member between said plate and said prolongation to secure the locked position of the crank rod.

5. In a holding device of the character described, the combination of a rubber suction plate to receive the surface to be held, said rubber plate having a metallic plate incorporated therein and vulcanized thereto, a cap supporting said rubber plate, a connecting member secured to said metallic plate, said connecting member projecting from said rubber plate and having an aperture, a crank rod with a handle journaled in said cap and engaged with said aperture, and clamping means secured to said cap to attach the device to a support.

6. In a holding device of the character described, the combination of a rubber suction plate to receive the surface to be held, said rubber plate having a metallic plate incorporated therein and vulcanized thereto, a cap supporting said rubber plate, a connecting member secured to said metallic plate, said connecting member projecting from said rubber plate and having an aperture, a crank rod with a handle journaled in said cap and engaged with said aperture, resilient means adapted to urge the suction plate in a flat position, and clamping means secured to said cap to attach the device to a support.

7. In a holding device of the character described, the combination of a suction plate to receive the surface to be held, a cap supporting said suction plate, means carried by said cap to cup the plate to create a vacuum between the latter and said surface, resilient means to urge the suction plate in a flat position, and clamping means secured to said cap to attach the device to a support.

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