

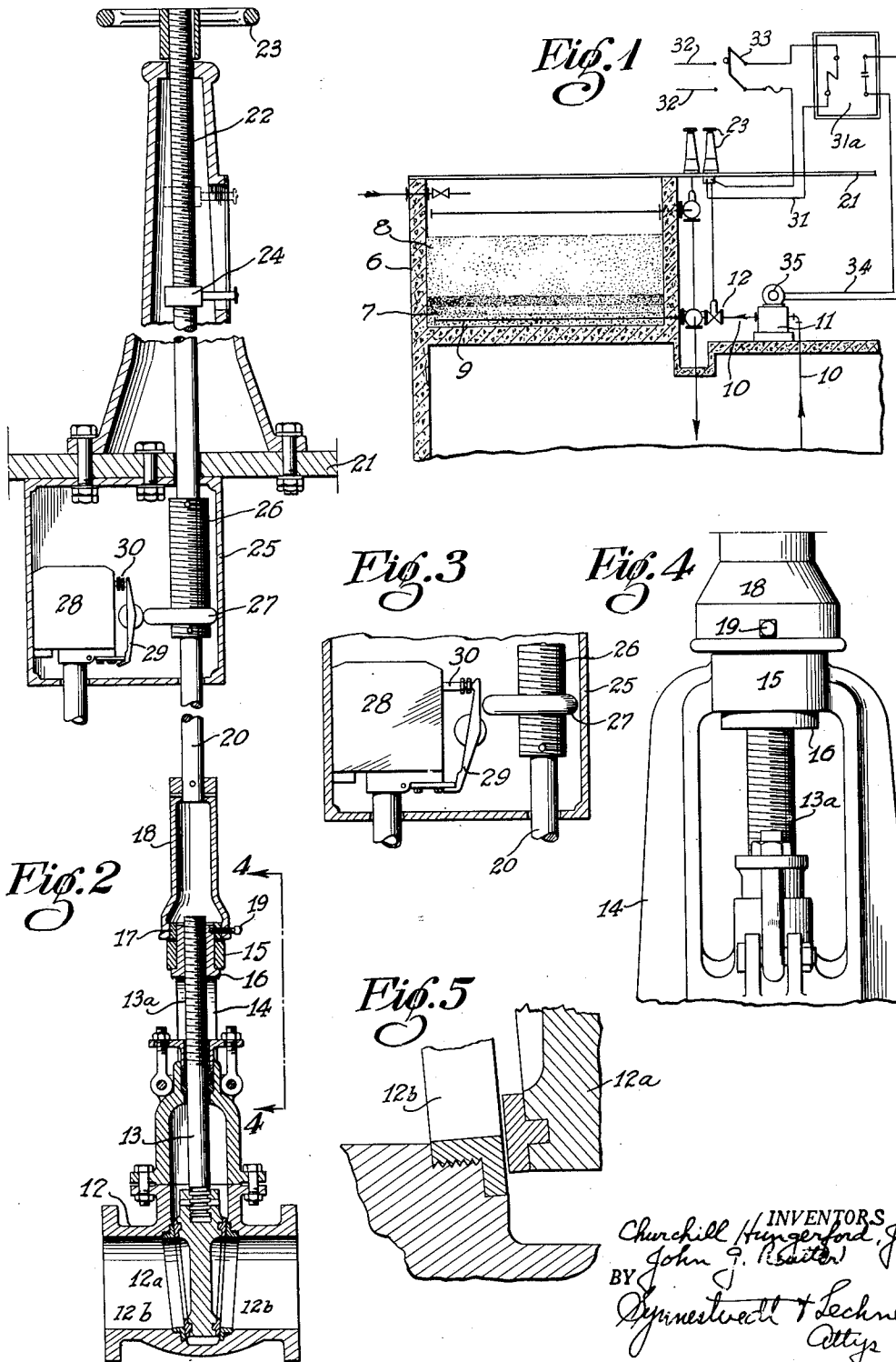
Feb. 17, 1953

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2,628,720

BACKWASH CONTROL EQUIPMENT FOR FILTERS

Filed July 9, 1949



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UNITED STATES PATENT OFFICE

2,628,720

BACKWASH CONTROL EQUIPMENT FOR FILTERS

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Application July 9, 1949, Serial No. 103,914

2 Claims. (Cl. 210—130)

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This invention relates to filters, softeners and the like for treating water and is especially concerned with equipment of this type in which the water passes downwardly by gravity through suitable beds of sand, gravel and/or softening material as the case may be. While the invention has been developed in connection with equipment for treating water, yet it will be obvious that the principles involved might equally well be used in equipment for handling other types of fluids which have been treated or filtered provided, of course, that the treatment involves a gravity flow of the fluid through beds of material which are of generally granular character, capable of being loosened by a backwashing operation.

Equipment of the type described must be cleaned or backwashed periodically and, in the hands of a careless operator, the backwashing operation often gives rise to trouble with the beds of granular material especially where the full force of the backwash fluid is suddenly discharged into the filtering equipment below the beds of granular material. The reason for this is that there is generally provided a backwash control valve which, if operated by hand, and many of them are, will require a considerable amount of exertion or strength on the part of the operator if pressure has already been developed on the backwash line. To avoid this the operators close all the valves and thereby place the filter in a quiescent state whereupon they move the backwash valve to its wide-open position and then suddenly start the wash pump into operation which immediately discharges the full quantity of washing fluid into the under-drain system and violently upsets the beds.

The proper way to operate a system of this kind is to place the wash pump in operation before the wash control valve is opened because this insures a gradual application of the full pressure to the underside of the beds and thereby avoids violently upsetting the materials of which the beds are composed.

The principal object of our invention is to provide equipment which will insure a gradual application of the washing fluid to the underside of the beds so that no sudden surge of pressure can be admitted to the wash line. In this way the beds of granular material will not be violently disturbed or upset.

Our preferred method of realizing the objects of our invention is illustrated in the accompanying drawing wherein:

Figure 1 is a vertical section through a water

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treating filter to which our control system has been applied, the latter being illustrated in diagrammatic form;

Figure 2 is a vertical section illustrating the wash fluid control valve and the means for operating the same, together with a trip mechanism which we employ for controlling the pressure through the wash line;

Figure 3 is a somewhat enlarged partial section similar to that of Figure 2 but illustrating the trip mechanism in a different position;

Figure 4 is a side elevation on a somewhat enlarged scale taken as indicated by the line 4—4 in Figure 2; and

Figure 5 is an enlarged vertical section through the wash fluid control valve shown in Figure 2 but illustrating the valve in a slightly different position after it has been moved somewhat toward open position.

The invention is illustrated as applied to a water softening filter 6, there being a bed of gravel or other supporting medium 7 in the bottom of the filter which, preferably, is arranged with the particles gradually decreasing in size from the bottom toward the bed of water softening material 8 which rests thereon. In the bed of supporting gravel is a distributor 9 through which the backwash fluid (in this case water) is delivered to the filter and discharged upwardly through the beds in a manner well understood in this art. The backwash water comes up through the connection 10 in which is located a pressure pump 11 and a control valve 12.

The gate disc 12a of the valve is raised and lowered by means of a stem 13 embraced by a yoke 14 having a ring 15 at the top which surrounds a yoke nut 16. In turn, the upper portion of the nut is embraced by a collar 17 which extends into the lower end of a wrench mechanism 18, the parts 16, 17 and 18 being pinned together by the pin 19. The upper end of the stem is provided with a thread 13a for cooperation with the nut 16. The wrench 18 is hollow, as shown, and when turned by the mechanism now to be described it will be obvious that the stem 13 and the gate 12a attached thereto can be raised or lowered depending upon the degree of rotation. When the gate 12a is raised so as to open it, the upper end of the stem 13a will travel upwardly into the interior of the wrench 18.

Non-rotatively secured to the upper end of the wrench is a stem extension 20 which projects upwardly above the level of the cat walk 21 to a position for convenient manipulation by

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the operator. The upper end of the extension stem 20 is threaded as at 22 and on the top is equipped with an operating hand wheel 23 suitably keyed to the stem so that the latter can be rotated by turning the wheel. Along the thread 22 there travels an index member 24 which shows the position of the gate 12a.

To the underside of the cat walk we secure a control box 25 and that portion of the stem extension 20 which passes therethrough is threaded as at 26. Mounted on the threads 26 is a trip mechanism 27 which travels upwardly and downwardly along the threads as the stem 20 is rotated by the hand wheel 23. To one side within the box 25 is a switch mechanism 28 having a control arm 29 located between the switch and the trip.

In the position shown in Figure 2 the upper end of the arm 29 is swung to the left to depress the switch plunger 30 and when the plunger 30 is depressed, the switch 28 is closed.

The switch controls the circuit 31 of a relay 31a located in the power line 32. A safety switch 33 is introduced for opening and closing the power line 32. When the switch 33 is closed and the power is on, the relay will be actuated when the switch 28 is closed, i. e., when the parts are in the position shown in Figure 2. This will hold the motor circuit 34 in open position so that the motor 35 will not be operating the pump 11. However, just as soon as the trip 27 is moved upwardly along the threads 26 upon rotation of the wheel 23 in the proper direction to open the gate 12a, the lever 28 will be freed so that its upper end will move to the right as shown in Figure 3 whereupon the switch 28 will be opened and the relay inactivated. The circuit 34 for the motor switch will then be closed and the motor 35 will be operated to actuate the pump 11.

The parts just described are constructed and arranged so that the pump 11 will be operated and pressure will be developed in the line 10 leading to the distributing manifold 9 at the time

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that the gate 12a begins to open and, by referring to Figure 5, it will be seen that the gate 12a can move an appreciable distance before the passage 12b through the valve is really opened. In this way the full impact of the pressure flow will not be delivered suddenly and undue disturbance or upsetting of the beds will be avoided.

We claim:

1. In filter equipment having a bed of gravel or the like where the bed is cleaned by passing wash water upwardly therethrough, the combination of a wash water supply line, a valve for controlling the flow through said line, a stem for opening and closing said valve, a pump for placing the line under pressure, an electric motor for actuating the pump, a switch for opening and closing the actuating circuit for said motor, a trip on the stem arranged to hold said motor actuating circuit in open position when the valve is closed, and means for moving the stem to open the valve, said trip being moved by the stem to effect closing of said motor actuating circuit before the valve is opened, whereby there will be pressure in the line as the valve is being opened.

2. Filter equipment according to claim 1 wherein the stem is rotated to open and close the valve and wherein the trip is threaded on the stem to move therealong as the stem is rotated.

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