June 7, 1932. W. F. CONRAN 1,862,111

REGULATOR DEVICE

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Fig. 1.

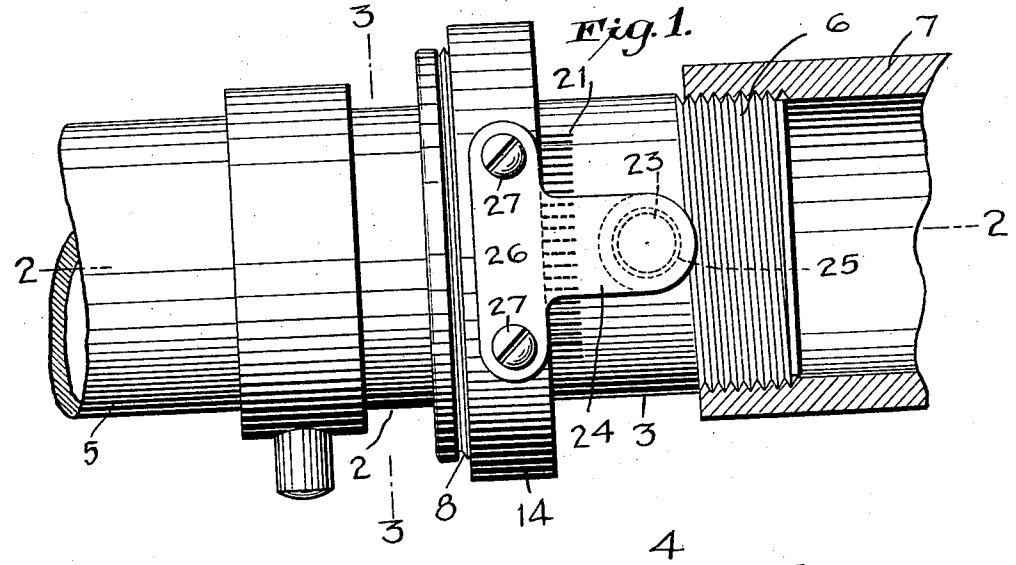
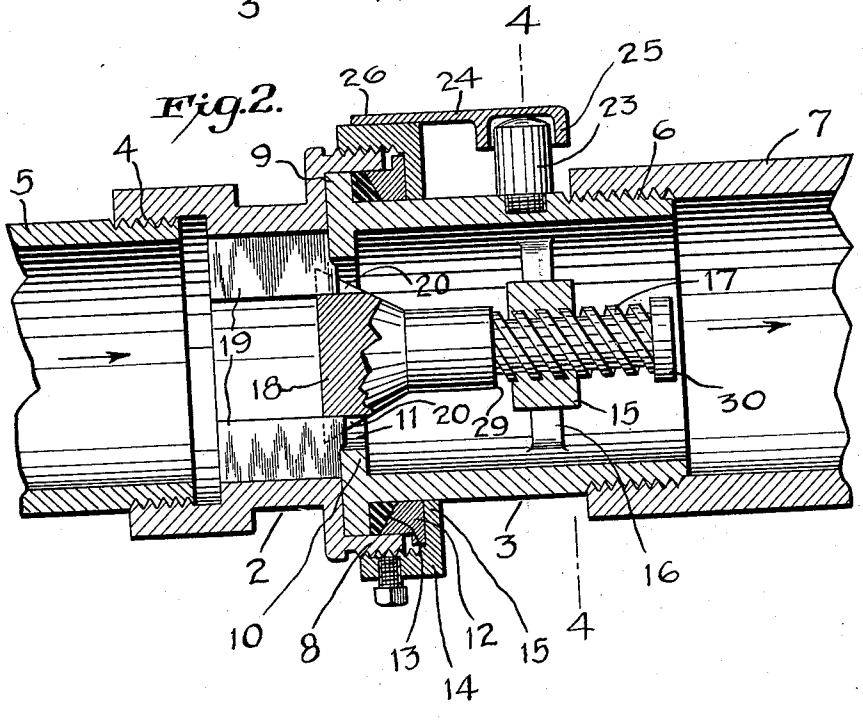


Fig. 2.



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Fig. 3.

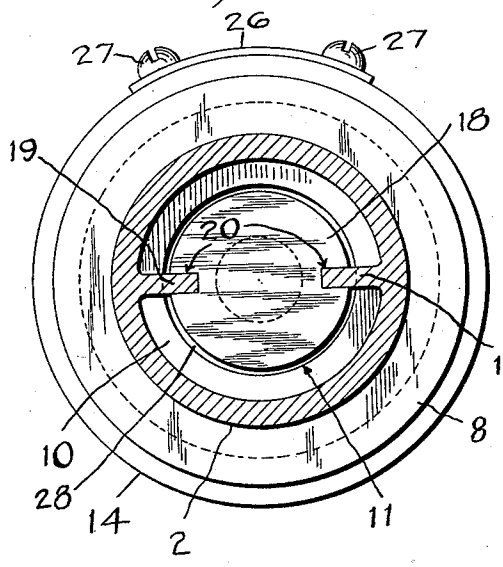


Fig. 4.

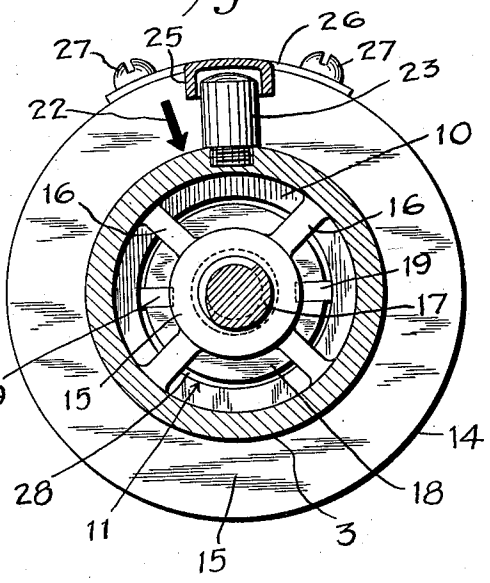
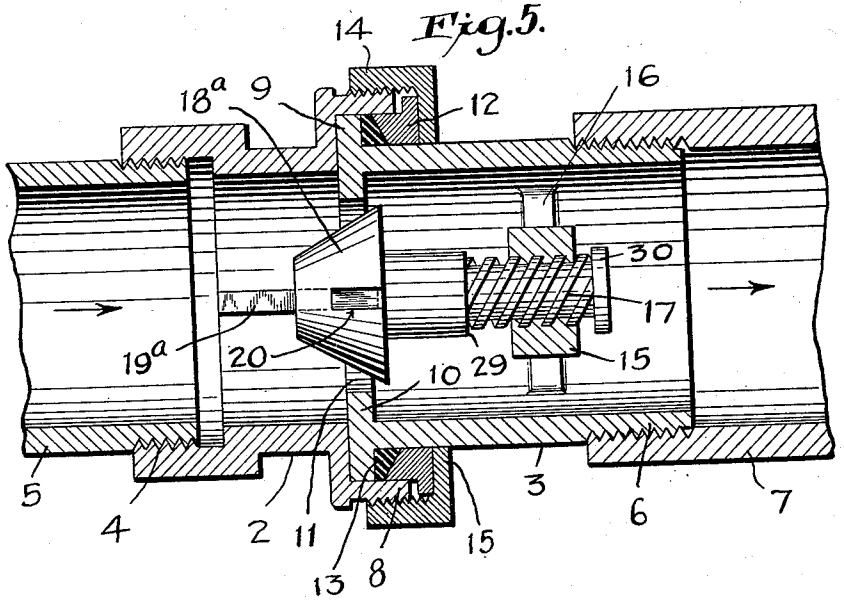


Fig. 5.



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UNITED STATES PATENT OFFICE

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REGULATOR DEVICE

Application filed July 26, 1928. Serial No. 295,494.

The invention relates to means for controlling fluid flow and pressure, and has particular reference to devices which are introduced in the branches or near the outlets of a piping system having a number of outlets, in order to limit a desired maximum pressure and/or flow at or adjacent each outlet. Thus, in fire-protection standpipe systems in buildings, owing to hydrostatic head and the resistance to flow through pipes, the working pressures at different floors would ordinarily vary, and some or all of these pressures would usually be too high to enable an inexperienced person to handle the hose satisfactorily or safely. In such systems it is therefore important to provide the branches with devices which are set when or before the system is installed for predetermined discharge pressures, which pressures are usually designed to be uniform for all outlets, though this is not necessarily the case. Each regulating device is capable of being set to determine the pressure adjacent its outlet without affecting the pressures at other outlets, and irrespective of the supply pressures in the system, provided that those pressures are materially above the maximum intended discharge pressures.

The object of the present invention is to provide a simple, effective and reliable device suitable for such purposes wherein the regulation is obtained by positioning in a longitudinal direction an internal obstructor the position of which relative to a gateway is determined by relative rotational adjustment of coupled waterway members within the bore of which the obstructor is axially disposed. In this respect the invention is essentially distinguished from a device such as disclosed in my prior Patent No. 1,344,383, dated June 22, 1920, wherein apertured partition members are fixed inside two coupled members, to partake directly of any relative rotation between such members.

A further object of the invention is to provide a device of the nature set forth in which the construction and relations are such that at the closest regulation which can be effected a certain minimal passageway is maintained.

Still another object is to provide a virtually permanent locking device for securing the coupled waterway members in the predetermined setting, so as to guard against the setting being tampered with, this locking device being adapted to be broken or forced in case of emergency in order to enable firemen or others to increase the pressure or flow at the outlet. It will be understood that the utility of the invention is not limited to the particular important field which has been indicated, and that the device may be applied to various pipes lines or systems, outlets or nozzles, wherein its capabilities may be availed of.

In the accompanying drawings forming part hereof:

Fig. 1 is an elevation of one embodiment of the invention connected between portions of two other members of a conduit, one of which is shown in elevation;

Fig. 2 is a longitudinal section taken on the line 2—2 of Fig. 1;

Figs. 3 and 4 are cross-sections taken on the lines 3—3 and 4—4, respectively, of Figs. 1 and 2; and

Fig. 5 is a longitudinal section taken in a plane at right angles to Fig. 2, illustrating a modification.

The device includes two coupled coaxial waterway members 2 and 3 of generally tubular or annular nature, the member 2 being the inlet member and 3 the outlet member. The member 2 is internally threaded at its rear end 4 to screw onto a section of pipe 5, which may be understood to represent part of a branch of a standpipe or other system. The member 3 is externally threaded at its forward end 6 to receive another conduit section 7, which may be part of a hose connection.

The forward end 8 of the member 2 is enlarged to form a annular circular recess within which fits the rear end of the member 3, this rear end having an annular outwardly projecting rim 9 and an internal rib or portion 10 defining a gateway 11.

The interfitting portions of the members 2 and 3 are adapted for tight connection permitting the members to be turned relatively

to each other about the common axis. A gland follower ring 12 enters within the recess between the outside of the member 3 and the surrounding enlarged portion 8 of the member 2, and between this ring and the rim 9 a packing member 13 is interposed to be compressed by pressure between the parts 9 and 12.

The portion 8 of the member 2 is screw threaded on the outside to receive a coupling nut 14, the flange 15 of which bears against the outer side of the follower ring 12 projecting from the recess. Tightening of the nut therefore couples the members 2, 3 firmly together and also applies pressure to the gland to prevent leakage.

The member 3 is also cast or otherwise provided with a centrally disposed nut 15 carried from the conduit wall of the member by arms 16, leaving ample passageway between the arms and between this nut and the bore of the member. The nut 15 is disposed at a suitable distance forwardly from the gateway 11, and extending through it is a screw-threaded stem 17 of an obstructor 18, this obstructor cooperating with the gateway 11 to determine a desired control passageway, which passageway is capable of being adjusted.

In the best embodiment, the obstructor 18 is a broad truncated conical element or head, which stands within the gateway so as to be circumferentially spaced from the boundary portion 10.

The forward portion of the obstructor preferably projects within the bore of the member 2 to engage with one or more longitudinal inwardly projecting guide ribs 19 formed in this member, the obstructor having longitudinal slots 20 in its outer portion to cooperate with the guide ribs. By this means the obstructor is restrained against rotation relative to the member 2 but is allowed to be shifted longitudinally.

It will be perceived, therefore, that by turning the members 2 and 3 relatively to each other the effective size of the annular control passage around the obstructor can be adjusted in a very definite and exact manner to predetermine a precise maximum pressure and rate of discharge at the outlet when the shut-off valve (not shown) of the pipe line or branch is opened.

The regulator is preferably set at the shop, before installation, and to assist in such setting the outside of the member 3, in front of the coupling nut 14, is marked with graduations 21, and the nut 14 with an index 22. In this connection, it may be observed that the coupling nut 14 when set tight enough to preclude leakage is in effect fixed to the member 2, and that the relative rotation between the members 2 and 3 may be effected by turning the member 3 within the gland without disturbing the said nut. In order so to turn the member 3 it is provided with a stud projection 23 adapted for the application of a spanner wrench.

Special means are provided for locking the members 2 and 3 in the predetermined setting in a sufficiently permanent manner to guard against tampering or accidental shifting of the adjustment. To this end, after the adjustment has been made, an arm 24 having a covered socket 25 at its free end and a widened base 26 is fixed to the nut 14 in such a manner that the socket engages over the end of the stud 23. A virtually fixed connection between the locking arm and the member 2 is secured with advantage by tightly affixing the base 26 to the nut 14 by screws 27, the holes for which in the nut are drilled and tapped after the adjustment has been made.

By making the piece 24 of a casting capable of being broken by a sharp blow of a hammer, or by so forming it that it may be distorted by the application of considerale force, the members can be unlocked by firemen or others in event of it becoming necessary to increase the area for flow.

In connection with the foregoing features, provision is made within the regulator so that at the lowest regulation possible with the device a passage for a certain amount of flow remains unclosed. This is preferably accomplished by making the extreme diameter of the obstructor 18 somewhat smaller than the diameter of the gateway 11, as indicated in Figs, 2, 3 and 4, so that a narrow annular space 28 exists even when the largest part of the obstructor stands in or immediately adjacent the gateway. In addition, or alternatively, this feature may involve a relation whereby, when a shoulder 29 at the forward end of the screw-threaded portion of the stem 17 abuts the stationary nut 15, the largest portion of the obstructor, even though it may not be smaller than the area of the gateway, is spaced slightly from the boundary. Again, openings, such as the notches 20, for example, may be so arranged as to leave a minimal passageway through or around the obstructor at the closest possible adjustment. The particular plan wherein the obstructor is made smaller than the opening or bore with reference to which it is adjustable possesses special advantages in simplicity, reliability and economy of manufacture.

The shoulder 29 also prevents the obstructor being drawn out of engagement with the guides 19, and a collar or shoulder 30 on the stem at the opposite side of the nut prevents the stem from being screwed entirely out of the nut, or the obstructor being moved out of engagement with the guides in the reverse direction.

A reason for providing for a minimal passage through the regulator is that it should be assumed that occasionally, through error,

or otherwise, one of the devices in a system may be in a "closed" condition. In that event, if it were not for the existence of a restricted flow opening, impossible to close, a person on opening the shut-off valve of the branch or line and finding no flow would be likely to conclude that a main valve in the basement of the building, or elsewhere, was closed, and valuable time might be lost while he went to seek such a valve. To obviate such a difficulty this invention provides for at least a tell-tale flow under any condition of adjustment of the device. If on opening the adjacent shut-off valve (not shown) the person should find that only an inadequate flow was delivered, he would know that the regulator was improperly adjusted and would break the locking device and turn the member 6 to shift the obstructor to a more open condition.

In the construction illustrated in Fig. 2, the broad end of the obstructor 18 is opposed to the upstream pressure. In order to make it easier to move the obstructor in the direction for wider opening when water is flowing through the regulator, the obstructor may be reversed, as in the case of the obstructor 18^a of Fig. 5. The other parts shown in this view, being similar to those of Fig. 2, are designated by the same reference characters. The guides 19 of Fig. 2 project endwise somewhat beyond the bore of the member 2, and in Fig. 5 it is desirable that the guides 19^a extend farther in this direction.

It will be understood that the invention is not limited to the precise form and details which have been described, and that certain parts and features may be used without others. For example, the locking means included herein may be employed with specifically different regulator elements, for instance those disclosed in my Patent 1,344,383.

I claim:

1. A regulating device adapted to be connected in a hose outlet of a standpipe system and comprising inlet and outlet waterway members coupled so as to permit of relative rotation, one of said members being formed to define a gateway in the waterway, a longitudinally movable internal obstructor cooperative with said gateway to regulate the pressure at the outlet side thereof, means in one of the members for engagement with said obstructor to restrain the same against rotation thereof relative to said member while permitting longitudinal movement, a screw-threaded stem connected with said obstructor, and cooperating screw-threaded means supported centrally of the waterway by the other of said members to effect longitudinal adjustment of the obstructor by relative rotation of the members, and destructible means for locking said members against relative rotation when any desired adjustment has been made.

2. In a regulating device for determining the pressure adjacent the outlet of a piping system, comprising inlet and outlet waterway members constructed for connection in the system and coupled so as to permit of relative rotation, and internal means whereby through relative rotation of the members the passageway therethrough may be adjusted, a projection on one of said members for turning the same to adjust said internal means, and a frangible locking piece projecting over said member and having a portion engaging said projection so as to prevent turning of the member, said locking means having a virtually fixed connection with the other of said members.

3. In a regulating device for determining the pressure adjacent the outlet of a piping system, comprising inlet and outlet waterway members constructed for connection in the system and coupled so as to permit of relative rotation, and internal means whereby through relative rotation of the members the passageway therethrough may be adjusted, a coupling nut secured on the outside of one of said members for coupling said members tightly together, a projection on the other of said members for turning the same to adjust said internal means, and a frangible locking piece secured to said coupling nut and having a portion engaging said projection to inhibit turning of the member carrying said projection.

4. A regulating device adapted to be connected in a hose outlet of a standpipe system, said device comprising two tubular waterway members, means tightly coupling said members in a manner nevertheless permitting the downstream member to be turned relatively to the upstream member, one of said members being formed to define a gateway in the waterway, a longitudinally movable internal obstructor cooperative with said gateway to regulate the pressure at the downstream side thereof, said obstructor being incapable of completely closing said gateway, ribs on the interior of one of said members cooperating with said obstructor to restrain the same against rotation relative to said member while permitting longitudinal movement of the obstructor, said obstructor provided with a screw-threaded stem disposed axially of the waterway, an internally threaded part engaged by said stem, and arms supporting said part from the wall of the other member.

5. A regulating device adapted to be connected in a hose outlet of a standpipe system, said device comprising two waterway members, one of said members having an enlarged end forming an annular recess, the adjoining end of the other member having a flange disposed rotatably in said recess, a coupling nut engaging screw-threads on the outside of said enlarged end, packing means between said nut and said flange, said coupling nut bearing an index and the member which is rotatable in said recess having a series of graduations

extending circumferentially, one of said members being formed to define a gateway in the waterway, a longitudinally movable internal obstructor cooperative with said gateway to regulate the pressure at the outlet side thereof, means in one of the members for engagement with said obstructor to restrain the same against rotation thereof relative to said member while permitting longitudinal movement, and means cooperative between the obstructor and the interior of the other of said members to effect longitudinal adjustment of the obstructor by relative rotation of the members, the construction being such that a minimal passageway is maintained at the closest obtainable adjustment of said obstructor.

6. A regulating device adapted to be connected in a hose outlet of a standpipe system and comprising inlet and outlet waterway members coupled so as to permit of relative rotation, one of said members being formed to define a gateway in the waterway, a longitudinally movable internal obstructor cooperative with said gateway to regulate the pressure at the outlet side thereof, means in one of the members for engagement with said obstructor to restrain the same against rotation thereof relative to said member while permitting longitudinal movement, and means cooperative between the obstructor and the interior of the other of said members to effect longitudinal adjustment of the obstructor by relative rotation of the members, the construction being such that a minimal passageway is maintained at the closest obtainable adjustment of said obstructor, and frangible means locking said members against relative rotation at any predetermined adjustment of said obstructor.

WILLIAM F. CONRAN.