

No. 734,378.

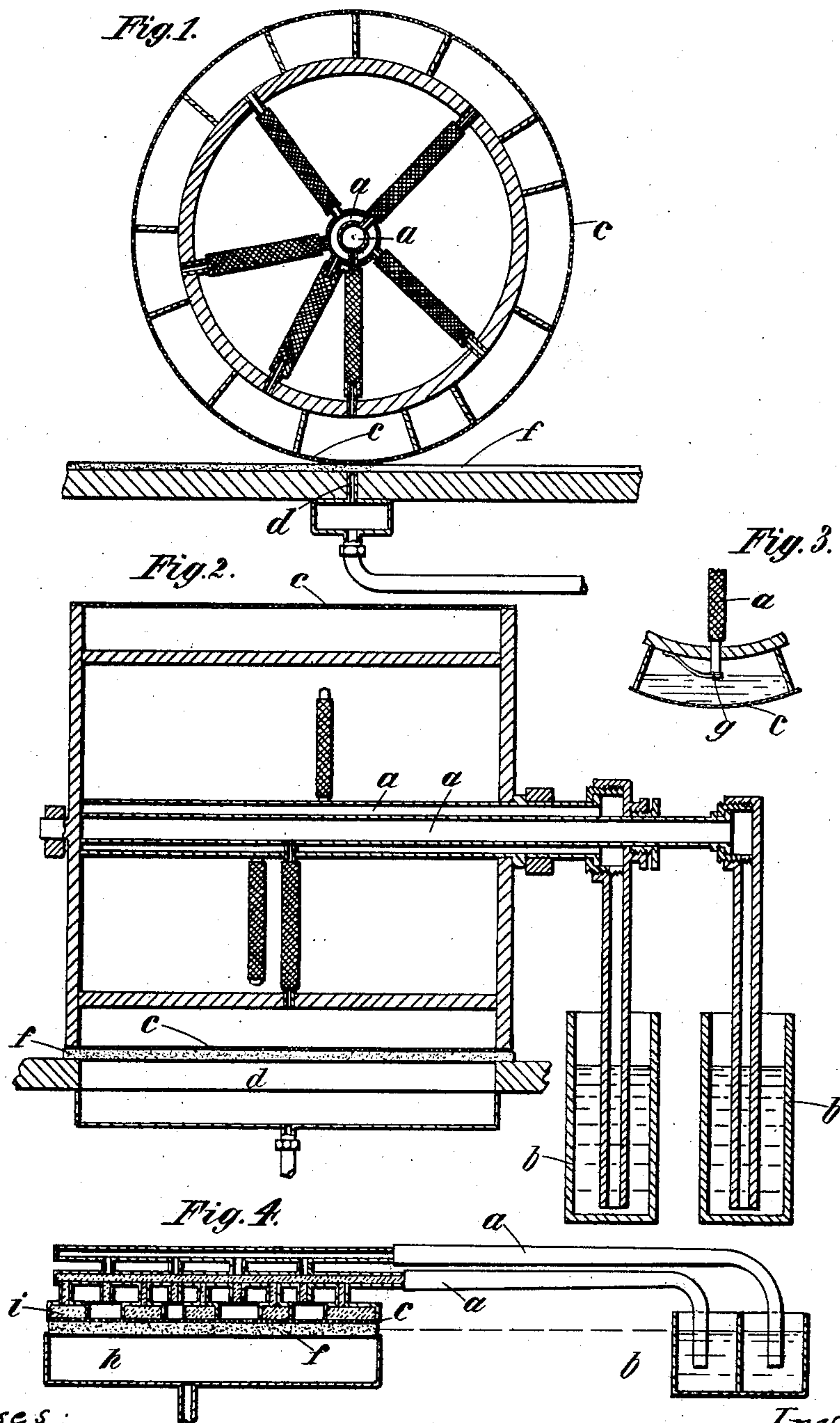
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MEANS FOR CONTROLLING THE FLOW OF LIQUIDS FROM OR TO CHAMBERS,
PIPES, OR OTHER RECEPTACLES.

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NO MODEL.



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MEANS FOR CONTROLLING THE FLOW OF LIQUIDS FROM OR TO CHAMBERS, PIPES, OR OTHER RECEPTACLES.

SPECIFICATION forming part of Letters Patent No. 734,378, dated July 21, 1903.

Application filed January 5, 1903. Serial No. 137,965. (No model.)

To all whom it may concern:

Be it known that I, CARL TÖNJES, a subject of the Grand Duke of Oldenburg, residing at Delmenhorst, in the Grand Dukedom of Oldenburg, German Empire, have invented certain new and useful Improvements in Means for Controlling the Flow of Liquids from or to Chambers, Pipes, or other Receptacles, of which the following is a specification.

This invention relates to a means for maintaining liquids in a condition of equipoise in chambers, pipes, or other containers which are open at the top or bottom and when the conditions are such that liquid contained therein would under ordinary circumstances run out or run back into the receptacle—that is to say, this invention relates to means for preventing liquid contained in the said receptacle from running out or running back into it by reason of suction or gravity.

The invention is of particular value where it is a question of drawing liquids periodically from chambers, pipes, or like receptacles which communicate with liquid-storage reservoirs by means of siphons and in which on the cessation of the siphonage the liquids tend to recede a little from the discharge-opening of the reservoir or container, so that the objects in communication with the discharge-opening may no longer be wetted by the liquid.

The invention consists in the discharge-opening of the chambers, pipes, or other receptacles being covered with a permeable cellular substance—such as fine wire-netting, silk gauze, felt, or the like—through which material the liquid when drawn off can pass out of the vessel, but which, however, when thoroughly saturated with the liquid allows no air to pass through it, so that on the cessation of the siphonage or suction no air can penetrate through the material into the vessel, and consequently no liquid can run out of or back into the same. When materials for closing the aperture of the kind mentioned are saturated with liquid, the meshes or pores of the material are closed by the particles of the liquid by reason of the adhesive, capillary, or cohesive action between the water particles and the air particles in such a

way that air of itself cannot penetrate the material.

Some examples of the application of this invention are shown in the accompanying drawings, in which—

Figures 1 and 2 are a cross-sectional view and longitudinal sectional view, respectively, of a dyeing-drum constructed in accordance with this invention and adapted for applying or producing patterns on coverings, carpets, or the like by drawing the dyestuff through the same. The separate dye-chambers of the drum, which communicate with the storage-vats *b*, Fig. 2, for the liquid dye by means of pipes *a*, are closed to the outside by means of a liquid-restraining guard, of permeable cellular material *c*, such as fine wire-net, silk gauze, felt, or the like. When one of the chambers by the rotation of the drum moves over the suction-slot *d*, the dyestuff is drawn out of this chamber through the material *c* and through the covering, floor-cloth, or the like which is to be dyed and which lies under the drum. When this dye-chamber has passed the suction-slot *d*, the suction action on the same ceases, and the pipe *a*, which connects it with the storage-reservoir *b*, in which the level of the liquid lies on a lower plane than the closing material *c*, then acts as a siphon on the liquid contained in the chamber of the drum in question and has a tendency to suck the liquid from this chamber into the storage vessel *b*, the liquid in which is at a lower level. Owing to the material *c* this action can, however, only take place in so far as the superfluous liquid contained on or rather in the closing material *c* is drawn inward out of the same, so that the said closing material is freed from superfluous liquid, and the carpet or the like which is to be dyed cannot be further treated with the liquid. A further return of the liquid from the drum-chamber to the storage-vat *b* cannot take place, because no air can penetrate through the saturated closing material *c*. The above-mentioned action, which keeps the closing material *c* free from superfluous liquid by the siphon action of the liquid in the vats *b*, is exerted on the closing material *c* while the dye-chamber of the drum is standing over the suction-slot *d* on those parts which

are not in actual contact with the carpet, because the suction action through the narrow slot *d* can only be exerted on the part of the closing material *c* which is situated exactly
 5 over the said slot, while the parts of the material *c* further removed from the slot *d* before and behind the place of contact are subjected to the opposing siphon action of the pipes *a*. By this means each part of the
 10 closing material *c* forming the periphery of the drum very soon after passing over the suction-slot *d* is freed from superfluous liquid—that is to say, is to a certain extent dried—whereby any blurring or running into
 15 one another of the colors on the carpet or floor-covering *f* is prevented.

The dye liquid is retained in the drum during its entire rotation—that is to say, even when the dye-liquid chambers reach the uppermost position—by means of the closing material *c*, which is saturated, and thereby rendered impervious to air, so that when the chamber again comes over the suction-slot *d* liquid is again drawn out of the same. For
 20 further preventing the liquids from running back from the drum-chambers to the storage-vats (in case the chambers are not perfectly air-tight) the mouth of the pipes *a* in the chambers may, as shown in Fig. 3, be provided with
 25 a back-pressure valve *g*, this mouth projecting as far forward as possible into the chamber, as shown in the said Fig. 3, so that when the chamber is in the lower position an air-space remains above the liquid contained in the
 30 same. During the suction period the back-pressure valve *g* is opened by the suction action, and at the same time the air over the liquids yields somewhat. As soon as the suction action ceases the back-pressure valve
 35 automatically closes, (by spring-pressure or the like,) and the air, which is previously somewhat expanded and is in the chamber again, contracts and acts instead of the siphon action of the pipes *a* in Figs. 1 and 2,
 40 so that the liquid recedes somewhat from the closing material *c*—that is to say, the latter is freed from surplus liquid. As in this form of construction less dye liquid is contained in the chambers of the drum, the closing material only requires to support a small pressure of liquid.
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Fig. 4 shows the use of the arrangement in another apparatus fulfilling the same object. *h* is a suction-box. *f* is a carpet or the like to
 55 be dyed, lying over the suction-box, and *i* a flat dye-box, which is open below and which has separate dye-chambers, each closed by

the permeable material *c*. Dye is conveyed from the storage vessels *b*, the liquid in which is at a lower level than the material *c*, and
 60 through the pipes *a* to the separate dye-chambers. If suction be applied to the suction-box *h*, liquids from the chambers of the box *i* are drawn through the material *c* and the carpet or the like *f*. When this action ceases,
 65 the siphoning action of the pipe *a* causes the return of the surplus dye from the closing material *c*, so that no surplus dye can be applied to the surface of the carpet or the like
 70 *f* and the various colors do not run into one another. When the box *i* is lifted off, no dropping is possible.

For the permeable closing material several layers of wire-netting, silk gauze, or the like, one above the other, may be employed instead of only a single layer, the wire-netting
 75 being correspondingly of wider mesh and carrying a higher pressure of water, and thereby allowing a freer passage to the liquid during the siphoning of the same without detriment
 80 to the action of the retention of the air by the wetted wire sieve, and consequently to the retention of the liquids contained in the interior.

Having now described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In an apparatus for controlling the flow of liquids, the combination with suction means, of a siphon-conduit having a discharge-
 90 leg associated with the suction means and its inlet-leg extending into a supply-reservoir to a plane below the opening of the discharge-leg, said discharge-leg being provided with a restraining-guard of permeable cellular material covering the opening thereof.
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2. In an apparatus for controlling the flow of liquids, the combination with supply-vats and suction means, of a body having a plurality of distributing-chambers, and a siphon-
 100 conduit having a discharge-leg associated with each of said chambers and its inlet-leg extending into a supply-vat to a plane below the discharge, the distributing-chamber for each discharge-leg of the siphon constituting
 105 the discharge-opening therefor and covered by a restraining-guard of permeable cellular material.

In witness whereof I have hereunto set my hand in presence of two witnesses.

CARL TÖNJES.

Witnesses:

F. A. BRYSE,
 FR. HOYERMAN.