

June 24, 1947.

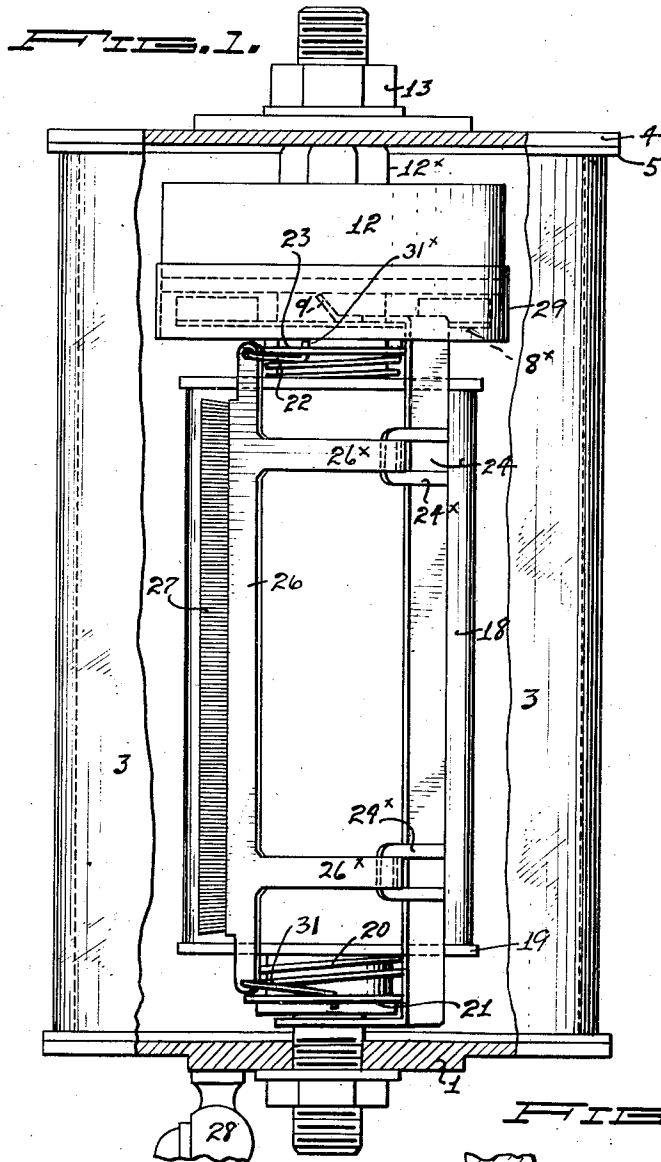
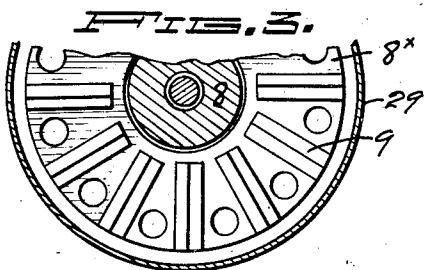
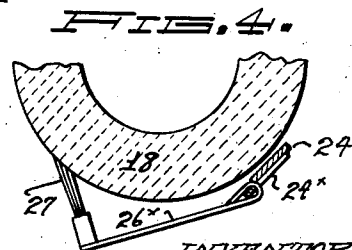
L. E. LA GUARDIA

2,422,735

AUTOMATIC CLEANING MEANS FOR FILTERS

Filed Feb. 16, 1944

2 Sheets-Sheet 1



INVENTOR
 Louis E. La Guardia
 BY *H. Lee Helms*
 ATTORNEY.

June 24, 1947.

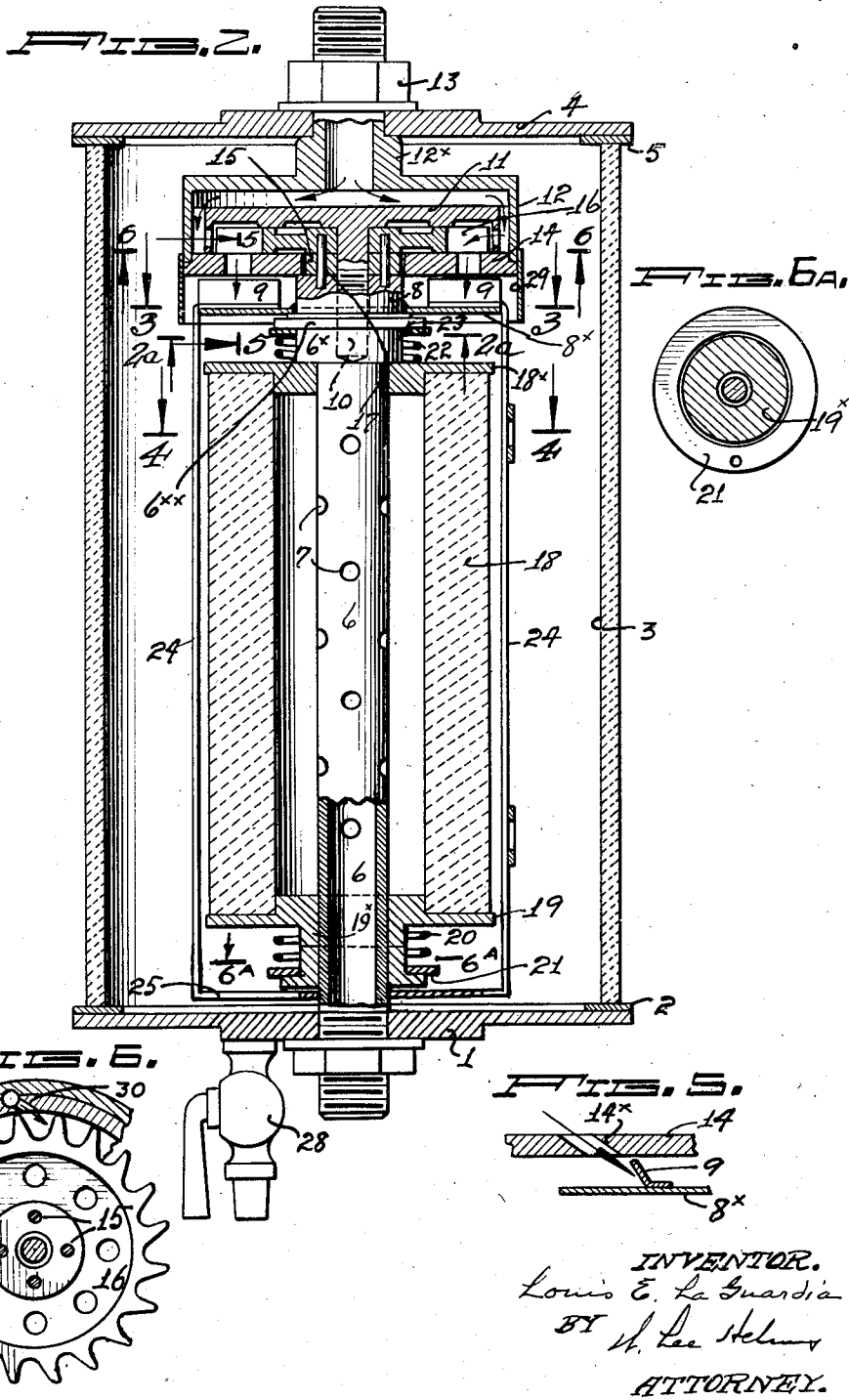
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2 Sheets-Sheet 2



UNITED STATES PATENT OFFICE

2,422,735

AUTOMATIC CLEANING MEANS FOR FILTERS

Louis E. La Guardia, New York, N. Y.

Application February 16, 1944, Serial No. 522,542

4 Claims. (Cl. 210-117)

1

This invention relates to that type of filter employing a filter element of annular form and adapted for the passage of liquid interiorly to an area where the clear liquid may be drawn off.

The specific object of the invention is to provide means actuated by the liquid itself for action upon the entrant surface of the filter medium to remove sediment or organic material collected upon said surface in the customary use of the filter.

The invention will be described with reference to the accompanying drawings, in which—

Fig. 1 is a view in elevation, partly broken away showing an embodiment of the invention.

Fig. 2 is a vertical section through the structure shown in Fig. 1.

Fig. 3 is a fragmentary plan view, partly in section on the line 3-3, Fig. 2.

Fig. 4 is a fragmentary view, partly in section on the line 4-4, Fig. 2.

Fig. 5 is a fragmentary vertical section on the line 5-5, Fig. 2.

Fig. 6 is a fragmentary horizontal section on the line 6-6, Fig. 2.

Fig. 6A is a horizontal section on the line 6A-6A, Fig. 2.

Referring to the drawings, it will be seen that the embodiment illustrated is made up of the following instrumentalities: An annular base plate 1 is formed with an axial aperture and provided at the top with a packing ring 2. Engaging the packing ring is a casing 3 of any suitable material, preferably glass. Closing the casing at its top is an annular plate 4 provided with a packing ring 5 which abuts the top of the casing 3.

Within the aperture of base plate 1 projects a hollow tubing 6 formed with a plurality of apertures 7. This tubing at its top is provided with a head 6^x having a flange 6^{xx}. Mounted upon head 6^x is a rotary connecting turbine hub 8 at the center of turbine wheel 8^x having blades 9. This hub rotates about a stud shaft 10 threaded in head 6^x, the stud being carried by a flanged liquid inlet member 11 within a casing 12, the latter having an upwardly projecting hollow threaded connection 12^x which extends through top plate 4 and receives nut 13, member 12^x being shouldered to abut the inner face of plate 4. Secured to the base of casing 12 is a lower closure plate 14.

Closure plate 14 is formed with an axial aperture which receives connecting disk 15 for an upper turbine wheel 16. The hub of the lower turbine wheel, the connecting disk, and the hub

2

of the upper turbine wheel, may be connected by pins 17. The connecting disk and upper turbine wheel will, of course, rotate about stud shaft 10.

The tubular filter element 18 may be of natural stone or composition and it is held between an upper disk 18^x and a lower disk 19 mounted on hollow tubing 6.

The lower disk is associated with a flanged extension 19^x surrounded by a spring 20, which engages a washer 21, and a like spring and washer 22 and 23, respectively, are associated with head 6^x for a purpose later to be described.

Connected to the turbine wheel 8^x and extending longitudinally of the filter element are two arms 24, these arms at their lower end being carried by a plate 25 rotatably mounted upon the hollow tubing 6. One of the arms 24 is provided with projecting loops 24^x which pivotally receive horizontal arm extensions 26^x of a brush holder 26, carrying a brush 27. The brush may be of wire or other material as to its bristles, and the brush is held into light contact with the filter element 18, since the brush holder is connected by members 31, 31^x with spring press washers 21, 23, as shown more particularly in Fig. 1.

The base plate 1 is apertured to receive a fluid outlet valve as indicated schematically by the valve 28. The opening for fluid through the valve should be adequate to cause a rapid flow of fluid through the turbine wheels and valve for rapid rotation of the brush relatively to the filter element.

In the operation of my apparatus, the valve 28 will normally be closed. The threaded upper end of the apparatus is hollow and may be attached to a water supply pipe. The water enters the device and flows as indicated by the arrows, the flow being first into casing 12, and through lateral apertures through member 11 to the upper turbine wheel 16. The latter is apertured, as shown at 14^x, so that the fluid flows downward onto the turbine wheel 8^x, which not only is apertured but is spaced from a surrounding fixed skirt member 29 so that the fluid may have free passage to the interior of the main casing 3.

The water within casing 3 will by its pressure pass through the filter element, and thence through the apertures in tubing 6, for discharge through its open lower end. This lower end is threaded and may be attached to a pipe line leading to a suitable valve or faucet.

It will thus be seen that whenever valve 28 is closed, the filter will have normal operation and that the brush will not rotate.

When valve 28, which, as stated, will in practice

be designed to permit rapid outflow of the fluid, is opened, the fluid will impart high rotation to the turbine wheels and brush frame. This follows because the rapid passage of fluid into and out of the filter apparatus will first effect jet flows of the fluid against the upper turbine wheel through opposed orifices such as indicated at 30, Fig. 6, and the fluid still under pressure will pass through the apertures in the said upper turbine wheel between the teeth thereof, and will flow through the inclined apertures of underlying disk 14 and directly against the blades 9 of the lower turbine wheel 8*, as indicated in Fig. 5, wherein one of the inclined apertures is shown at 14*.

The liquid thus will, in its rapid flow, rotate both connected turbine wheels inasmuch as the latter carry the brush holding elements, the specific carrying member being the lower turbine wheel. The lower coil spring 20 exerts a slight pressure on the lower washer 21 and the upper coil spring 22 exerts a slight pressure on the upper washer 23. When the washers are rotated by the rotation of the brush frame 24, the washers being connected to the brush holder 26 by the members 28, the pressure of the coil springs causes a drag on the washer rotation which exerts a pull on connecting members 28 to cause the pivotly mounted brush holder 26 to be pressed against the outer surface of the filter element 13. When the outer casing 3 is made of glass, the effect of the brush action can be observed. When the filter element has been given sufficient brushing action to remove material deposited thereon, valve 23 will be given a closing movement, and thereupon the flow of fluid and waste material through the valve will cease and normal action of the filter will resume.

It will be understood that various modifications may be made in the form and arrangement of the elements illustrated in the drawings and constituting the embodiment of the invention just described, without departing from the spirit of the invention.

Having described my invention, what I claim and desire to secure by Letters Patent, is as follows:

1. In a filter of the type described consisting of a casing and tubular filter element therein through which the water percolates, a perforated central tube disposed within the filter element, a brush extending over the length of said filter element and a frame carrying said brush and rotatably mounted on said central tube, and an outlet for filtered water at an end of said control tube and an independent outlet for unfiltered water, the combination of a turbine housing in the top area of the casing above said tube, a spindle extending through the bottom of the turbine housing and secured to the upper end of the central tube, a turbine wheel within said housing having peripheral vanes, means for connecting the brush frame to the said turbine wheel, said turbine housing having a water inlet at its top and apertures disposed at its bottom and said brush frame having means at its top adapted to be impelled for rotation by the streams from said apertures.

2. In a filter of the type described consisting of a casing, a tubular filter element within the

casing and co-axial therewith through which the water percolates, a perforated central tube disposed within the filter element and means supported thereby adapted to support the ends of the filter element, a brush extending over the length of said filter element, a frame carrying said brush and rotatably mounted on said central tube, an outlet in the casing and communicating with the tube for discharge of filtered water and an independent outlet for unfiltered water, the combination of an upper turbine wheel within the casing above the central tube, a separate housing therefor, a spindle extending through said housing and secured to the upper end of the central tube, a lower turbine wheel within the casing and mounted on the upper end of the said brush frame in underlying relation to the housing of the upper turbine wheel, said housing having a water inlet at its top and apertures disposed at its bottom and adapted to direct water jets against the vanes of said lower turbine wheel and thereby to increase the rotating movement of the brush frame.

3. A filter constructed in accordance with claim 1 including, at each end of the filter element, a disk secured to and for supporting the end of said filter element in concentric relation to the central tube, a flange member secured to said central tube in spaced relation to said disk, a washer mounted for rotation on said flange member, a coil spring interposed between said disk and washer and means to connect said washer to the brush holder to control the action thereof upon the filter element.

4. A filter constructed in accordance with claim 1 including, at each end of the filter element, a disk secured to and for supporting the end of said filter element in concentric relation to the central tube, a flange member secured to said central tube in spaced relation to said disk, a washer mounted for rotation on said flange member, a coil spring interposed between said disk and washer, said washer having a flexible connection to the brush holder whereby, upon rotation of the frame, the pressure of said coil spring against the washer imposes a drag on the washer rotation to effect a uniform pressure of the brush against the outer surface of the filter element.

LOUIS E. LA GUARDIA.

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