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DOSING ARRANGEMENTS
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FIG. 1

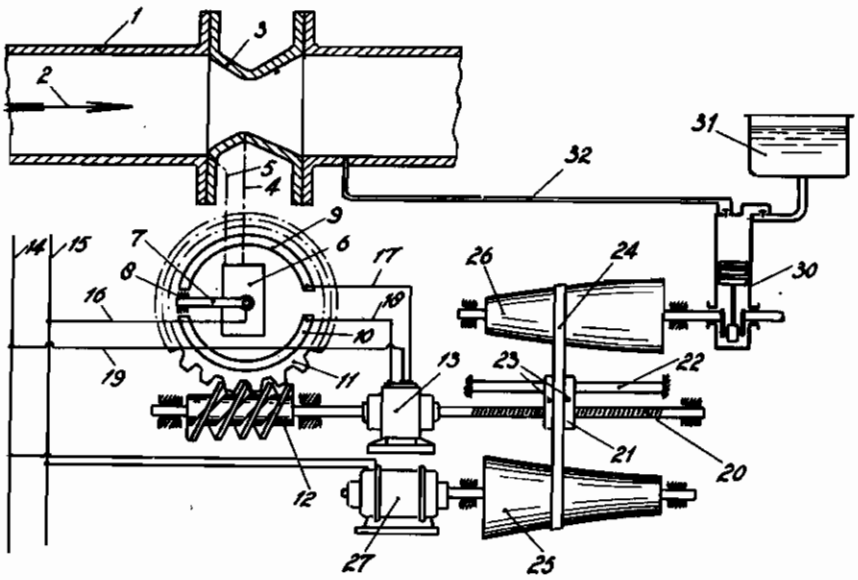
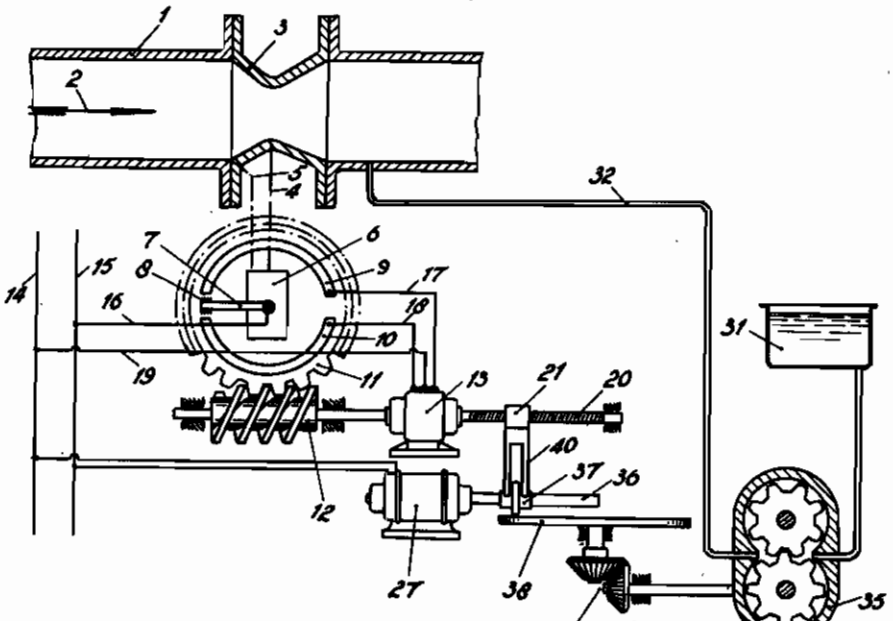


FIG. 2



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DOSING ARRANGEMENTS

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This invention relates to dosing arrangements for adding to a main medium, flowing through an open or closed conduit, a quantity of another medium controlled in predetermined relationship to the volume of the main medium. Such arrangements may be employed, for example, for dosing drinking water systems, e. g. by the addition of substances, such for example as potassium permanganate or potassium iodide, or for softening boiler water by the addition of other substances to the feed water. There are, however, in the art many other cases where such dosing arrangements are useful.

It has already been proposed continually to supply the medium to be added by a pump and to vary the quantity of added medium in accordance with the quantity of flow of the main medium by varying the output of the pump by speed regulation of its driving motor. Such arrangements, however, are liable to be complicated in construction and are not always trouble-free in operation.

According to the invention a control member operated in accordance with the volume of the main medium flowing per unit of time acts on a servo motor comprising a follower which adjusts the ratio of a transmission gear between a feed device for the added medium and the driving device therefor, the feed device being such that its output is proportional to the driving speed.

Such arrangement, whilst being simple in construction and operation, gives reliable and accurate mechanical regulation over a wide range.

Two practical examples of the invention are shown in the accompanying drawings, in which

Figure 1 shows one arrangement including variable transmission gear of the belt type, and

Figure 2 shows a similar arrangement but employing friction wheel gear instead of belt driven gear.

In Figure 1 the main medium, e. g., drinking water, flows through a conduit 1, for example in the direction of the arrow 2. The conduit 1 is furnished with a throat 3 such as a measuring nozzle, throttle or the like connected at two points of different flow velocity, respectively through two branch pipes 4, 5 with a Venturi meter 6 which is provided with a rotary indicator 7 for indicating the quanttiy of flow per second through the pipe 1. The indicator 7, or a member connected thereto, carries a brush contact or contacts 8, which pass over contact strips 9, 10, arranged on a support 11 which can turn coaxially with the indicator 7 and is provided with a worm with which a worm wheel 12 engages. The worm wheel 12 is driven by a reversible motor 13 supplied with power from mains 14, 15 through a conductor 16, the indicator 7, contacts 8 and thence either through the contact strip 9 or 10 and the conductor 17 or 18, according to whether the contact 9 bears on the contact strip 9 or 10. The circuit is completed by a conductor 19. The motor 13 thus operates in the one or the other direction according to whether the contact 8 bears on the strip 9 or 10, whereby the operation is such that the support 11 is so turned that the brush 8 always returns to rest between the contact strips 9 and 10, the power supply to the motor 13 being thus cut off so that it comes to a standstill.

The mechanism just described is a real servomotor with follower device.

In addition to the worm 12 the motor 13 drives a screwed spindle 20 engaged by a travelling nut 21 carried by a bar 22. Thus, when the motor 13 operates it moves the travelling nut 21 to the left or to the right the motor thus shifting, through the fork 23, a belt 24, which passes round two conical pulleys 25 and 26.

The pulley 25 is driven from a motor 27 which is separately supplied with power from the mains 14, 15. Thus, when the motor 27 is running at constant speed, the pulley 26 will be driven at a speed in accordance with the position of the nut 21 and thus according to the position of the indicator 7 of the Venturi meter 6.

The pulley 26 drives a piston pump 30, though it will be understood that any other suitable form of displacement pump, e. g. a plunger pump may be used provided that it has a feed output which is proportional to the speed of the driving shaft. The pump draws the medium to be added from the reservoir 31, and supplies this medium through a pipe 32 into the stream of the main medium flowing in the pipe 1, the quantity of added medium being proportional to the position of the indicator 7 of the Venturi meter and therefore to the flow per second of the main medium through the pipe 1.

The belt transmission gearing shown may be replaced by variable transmission gearing of other construction. For example, each of the pulleys 25 and 26 may be replaced by two conical pulleys whose vertices are directed towards each other and which are adjusted axially away from or towards each other, the belt being provided with wooden blocks. As the two conical pulleys approach each other, so the belt contacts with a larger diameter, and as they move farther from

each other so the belt contacts with a smaller diameter. Such gear is known as "Flender" or "Reeves" gear.

The arrangement shown in Figure 2 includes, as in Figure 1, a meter 6 with indicator 7, contacts 8, contact strips 9 and 18 on a support 11 driven by a worm 12, the motor 13, the screwed spindle 20 and the driving motor 27. The latter, however, drives a gear wheel pump 35 through a friction wheel drive comprising a roller 37 movable along but not rotatable on a shaft 38 and driving a disc 38. The connection between the disc 38 and the pump 35 is effected through bevel wheel gear 39. The roller 37 is moved to and fro by a fork 40 which is carried on the spindle 20 by the travelling nut 21, the roller 37 taking up a position proportional to the position of the indicator 7. As a result, the pump 35 operates at a speed proportional to the quantity of flow per second of the main medium through the pipe 1. The added medium is again drawn from the reservoir 31 and delivered through the pipe 32 to the pipe 1.

Any other suitable form of variable ratio friction drive may be employed, there being a large number of such types of gear. The main object of the invention is, however, to regulate the device for supplying the added medium by regulation of the transmission ratio of the gear between the said supply device and the driving device therefor, particularly by the use of a servo motor control.

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