Aug. 21, 1934. J. ZWICKY ET AL 1,971,090

FILTER

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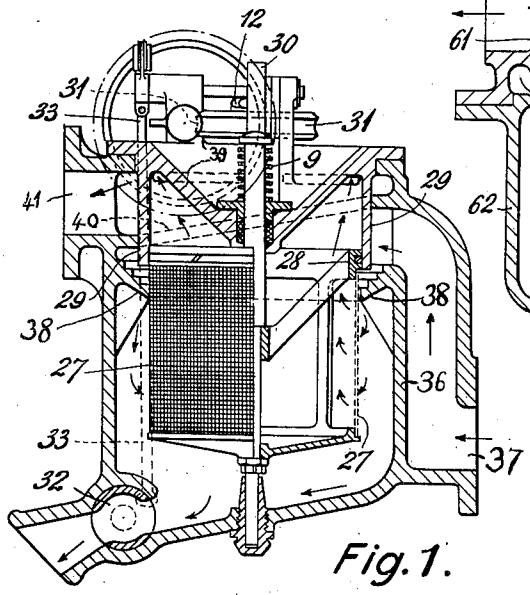


Fig. 1.

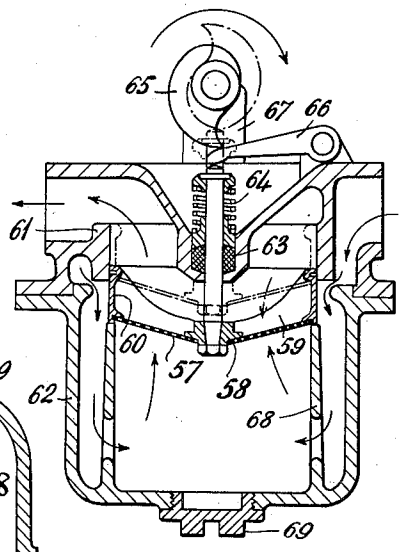


Fig. 2.

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FILTER

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2 Claims. (Cl. 210—167)

To increase the time during which a filter can usefully remain in service the flow through its straining member is periodically reversed with a view to dislodging the solid matter that has accumulated upon it; and for this purpose a cylinder and piston or equivalent means have been built into the filter so that cleaning may be effected by an occasional stroke of the piston.

Experience has shown that for effective cleaning a very vigorous initial backward impulse is required; followed by a sufficient interval of backward flow to permit the solids dislodged from the surface by the initial impulse to fall clear of it so that they are not at once drawn back on normal flow being resumed.

According to the invention, therefore, a piston fitting and sliding within a cylinder formed in the filter casing is moved against the action of a spring to one end of a setting or non-cleaning stroke and is then suddenly released, whereupon the spring drives it through its cleaning stroke, causing it to return filtered liquid through the straining member. A sump is provided into which the dislodged solid matter can fall and where it will lie undisturbed by the resumption of normal flow through the filter.

The cleaning means may be operated by hand from time to time; but where the filter is dealing with liquid forwarded by a pump, as will commonly be the case, it is preferable to connect the cleaning device with the pump mechanism so that it is operated every so many strokes of the pump; cleaning cannot then be neglected.

The straining member may itself form a part of the cleaning piston, and it is so placed in relation to the filter inlet that incoming liquid sweeps along the surface of the straining member and so carries away from its neighborhood the material that has been dislodged by the vigorous cleaning stroke.

Typical embodiments of the invention are illustrated in the accompanying drawing, which are sectional elevations of filters in which the straining member itself is a part of the piston, Figure 1 showing a straining member of cylindrical form, and Figure 2 a nearly flat one.

In Figure 1 the cylindrical straining member 27 is of now well known pattern comprising a skeleton frame on which are secured sheets of perforated metal and wire gauze of graduated fineness.

This straining member forms part of a piston the end 28 of which fits and slides within the cylindrical wall 29 depending from the cover plate of the filter casing 36. The piston is depressed by an annular cam 12, acting through a lever 30, against the action of spring 9. The cam may be turned by hand, but is indicated as driven continuously through the worm gear 31 by the same means as operates the pump forcing liquid through the filter. A discharge cock 32 through which separated material is ejected may also be opened mechanically through the medium of rod 33.

The operation of this construction depends wholly upon the inertia of the fluid and the resistance to its flow, and on the fact that the piston 27, 28 during its cleaning stroke sweeps out a substantially greater volume than would normally flow through the filter in the time the stroke occupies; for the normal flow indicated by the arrows is no-where positively arrested. The fluid enters at 37, turns downward around the edge of the cylinder 29, and being confined to a narrow annular path by the inwardly projecting part 38 of the casing 36 it scours the surface of the strainer 27. It passes radially through the strainer, leaves the cylinder 29 through slots 39 at its upper end, and through the annular expanding channel 40 passes to the outlet 41.

Another example of the use of the straining member itself as the movable wall of the inflow and outflow chambers is shown in Figure 2. The straining member 57 forms the crown of a piston completed by a boss 58, webs 59 and a skirt 60. This piston slides in a cylindrical part 61 of the casing 62. The piston rod 63 passes through a gland and is pressed upward by a spring 64. It is normally held down in the position shown in full lines against the action of the spring by a cam 65 acting on it through a pivoted arm 66. Cam 65 is revolubly mounted in ears 67 projecting upward from the casing 62, and can be turned by a suitable handle, not shown. An apertured wall 68 assists in distributing the fluid uniformly over the whole surface of the strainer and provides a sheltered sump from which solid material can be periodically removed at 69.

The normal flow of liquid through the filter is indicated by the arrows. Occasionally the cam is given one complete turn. The instant it clears the arm 66 spring 64 vigorously lifts the straining member, causing, through inertia, a forcible displacement of liquid downward through the straining member. Solid matter detached from the strainer by this action falls into the sump. Moreover during the time that the piston is lifted to the position shown in dotted lines the incoming fluid enters beneath the cylinder 61 and sweeps

along the surface of the strainer 57 so assisting the cleaning operation.

We claim:

1. In a filter the combination of a casing having an inlet and outlet, a cylinder formed within said casing, a piston sliding in said cylinder and dividing the casing into inlet and outlet chambers, part of said piston being a straining member, a spring pressing said piston towards the outlet so as to contract the outlet chamber and expand the inlet chamber, means for moving said piston against the action of its spring and suddenly releasing it, and means in the inlet chamber directing incoming fluid along the surface of said straining member.

2. In a filter the combination of a casing having an inlet and outlet, a cylinder within said casing, a piston fitting and sliding in said cylinder and having a straining member as part thereof separating the inlet and outlet, a spring pressing said piston towards the outlet, means for moving said piston to compress the spring and suddenly releasing it, and means in said casing forming an annular inlet channel directing incoming fluid through a narrow opening to and along said straining member.

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