

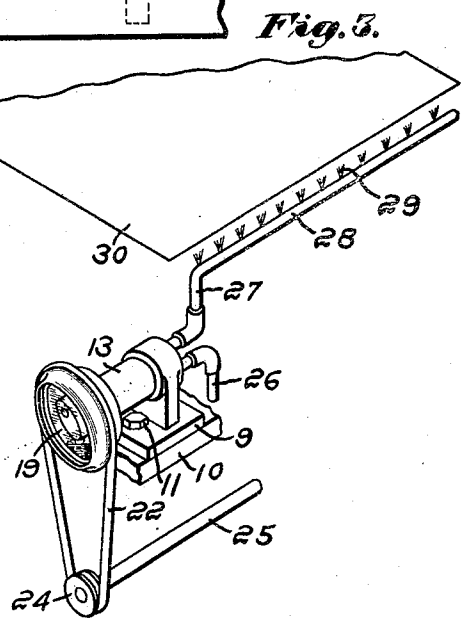
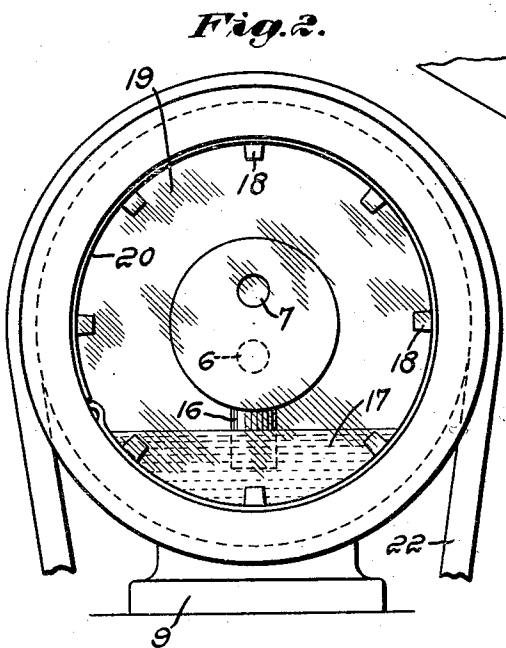
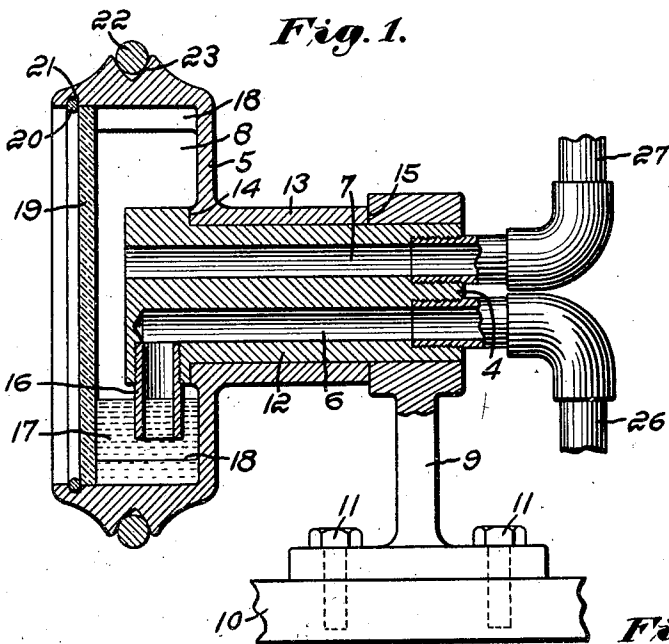
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F. R. BELLUCHE

VALVE

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UNITED STATES PATENT OFFICE.

FRANK R. BELLUCHE, OF MANSFIELD, MASSACHUSETTS.

VALVE.

Application filed August 20, 1924. Serial No. 733,241.

To all whom it may concern:

Be it known that I, FRANK R. BELLUCHE, a citizen of the United States, and a resident of Mansfield, in the county of Bristol and State of Massachusetts, have invented an Improvement in Valves, of which the following description, in connection with the accompanying drawings, is a specification, like characters on the drawings representing like parts.

This invention relates to a novel and improved valve for utilizing centrifugal and gravitational forces and inertia to control the flow of a fluid from a source of supply through the valve to the thing to be supplied with the fluid. The invention will be best understood by reference to the following description when taken in connection with the accompanying drawings of one specific embodiment thereof, while its scope will be more particularly pointed out in the appended claims.

In the drawings,—

Fig. 1 is a vertical, sectional view of a valve structure embodying the invention taken on a plane containing its axis of rotation;

Fig. 2 is an end elevation of the valve; and

Fig. 3 is a perspective view on a much reduced scale illustrating the application of the valve to an apparatus such as a sheet drier and static eliminator for printing presses.

Referring to the drawings and to the embodiment of the invention which is selected for exemplification, and having reference at first more particularly to Fig. 1, there is shown a valve structure comprising a stator 4 and a rotor 5, one presenting an inlet 6 and an outlet 7, the former leading to and the latter from a chamber 8 presented by the rotor. In the present example, the stator is supported by an appropriate mounting, herein a bracket 9, which may be attached to any suitable support 10 as by screws 11.

Herein the rotor is conveniently mounted on the stator which presents a bearing portion 12 for a hub 13 presented by the rotor, said hub being interposed between and held against axial displacement in one direction by a shoulder 14 presented by the stator, and in the opposite direction by a shoulder 15 presented by the bracket 9.

In the present example the inlet and outlet passages 6 and 7 are conduits generally

parallel with the axis of rotation, which in this instance is horizontal. One of these passages, herein the inlet passage 6, terminates at its inner end adjacent the bottom of the chamber 8 and its terminal portion is conveniently formed as a tube 16 whose upper end is inserted in the body of the stator. It should, of course, be understood that this is simply one convenient way of making the inlet conduit. In the present embodiment the outlet passage leads from the chamber at a point above the point of entrance of the inlet passage thereto.

When the rotor is at rest communication between the inlet and outlet passages is closed by an appropriate closure, herein comprising a body of liquid 17 such as mercury in which the inner orifice of the inlet passage is normally submerged, and which therefore prevents communication between the inlet and outlet passages by way of the chamber. When, however, the rotor is rotated at a sufficient speed the action of centrifugal force will cause the mercury to spread out and to follow the internal periphery of the rotor, and in so doing the mercury recedes from the orifice of the inlet, thereby establishing communication between the inlet and outlet.

This condition of affairs will continue until the speed of the rotor drops sufficiently to permit the mercury to gravitate to its original position and again to submerge the orifice of the inlet when communication will be closed. The prompt resumption of this normal condition in response to reduction of speed of the rotor is facilitated by the provision of a series of partitions or ribs 18 (see Fig. 2) extending lengthwise of the axis of rotation and disposed at appropriate intervals along the internal periphery of the chamber. The effect of these partitions is to break up the mercury into a number of small bodies, the inertia of each of which is so slight that reduction of speed of the rotor is accompanied by a prompt return of the mercury to its normal position represented in Fig. 2. This is desirable as it has been found in practice that without the partitions the body of mercury tends to continue to revolve too long after the rotor has started to slow down, and the closing of the valve is insufficiently prompt for some applications of the valve, such as that presently to be described. Mercury is preferred to other

liquids because, owing to its great weight, it naturally tends to gravitate to its normal condition quickly.

Herein the rotor is provided with a removable cover plate 19 to facilitate manufacture and assembly of the parts and to afford opportunity for inspection, and in the present example this cover plate is formed of transparent material, such as glass, which is preferred as it enables inspection to be made at all times, even when the device is running, by simply looking through the glass into the chamber. In this way the operation of the valve can be seen at a glance. The cover plate may be secured in place by any appropriate means, such as a spring ring 20 received in a circumferential groove 21 presented by the rotor, said ring serving to lock the glass in place but permitting its ready removal by simply springing the ring out of its groove.

Rotation of the rotor herein is conveniently effected by the use of a belt 22 received in a groove 23 presented by the rotor (see Fig. 1) and driven by a grooved pulley 24 (see Fig. 3) driven as by a shaft 25 from any convenient part of the machine in connection with which the valve is employed. As already indicated, one possible application of the valve is to a printing press for the purpose of drying the ink and preventing or eliminating static electricity. In such an installation the inlet 6 will be connected by a supply pipe 26 to a source of gas, while the outlet 7 will be connected by a pipe 27 to a burner 28 having one or more outlets 29 at which the gas is delivered and is burned. The printed sheet 30 is caused to travel in proximity to the flames, thereby to be heated during its passage. It should be understood, of course, that when the sheet is traversing the burner and at normal speed, the flames should be at maximum intensity, and to this end the gas controlling valve should and does remain open in the manner hereinbefore explained, but should the press slow down beyond a predetermined speed, or stop altogether, the speed responsive valve will be closed and the supply of gas to the burners cut off. Of course, if desired, a separately controlled source of gas may be supplied to a usual pilot light to relight the burner when the main supply is again turned on by the action of the speed responsive valve.

Having thus described one embodiment of the invention but without limiting myself thereto, what I claim and desire by Letters Patent to secure is:

Claims.

1. In a valve structure, the combination of a stator presenting two passages, a rotor having a bearing on said stator and presenting a chamber within which said passages terminate, and a body of liquid within said

chamber normally covering the terminal orifice of one of said passages.

2. In a valve structure, the combination of a stator presenting two passages, a rotor having a bearing portion on said stator and about said passages, said rotor presenting a chamber adapted to afford communication between said passages, and a body of liquid within said chamber normally closing said communication.

3. In a valve structure, the combination of a stator presenting two passages and a bearing portion about said passages, a rotor mounted on and about said bearing portion to turn about a generally horizontal axis and presenting a chamber adapted to afford communication between said passages, one of said passages having its orifice below the other, and a body of liquid within said chamber normally covering the lower orifice.

4. A valve structure comprising, in combination, a rotor presenting a chamber, a stator presenting an inlet to said chamber and an outlet therefrom, and a body of liquid within said chamber normally closing communication between said inlet and said outlet and adapted to utilize centrifugal force when said rotor is rotated at a predetermined speed to open such communication.

5. A valve structure comprising, in combination, rotatable means presenting a chamber having an inlet and an outlet, and a body within said chamber normally closing communication between said inlet and said outlet and mounted for movement under the influence of centrifugal force to open such communication when rotation of said means reaches a predetermined speed.

6. A valve structure comprising two parts one of which presents a port and one of which is a rotatable liquid valve, which in its normal position closes said port and which under the influence of centrifugal force due to rotation opens said port.

7. A valve presenting an inlet and an outlet and comprising a rotor presenting a chamber through which communication between said inlet and said outlet is afforded, and a body within said chamber responsive to centrifugal force to open and close communication between said inlet and outlet by way of said chamber.

8. A valve structure comprising, in combination, a rotor and a stator presenting a chamber and an inlet thereto and an outlet therefrom, and a body of mercury within said chamber responsive to centrifugal force due to rotation of said rotor to open and close communication between said inlet and said outlet by way of said chamber.

9. A valve structure comprising, in combination, a rotor and a stator presenting a chamber and an inlet thereto and an outlet therefrom, a body of mercury within said chamber responsive to centrifugal force due

to rotation of said rotor to open and close communication between said inlet and said outlet by way of said chamber, and means for dividing said body into a plurality of
5 bodies during rotation of said rotor.

10 10. A valve structure comprising, in combination, a rotor and a stator presenting a chamber and an inlet thereto and an outlet therefrom, and a body of mercury within said
15 chamber responsive to centrifugal force due to rotation of said rotor to open and close communication between said inlet and said outlet by way of said chamber, said rotor
presenting within said chamber a series of
partitions to facilitate restoration of said
body to its normal state under the influence
of gravity.

20 11. A valve structure comprising, in combination, rotatable means presenting a chamber having an inlet and an outlet, and a
body within said chamber normally closing
communication between said inlet and said
outlet and mounted for movement under the
influence of centrifugal force to open such
25 communication when rotation of said means reaches a predetermined speed, said means
presenting a transparent wall through which
the interior of said chamber may be viewed.

30 12. A valve comprising two rotatable parts one of which is a liquid, which in its normal position closes the valve and which
under the influence of centrifugal force due
to rotation opens the valve, one of said parts
having a transparent portion through which
35 said liquid may be viewed.

13. A valve structure comprising, in combination, means presenting a chamber having an inlet and an outlet, a body of liquid within said chamber constituting a valve to open

and close communication between said inlet 40
and said outlet, and means to cause rotation
of said liquid to open such communication
and to stop rotation of said liquid to close
such communication.

14. A valve structure comprising, in com- 45
bination, means presenting two passages, a
body of liquid constituting a valve normally
closing communication between said pas-
sages, and means to cause rotation of said
liquid to open such communication and to 50
stop rotation of said liquid to close such
communication.

15. A valve structure comprising, in combination, means presenting two passages, a
body of liquid constituting a valve normally 55
closing communication between said pas-
sages, a rotatable body to cause rotation of
said liquid to open such communication, and
means within said liquid to stop its rotation.

16. A valve structure comprising, in com- 60
bination, a body of liquid constituting a
valve, means presenting a port normally
closed by said valve, and means to cause
rotation of said valve to open said port and
to stop rotation of said valve to close said 65
port.

17. A valve structure comprising, in combination, a body of liquid constituting a
valve, means presenting a port normally 70
closed by said valve, means to cause rotation
of said valve to open said port, and means
within the path of rotation of said valve to
stop its rotation and to cause it to close said
port.

In testimony whereof, I have signed my 75
name to this specification.

FRANK R. BELLUCHE.