Aug. 29, 1961 D. A. QUINLAN 2,998,161

AUTOMATIC FLOW REGULATOR

Filed July 9, 1958

FIG. 1.

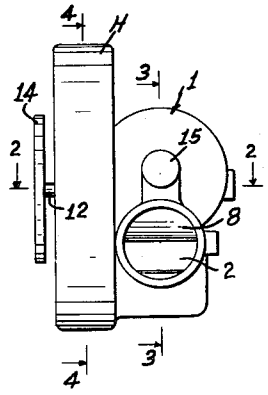
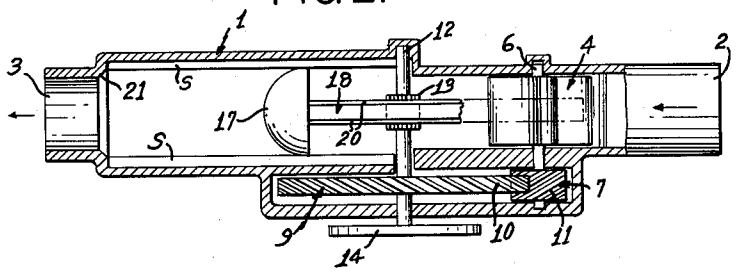


FIG. 2.



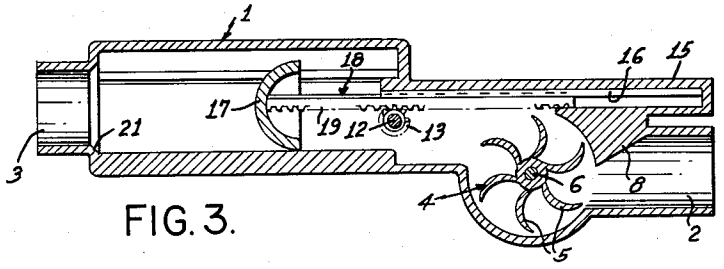


FIG. 3.

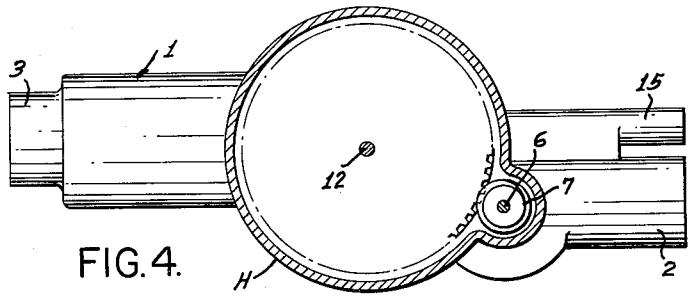


FIG. 4.

FIG. 5.

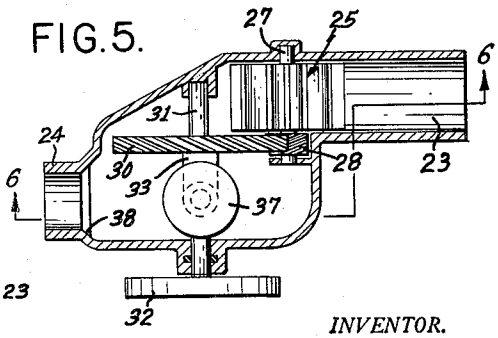
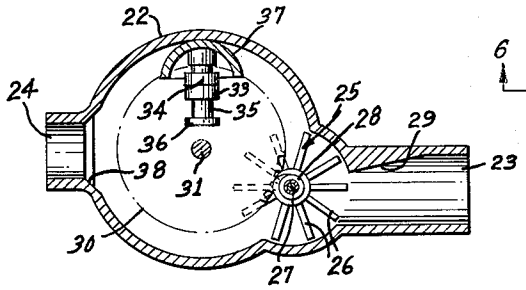


FIG. 6.



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AUTOMATIC FLOW REGULATOR

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1 Claim. (Cl. 222—20)

The present invention deals with a flow regulator and more particularly with a flow regulator for delivering a predetermined volume of fluid and automatically terminating the flow when a predetermined volume has been delivered.

It is an object of the invention to provide a flow regulator for measuring and delivering a volume of fluid and automatically terminating the flow. It is another object of the invention to provide a flow meter capable of regulating the volume of flow desired regardless of rate of flow and automatically terminating the flow of the regulated volume. Other objects and advantages of the invention will become apparent from the description hereinafter following and the drawings forming a part hereof, in which:

FIGURE 1 illustrates an elevational end view of a flow meter according to the invention,

FIGURE 2 illustrates a partly elevational and a partly longitudinally sectional top view of the flow regulator along lines 2—2 of FIGURE 1,

FIGURE 3 illustrates a partly elevational and partly sectional side view along lines 3—3 of FIGURE 1,

FIGURE 4 illustrates a partly sectional and partly elevational view along lines 4—4 of FIGURE 1,

FIGURE 5 illustrates a partly sectional and partly elevational top view of a modified form of the invention, and

FIGURE 6 illustrates a partly sectional and partly elevational side view along lines 6—6 of FIGURE 5.

The invention deals with a flow regulator and valve combination for delivering a predetermined volume of fluid and automatically terminating the flow when the predetermined volume has been delivered.

Referring to FIGURES 1 through 4 the flow regulator comprises a housing 1 having an inlet conduit 2 and outlet conduit 3 with an enlarged body portion therebetween and communicating with the inlet and outlet conduits. The housing contains a wheel 4 having vanes 5 radiating outwardly of the axis thereof, with the vaned wheel being positioned inwardly of the inlet conduit 2 and having its shaft 6 rotatably mounted in the housing transversally of the inlet axis. A drive gear 7 is positioned on the shaft 6 coaxially laterally of the vaned wheel 4. The inlet conduit 2 contains an internal deflector 8 either integral therewith or otherwise secured thereto for deflecting inlet fluid against the vanes 5 either above or below the wheel axis depending on the direction of rotation desired. A spur gear 9, having spurs or gear members 10 mating the gear grooves 11, is positioned to contact the drive gear 7 and mounted in a housing H attached to housing 1 with its shaft 12 rotatably mounted in the housing transversally of the outlet conduit axis. The diameter of the spur gear is greater than the diameter of the drive gear. A spur gear 13 is positioned on the shaft 12 laterally coaxially with spur gear 9 within the housing 1. One end of the shaft 12 extends outwardly of the housing 1 through the wall thereof. An external dial 14 is positioned on the portion of shaft 12 which extends outwardly of the housing 1. Internally of the housing 1 is mounted a support member 15 having a bevelled keyway 16 facing the shaft 12. A plunger or stopper 17 is positioned internally of the housing 1 and provided with a longitudinal arm 18 in the form of a rack having tooth members 19 engaging the spur gear 13, and the rack or arm 18 slidably engaging the support 15 by means of a longitudinal keyway 20 mating the keyway 16 of the support 15.

In operation, pressurized fluid enters inlet 2, is directed against the vanes 5 by means of deflector 8, causing the wheel 4 and gear 7 to rotate. Rotation of the gear 7 turns the spur gear 9, but at a reduced rate, and causes the plunger 17, by means of rack 18 and spur gear 13, to seat itself against the valve seat 21 as it travels along spacers S on the inner wall of housing 1 thereby terminating flow through outlet conduit 3. The flow of fluid through the housing 1 and outlet conduit 3 is again initiated by turning the dial 14 to a predetermined setting, which moves the plunger rearwardly for a distance depending on the turning of the dial 14. It is apparent that the dial 14 and the plunger 17 can be reset by moving for any predetermined flow volume before termination of flow. The setting of the dial 14 will regulate the volume of flow that passes through the outlet conduit 3 and will terminate the flow when the plunger contacts the valve seat 21.

Regarding FIGURES 5 and 6, the flow meter is modified by replacing the rack 18 and spur gear 13 with rotatable means for terminating the flow. The flow meter comprises a housing 22 having an inlet conduit 23 and outlet conduit 24 with an enlarged body portion therebetween and communicating with the inlet and outlet conduits. The housing contains a wheel 25 having vanes 26 radiating outwardly of the axis thereof, with the vaned wheel being positioned inwardly of the inlet conduits 23 and having its shaft 27 rotatably mounted therein transversally of the inlet axis. A drive gear 28 is positioned on the shaft 27 coaxially laterally of the wheel 25. The inlet conduit 23 contains a deflector 29 for the same purpose as described with respect to FIGURES 1 to 4. The gear 30, its shaft 31 and dial 32 operate exactly as described with respect to FIGURES 1 to 4. An arm 33 is secured to the side of spur gear 30 and extends outwardly therefrom. A sleeve 34 is mounted on the free end of the arm 33 with its axis radial to the spur gear 30, A shaft 35 with an abutment 36 at one end, and a plunger 37 at the other end is slidably mounted in said sleeve 34 with the plunger mounted so as to contact the inner wall of the housing 22. On rotation of the spur wheel 30, the plunger slides along the inner wall of the housing until it contacts the valve seat 38 to terminate the flow. Otherwise, the operation of the modification of FIGURES 5 and 6 is identical to the operation of the structure illustrated by FIGURES 1 to 4.

The velocity of the fluid that enters through the inlet port or conduit and activates the vaned wheel determines the speed or r.p.m. of the vaned wheel which in turn determines the rate that the ball plunger moves to the valve seat causing shut off of the fluid.

As the velocity of the fluid varies so will the speed of the moving components vary. Thus, regardless of rate of flow, the flow meter will allow only the predetermined volume to pass therethrough.

While the description is specific to the illustrations, various modifications of the invention are contemplated within the scope of the appended claim.

What is claimed is:

A flow regulator comprising in combination a housing having a fluid inlet and outlet, a rotatable vaned member and shaft therefor rotatably mounted within said housing transversally of the inlet, a first gear member mounted on said shaft, a second gear member of a larger diameter than said first gear member, said second gear member being mounted on a shaft positioned within said housing and transversally of the housing outlet, said first and second gear members engaging each other, a valve seat in said outlet, a plunger mounted on a rack within said

housing to seat against said valve seat, a third gear member mounted within said housing on said second gear member shaft, said third gear member and said rack engaging each other for urging said plunger toward the outlet when said vaned member is rotated.

References Cited in the file of this patent

UNITED STATES PATENTS

74,605	Saunders	Feb. 18, 1868
2,698,111	Wiley	Dec. 28, 1954
2,804,991	Burleyson	Sept. 3, 1957