

No. 708,335.

Patented Sept. 2, 1902.

H. A. FISKE.  
FLOW ARRESTING DEVICE.

(Application filed Sept. 21, 1900.)

(No Model.)

FIG. 1.

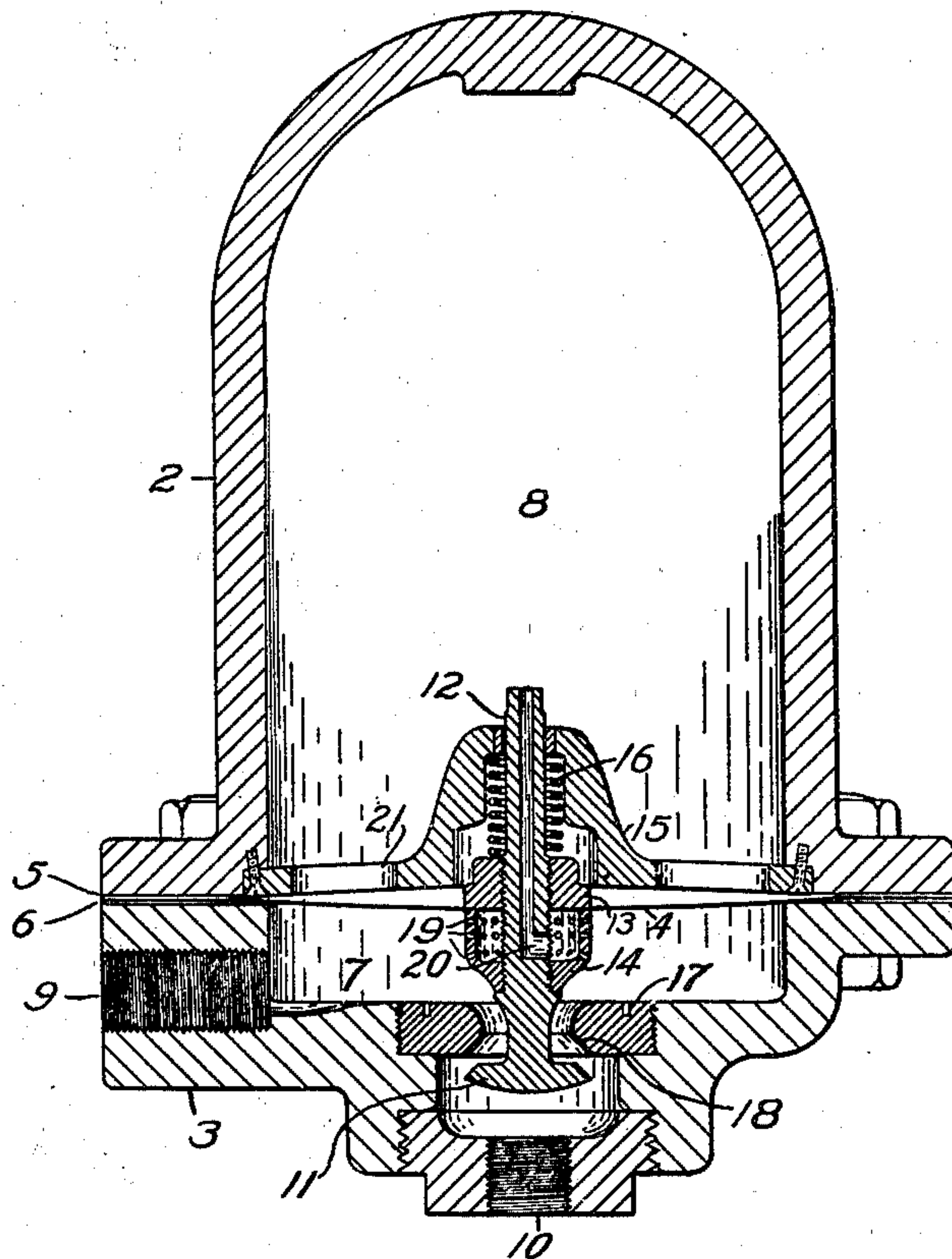
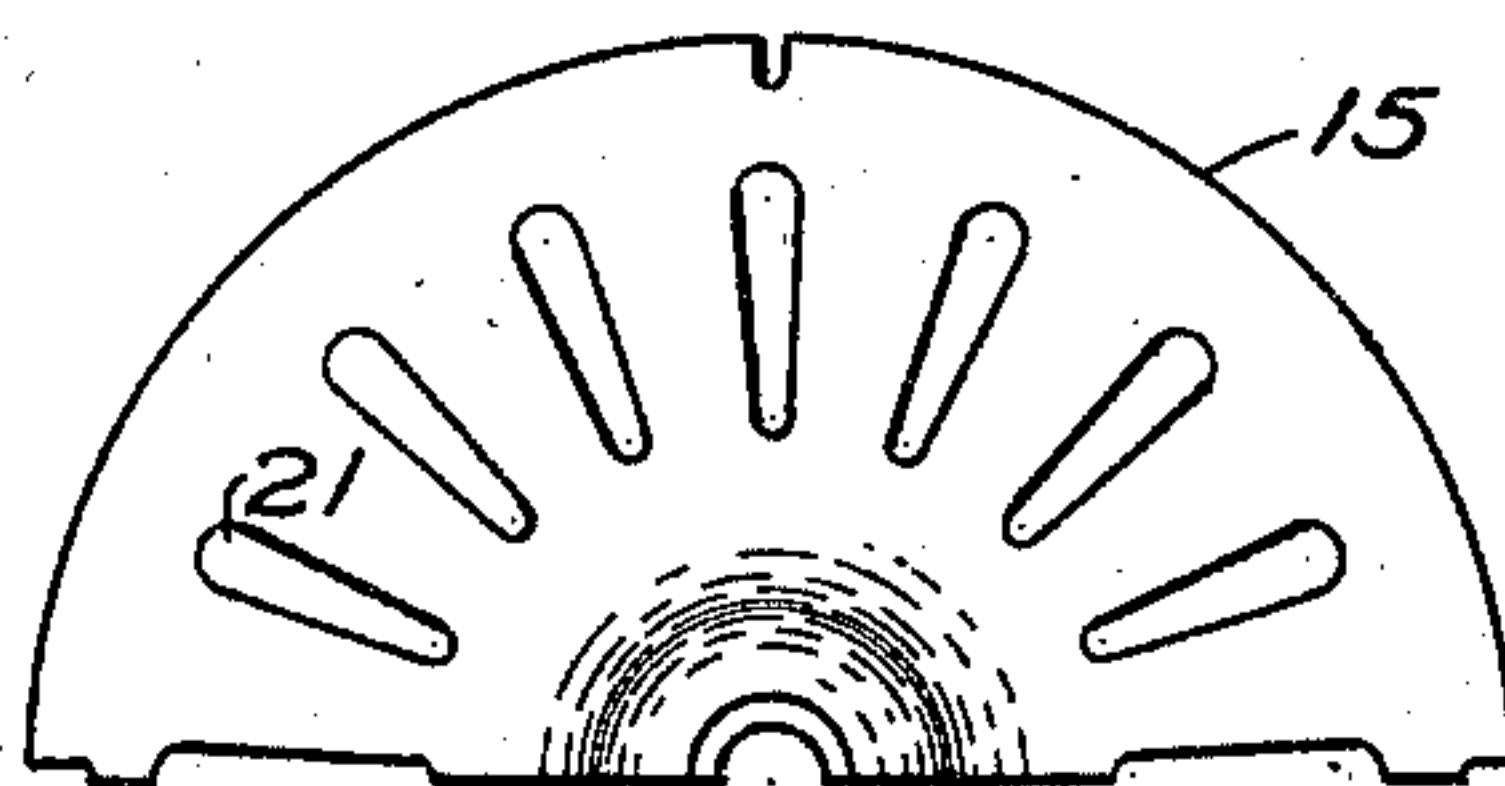


FIG. 2.



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# UNITED STATES PATENT OFFICE.

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## FLOW-ARRESTING DEVICE.

SPECIFICATION forming part of Letters Patent No. 708,335, dated September 2, 1902.

Application filed September 21, 1900. Serial No. 30,676. (No model.)

*To all whom it may concern:*

Be it known that I, HENRY A. FISKE, a citizen of the United States, residing at Newton, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Flow-Arresting Devices, of which the following is a specification.

My invention is intended to provide a simple and effective device for temporarily checking or arresting the flow of a fluid under pressure, the device herein shown and described being particularly adapted to be used as an attachment to certain types of alarm-valves for automatic fire-extinguishing systems to prevent the giving of false alarms. An alarm-valve of the kind referred to is shown and described in Letters Patent of the United States No. 384,514, granted June 12, 1888, to Dowson and Taylor, for an alarm-valve for automatic fire-extinguishers, in which valve the opening of the main check-valve to supply the sprinkling system permits a stream of water under pressure to flow to a water rotary or other suitable alarm device. It has been found in practice that in an alarm-valve of the type just described the check-valve will not infrequently be opened by a temporary excess pressure in the supply system, such as is caused by a water-hammer or by a slight leakage above the check-valve sufficiently to permit the flow to the alarm device of enough water to operate the same, in which case a false alarm will be given.

My present invention provides a device which when interposed between the main check-valve and the alarm device of an alarm-valve such as above described may be made to check or arrest the flow of water to the alarm device for a predetermined interval, which will be long enough to permit the check-valve to close in case it has been opened temporarily, as above described, so that before an operative amount of water can reach the alarm device said check-valve will have closed and the transmission of water with sufficient pressure and volume to give an alarm will thus be wholly prevented. After the predetermined interval has elapsed, however, the device will cease to interrupt the flow of water, and hence it will not interfere

with the proper operation of the alarm-valve, but will merely delay the giving of the alarm for the interval referred to.

A preferred form of flow-arresting device embodying my invention and adapted to be used in connection with an alarm-valve, as above set forth, is illustrated in the accompanying drawings, in which—

Figure 1 shows the device in central vertical section, and Fig. 2 is a plan view showing half of a guiding-plate hereinafter described.

My device may be broadly described as consisting of the combination of a chamber through which the stream of fluid to be checked is adapted to flow, a valve or equivalent device for controlling the flow of the fluid through the chamber, means for opening the valve, and means arranged to be acted upon by the pressure of the fluid, and thereby made to exert a closing force on said valve, the construction being such that after a desired interval of time has elapsed the effective force tending to hold the valve closed will be neutralized, whereupon the valve will open and the fluid will be free to flow through the chamber without further interruption.

The device shown in the drawings comprises two hollow castings 2 and 3, flanged and bolted tightly together, as shown, and separated by a movable partition, herein shown as a flexible diaphragm 4, clamped between the flanged ends of the said castings, which are preferably circular in cross-section. The joint between the castings should be made fluid-tight by means of gasket-rings 5 and 6 or otherwise. There are thus provided two chambers 7 and 8, situated on opposite sides of the diaphragm 4, the chamber 8 being closed at its upper or outer end and the chamber 7 being provided with an inlet 9 and an outlet 10, to which in use are secured the pipes which convey the fluid, so that the chamber 7 is inserted in and forms a part of the channel or passage through which said fluid is intended to flow when admitted thereto.

The passage of the fluid through the chamber 7 is controlled by a valve 11 or similar device, which is arranged to open outward and to be operated by the movements of the diaphragm or other partition 4, preferably by



being attached to the center thereof. According to the arrangement shown the valve-stem 12 passes directly through the diaphragm 4 and is screw-threaded to receive two clamping plates or nuts 13 and 14, between and by means of which said diaphragm and valve-stem are securely united. A guide and bearing for the upper end of the valve-stem 12 may be provided by means of a circular casting 15, secured to the casting 2 above the diaphragm and provided with a hollowed central portion, the upper end of which forms the desired guide for the stem 12 and may also serve as the bearing for one end of a spring 16, arranged to press against the nut 13, and thereby hold the valve 11 open under normal conditions. The bearing-surface of said valve is preferably made conical, as shown, and the valve-seat 17 has a corresponding surface 18, said seat 17 being preferably formed separate from the casting 3 and screwed into a recess provided for it.

An open passage is provided between the chambers 7 and 8, so that the fluid will always be free to flow from one chamber to another; but said passage has, however, so limited a capacity that a transfer of fluid through the same sufficient substantially to equalize the pressures in the chambers 7 and 8 will require that period of time for which it is desired to arrest the flow of fluid through the device. I prefer to form said passage by making the clamping device 14 cup-shaped and perforating its walls with a number of minute holes 19, the interior cavity of the part 14 and the chamber 8 being connected by making the upper portion of the valve-stem 12 hollow and connecting the lower portion of the tube thus formed with said cavity by a lateral perforation 20. As thus constructed the holes 19 collectively form a sort of strainer, which serves to prevent the clogging of the hollow stem 12 by dirt or sediment. Free communication between the chamber 8 and the top of the diaphragm 4 is afforded by providing a suitable number of apertures 21 in the plate 15.

The device above described operates as follows: The parts being normally in the position shown in the drawings, if a fluid under pressure be admitted to the chamber 7 through the inlet 9 it will instantly fill said chamber and exert sufficient pressure on the under side of the diaphragm 4 to lift said diaphragm, and with it the valve 11, overbalancing the pressure on the valve itself, thereby closing said valve and preventing the escape of fluid through the outlet 10. The fluid in the chamber 7 will simultaneously pass through the holes 19 and hollow valve-stem 12 into the chamber 8 at a rate which is determined in part by the fluid-pressure in the chamber 7, in part by the back pressure in the chamber 8, and in part by the cross-sectional area of the passage leading from one chamber to the other at its smallest part. The chamber 8 thus acts as a closed reservoir, and as it fills with fluid the pressure therein will increase

until the pressures on both sides of the diaphragm 4 will become so nearly equal that the resultant or operative fluid-pressure on said diaphragm will be overbalanced by the forces tending to open the valve 11, whereupon said valve will open and the fluid will be free to flow through the outlet 10. The size of the chamber 8 and the cross-sectional area of the bore of the valve-stem 12 are such, as above stated, that before the pressures in the chambers 7 and 8 can become approximately equalized, as above described, the desired interval of time will elapse after the entrance of the fluid into the chamber 7, so that before the valve 11 can open the desired interruption of the flow of fluid will have taken place. In case the fluid ceases to flow into the chamber 7 said chamber will empty itself through the opening 10 or through a small drip provided for the purpose, and the fluid in the reservoir 8 will pass into the chamber 7 and be thence drained off until in the case of water or other liquid the level of the liquid in said reservoir reaches the top of the hollow valve-stem, when no further escape will take place from said reservoir.

It will be understood that the alarm devices commonly used with alarm-valves of the kind described are arranged to be operated only by a quantity of water which has considerable volume and pressure, and hence said devices will not be affected by the small quantity of water which may flow past the valve 11 before it closes or which may leak past said valve after it has closed or which may be drained from the chambers 7 and 8 after the device has operated, as above described.

It is also to be observed that when my device is operated by a liquid the time during which the valve 11 will remain closed may be varied not only by varying the size of the passage through which the chambers 7 and 8 communicate with each other, but also and more easily by varying the height of the valve-stem 12 within the chamber 8, because all of said chamber below the top of said stem will remain permanently filled with liquid, and consequently the capacity of said chamber and the quickness with which it will be filled will depend upon the height of said valve-stem.

Although my invention as herein shown and described is particularly adapted to provide an attachment for alarm-valves to prevent the giving of false alarms, it may also be made use of to check or arrest the flow of any fluid under pressure, whether liquid or gas, for a desired period of time wherever such a device may be desirable, and I do not consider that my invention is limited to the specific use above set forth nor to the form or arrangement of parts herein shown and described, as the same may be greatly varied without departing from my invention. For example, it may be noted that it is not material whether the valve 11 be normally open or normally closed in case the arrangement



is such, as shown in the drawings, that the pressure in the chamber 7 will be operative upon said valve to provide a force for opening the same. Thus if in the device shown the spring 16 were normally stretched instead of compressed it would normally hold the valve 11 closed, and the only difference in operation in such case would be that when the fluid reached the chamber 7 it would find the valve 11 closed, and in order to open the valve it would have to exert sufficient pressure thereon to overcome the effect of the spring 16, whereas in the arrangement shown the fluid-pressure first has to close the valve 11 and is subsequently assisted in opening the same by said spring. In each case, however, the valve will be provided with means for opening it, and in each case the movable member or diaphragm 4 will exert a closing force on the valve when the fluid first reaches the chamber 7 and will continue to hold the valve closed until the effective valve-closing force is neutralized by the gradual flow of fluid into the chamber 8. In case the valve 11 be normally closed it will of course be necessary to drain the chambers 7 and 8 through a drip-opening into the former chamber, as obviously no drainage will be able to escape through the valve 11. This latter arrangement may be preferred in case it is desired to prevent any flow of fluid past the valve 11 prior to the operation of the device.

I claim as my invention—

1. In a device of the character described, the combination of a chamber having an inlet and an outlet, a valve controlling said outlet, means for opening said valve, means operated by the pressure of the fluid entering said chamber for exerting a closing force on the valve, and means whereby the effective force holding said valve closed is automatically neutralized after a predetermined interval.

2. In a device of the character described, the combination of a chamber provided with an inlet and an outlet, a valve arranged to control the flow of a fluid through said outlet, means for holding the valve normally open, means for closing the valve arranged to be operated by the pressure of said fluid, and means for rendering said pressure inoperative after a predetermined interval.

3. In a device of the character described, the combination of a chamber provided with an inlet and outlet, a movable member arranged to be operated by fluid-pressure exerted in said chamber, a flow-controlling device operative with said member and arranged to arrest the flow of the fluid through the outlet when said member is acted upon by the pressure thereof, and means for render-

ing the pressure on said member inoperative after a predetermined interval.

4. In a device of the character described, the combination of a movable member arranged to be operated by fluid-pressure, a valve controlled by said movable member and arranged to be held closed thereby when said member is acted upon by said pressure, means for automatically equalizing the pressures on both sides of said movable member after a predetermined interval, and means for opening said valve.

5. In a device of the character described, the combination of a chamber provided with an inlet and an outlet, a movable plate or diaphragm closing one side of said chamber, a valve connected with said diaphragm and arranged to close said outlet when the diaphragm is acted upon by the pressure of the fluid in said chamber, means for opening said valve, and means for equalizing the pressures on both sides of said diaphragm after a predetermined interval.

6. In a device of the character described, the combination of a chamber provided with an inlet and an outlet, a reservoir separated from said chamber by a movable partition, a valve carried by said partition and arranged to close said outlet, and means for opening said valve, said partition being provided with an open passage-way leading from said chamber to said reservoir.

7. In a device of the character described, the combination of a chamber provided with an inlet and an outlet, a reservoir adjacent to said chamber, a movable partition between said chamber and reservoir provided with an open passage adapted to permit a gradual flow of fluid between the chamber and reservoir, a valve connected with said partition and adapted to close the outlet from said chamber, and means for opening said valve.

8. In a device of the character described, the combination of a chamber and a reservoir separated by a flexible diaphragm, said chamber being provided with an inlet and an outlet, a valve attached to said diaphragm and arranged to close the outlet, said valve having the upper portion of its stem hollow and thereby providing a passage between said chamber and reservoir, a straining device surrounding the lower end of said hollow stem and communicating therewith, and means for opening said valve.

In testimony whereof I have hereunto subscribed my name this 18th day of September, 1900.

HENRY A. FISKE.

Witnesses:

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ELLEN F. COLLINS.