

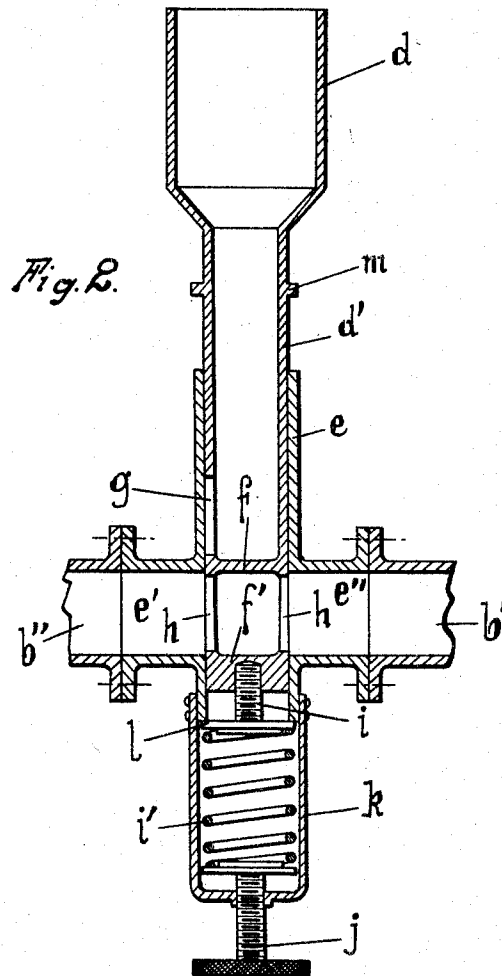
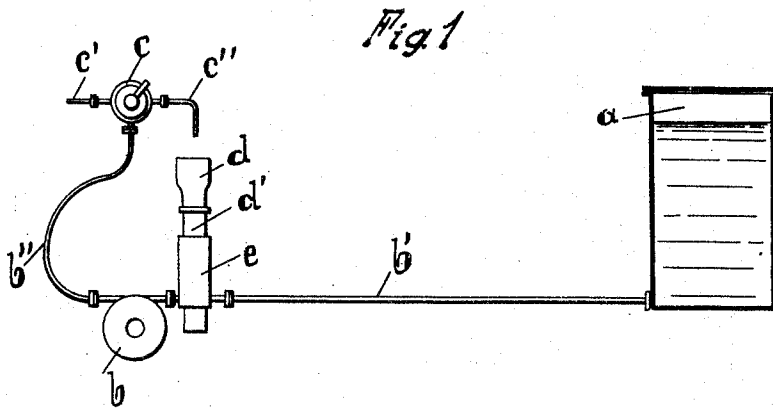
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1,923,518

LIQUID DISTRIBUTOR

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UNITED STATES PATENT OFFICE

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LIQUID DISTRIBUTOR

Paul Louis Armand Thiberge, Nanterre (Seine),
FranceApplication November 29, 1930, Serial No.
499,113, and in France December 3, 1929

12 Claims. (Cl. 103—42)

The present invention relates to devices which distribute, with variable output, a liquid delivered by a pump of constant output. The devices of this kind comprise a sort of three-way cock interposed in the delivery pipe from the pump. This cock is arranged in such a way that when it throttles the distribution orifice, it opens to a corresponding extent a discharge orifice through which the liquid delivered in excess by the pump returns to the supply reservoir.

Now, it is very often necessary to place this reservoir at a distance from the pump and the distributor. The pipe system for returning the surplus liquid pumped has then a relatively great length. There results a considerable resistance to the flow of the excess of liquid delivered. This resistance, which varies moreover with the amount of the said excess and the viscosity of the liquid, creates an irregular back pressure, interfering with the regulation of the useful output.

The object of the present invention is to suppress this drawback.

For this purpose, instead of returning into the reservoir the surplus liquid delivered, it is returned directly to the suction side of the pump, while at the same time the passage between the pump and the reservoir is throttled in accordance with the amount of this surplus, which passage has then only to furnish the quantity of liquid actually distributed.

The accompanying drawing represents, by way of example, one of the forms of construction of a device operating automatically, in accordance with the invention.

Figure 1 is a diagrammatic view of the whole arrangement.

Figure 2 shows in vertical section and on a larger scale, an important part of the device.

In Figure 1, *a* designates the reservoir supplying the constant output pump *b* through the pipe *b'*. This pump delivers through the pipe *b''* to the three-way cock *c*. One of the branch pipes of the latter is connected to *b''*; one of the others *c'* is the distribution branch, and through the last branch *c''* there is discharged the excess of liquid delivered by the pump.

The plug of the cock *c* is constituted in the known manner so as to shut off the passage of liquid towards the escape branch *c''* to the same extent that it opens the passage towards the branch *c'* and vice versa.

The surplus of liquid leaving the branch *c''* pours into a spout *d* forming part of a kind of funnel, of which the cylindrical socket *d'* is

relatively long. This socket is adapted to slide vertically in a bush *e* of which the two transverse branches *e'* and *e''* are connected respectively to the suction branch of the pump *b* and to the supply pipe *b'*.

A piston *f* closes the socket *d'* at a certain distance from its base. Above this piston, the socket *d'* is pierced with a lateral port *g* directed towards the pump. At its lower extremity, the socket *d'* is closed by a second piston *f'*. Between the two pistons *f* and *f'*, the socket is pierced with two diametrically opposite ports *h*, which correspond respectively with the branch pipe *e'* and the branch pipe *e''*.

Below the lower piston *f'*, there is fixed a central rod *i* subject to the action of a spring *i'*. This spring can be regulated by means of the screw *j* passing through the stirrup *k* fixed to the bush *e*. The rod *i* carries a washer *l* which by abutting against the base of the bush *e* arrests the upward movement of the socket *d'*. The descent of the latter is itself limited by an annular stop *m* which is carried by the socket *d'* above the bush *e* and which is intended to come into abutment against the upper edge of this bush.

When the socket *d'* is in its highest position, the spout *d* being empty, the port *g* is masked, whereas the ports *h* are placed right in line with the passages of the corresponding branches. The pump then sucks in from the reservoir *a* alone.

When there is a discharge of liquid into the spout *d*, the latter falls together with the socket *d'*, compressing the spring *i'*. The port *g* opens at the same time that the ports *h* close. The pump in these conditions draws partly from the spout *d* and partly from the reservoir *a*.

The socket *d'* falls further, and therefore the port *g* is further unmasked, in proportion as less liquid is distributed through the branch *c'*, the excess of liquid discharged at *c''* increasing in consequence. The ports *h* on the contrary close more and more, since the pump has to draw from the reservoir *a* no more than the quantity actually delivered.

For each output of the distributor the socket *d'* takes up automatically a position of equilibrium for which the degrees of opening of the respective ports *g* and *h* are in the desired proportion.

It is quite evident that the invention is not strictly limited to what has been described and illustrated, but that it may give rise to modifications.

What I claim is:

1. A device of the type described, comprising in combination, a pump, a liquid tank for said pump, a suction pipe for connecting said tank to said pump, a delivery pipe for said pump, an auxiliary receiver, adjustable means on said delivery pipe for simultaneously allowing a variable part of the liquid flowing from said pump to be discharged and returning the remainder of said liquid to said receiver, and means, operated by the weight of the liquid in said receiver, for substantially simultaneously and correspondingly connecting said receiver with said suction pipe and obturating said suction pipe at a point located between said receiver and said liquid tank.

2. A device of the type described, comprising in combination, a pump, a liquid tank for said pump, a suction pipe for connecting said tank to said pump, a delivery pipe for said pump, a vertically slidable receiver, elastic means for supporting said receiver, adjustable means on said delivery pipe for simultaneously allowing a variable part of the liquid flowing from the pump to be discharged and returning the remainder of said liquid to said receiver, and means, operated by the displacement of said receiver, for substantially, simultaneously and correspondingly connecting said receiver with said suction pipe and throttling said suction pipe at a point located between said receiver and said liquid tank.

3. A device of the type described, comprising in combination, a pump, a liquid tank for said pump, a suction pipe for connecting said tank to said pump, a delivery pipe for said pump, an auxiliary receiver, adjustable means on said delivery pipe for simultaneously allowing a part of the liquid flowing from said pump to be discharged and returning the remainder of said liquid to said receiver, and means, operated by the weight of the liquid in said receiver, for connecting said receiver to the suction end of said pump, and substantially, simultaneously throttling said suction pipe to a corresponding amount.

4. A device according to claim 2 in which the means for supporting said receiver consist of a spring and means for adjusting the tension of said spring.

5. A device of the type described comprising in combination, a pump, a liquid tank for said pump, a suction pipe for connecting said tank to said pipe, a delivery pipe for said pump, a vertically slidable receiver, a spring for supporting said receiver, adjustable means on said delivery pipe for simultaneously allowing a variable part of the liquid flowing from said pump to be discharged and returning the remainder of said liquid to said receiver, and means integral with said receiver for connecting said receiver to said suction pipe and substantially, simultaneously throttling said suction pipe to a corresponding mount at a point located between said tank and said receiver.

6. A device of the type described, comprising in combination, a pump, a liquid tank for said pump, a suction pipe for connecting said tank to said pump, a sleeve connected to said pipe and extending on either side thereof in a substantially vertical direction, a cylindrical receiver open at the upper end adapted to slide in said sleeve, the walls of said receiver being provided with diametrically opposed apertures in a direction parallel to said pipe, two partitions in said receiver located on either side of

said apertures and parallel to the axis of said pipe, said receiver being further provided with an aperture in its wall above the upper partition in the part thereof nearer to the pump, a spring for supporting said receiver in a determined position with respect to said pipe, a delivery pipe for said pump, adjustable means on said delivery pipe for simultaneously allowing a variable part of the liquid flowing from said pump to be discharged and for returning the remainder of said liquid to said receiver, whereby the weight of liquid in said receiver causes it to throttle to a variable extent the suction pipe, and causes said receiver to be connected to said suction pipe through the last mentioned aperture.

7. A device of the type described comprising in combination, a source of liquid, a pipe connected with said source, means for causing said liquid to flow through said pipe with a uniform rate of flow, a delivery pipe connected to said means, an auxiliary receiver, adjustable means on said delivery pipe for simultaneously allowing a variable part of the liquid flowing from the first mentioned means to be discharged and returning the remainder of said liquid to said receiver, and means, operated by the weight of the liquid in said receiver, for substantially, simultaneously and correspondingly connecting said receiver with the first mentioned pipe and obturating said first mentioned pipe at a point located between said receiver and said source of liquid.

8. A device of the type described, comprising in combination, a source of liquid, a pipe connected with said source, means for causing said liquid to flow through said pipe with a uniform rate of flow, a delivery pipe connected to said means, a vertically slidable receiver, adjustable means on said delivery pipe for simultaneously allowing a variable part of the liquid flowing from the first mentioned means to be discharged and returning the remainder of said liquid to said receiver, means operated by the displacements of said receiver, for substantially, simultaneously and correspondingly connecting said receiver with the first mentioned pipe and throttling said first mentioned pipe at a point thereof located between said receiver and said source of liquid and means, sensitive to the weight of liquid in said receiver, for adjusting the vertical position of said receiver.

9. A device of the type described comprising in combination, a pump, a liquid tank for said pump, a suction pipe for connecting said tank to said pump, a delivery pipe for said pump, a vertically slidable receiver, adjustable means on said delivery pipe for simultaneously allowing a variable part of the liquid flowing from the pump to be discharged and returning the remainder of said liquid to said receiver, means, operated by the displacements of said receiver, for substantially, simultaneously and correspondingly connecting said receiver with said suction pipe and throttling said suction pipe at a point located between said receiver and said liquid tank, and means, sensitive to the weight of liquid in said receiver, for adjusting the vertical position of said receiver automatically.

10. A device of the type described comprising in combination, a pump, a liquid tank for said pump, a suction pipe for connecting said tank to said pump, a delivery pipe for said pump, a vertically slidable receiver, adjustable means on said delivery pipe for simultaneously allowing

a variable part of the liquid flowing from the pump to be discharged and returning the remainder of said liquid to said receiver, means operatively connected with said receiver for substantially, simultaneously and correspondingly connecting said receiver with said suction pipe and throttling said suction pipe at a point located between said receiver and said liquid tank, deformable means for supporting said receiver adapted to resist any downward movement of said receiver, whereby the vertical position depends upon the equilibrium between the action of said last mentioned means and the action of gravity of said receiver.

11. A device of the type described, comprising in combination, a pump, a liquid tank for said pump, a suction pipe for connecting said tank to said pump, a delivery pipe for said pump, an auxiliary receiver, adjustable means on said delivery pipe for simultaneously allowing a variable part of the liquid flowing from said pump to be discharged and returning the remainder of

said liquid to said receiver, and means, controlled by the quantity of the liquid in said receiver, for substantially simultaneously and correspondingly connecting said receiver with said suction pipe and obturating said suction pipe at a point located between said receiver and said liquid tank.

12. A device of the type described comprising in combination, a pump, a liquid tank for said pump, a suction pipe for connecting said tank to said pipe, a delivery pipe for said pump, a receiver connected with said suction pipe, adjustable means on said delivery pipe for simultaneously allowing a variable part of the liquid flowing from said pump to be discharged and returning the remainder of said liquid to said receiver, and means, coactive with said receiver for connecting said receiver to said suction pipe and substantially simultaneously throttling said suction pipe to a corresponding amount at a point located between said tank and said receiver.

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