

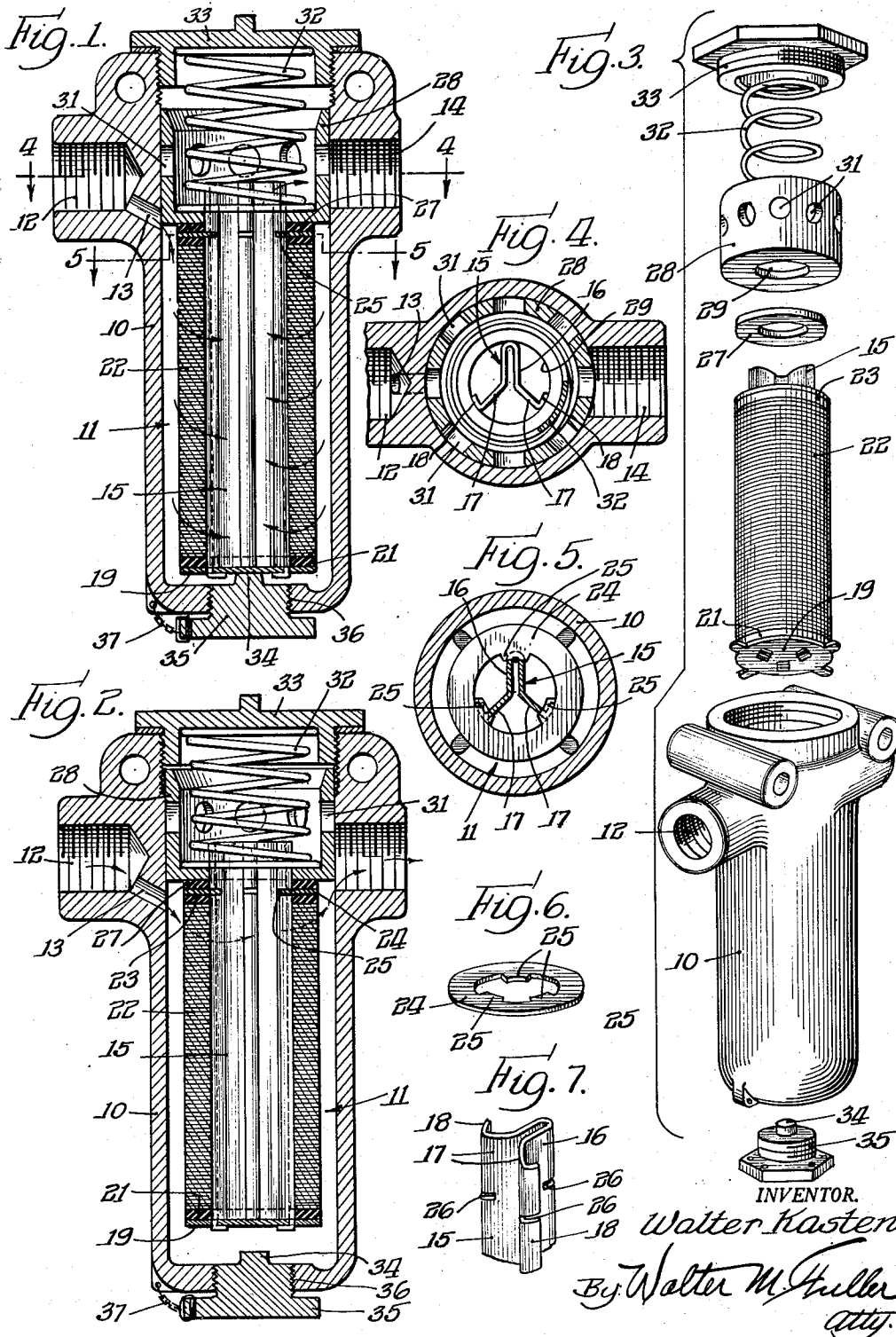
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FILTER

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FILTER

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1 Claim. (Cl. 210—187)

The current invention pertains to filters or separators and concerns more particularly new and improved means for opening or controlling a bypass around the filtering-medium, if the latter becomes unduly clogged or obstructed with the filtered-out material, so that the device or apparatus to which the filtered fluid is delivered may continue to function adequately and not be interrupted because of the temporary choking or coating-over of the filtering agent.

One of the main objects of this invention is to provide a filter of this character which is simple in structure, which is effective and reliable in operation, which is relatively inexpensive to make, and which does not become damaged or injured in ordinary service.

To enable those skilled in this art to understand the invention fully from structural and functional standpoints, a present preferred embodiment thereof has been illustrated in the accompanying drawing forming a part of this specification, and, for simplicity, like reference numerals have been employed to designate the same parts throughout the several views.

In this drawing—

Figure 1 is a vertical central section through the filter in its normal operative condition;

Figure 2 is a similar section showing the bypass or supplemental-path open;

Figure 3 is a perspective view of the several parts of the filter in dismantled or separated relation;

Figure 4 is a horizontal section on line 4—4 of Figure 1;

Figure 5 is a horizontal cross-section on line 5—5 of Figure 1;

Figure 6 is a perspective view of a metal locking-disc forming part of the filter-pack; and

Figure 7 is a perspective view of a fragment of the locking-bar employed inside of the filter-pack.

Referring to the drawing, it will be noted that the novel filter construction includes a main-body 10 having a cylindrical upright chamber 11, a screw-threaded inlet 12 adapted to accommodate the threaded end of a suitable admission pipe or conduit, not shown, the inner end of such inlet 12 connecting with an intermediate part of the height of chamber 11 by means of an appropriate passage 13, that part of the chamber opposite the inlet having a screw-threaded outlet 14 into which may be screwed the end of a discharge or delivery pipe, not illustrated.

The filter-pack includes a central, bent-sheet-metal rod 15, of the shape in cross-section represented in Figures 5 and 7, having three, longitu-

dinal, radially-disposed arms or ribs one of which 16 is of double-metal thickness, whereas the remaining two designated 17, 17 each is of single metal thickness with a terminal extension 18.

The lower end of such supporting rod has fixed thereto, in any approved manner, a terminal or end metal disc 19 and mounted on the rod and bearing on the upper face of such disc is a washer-shaped, resilient or elastic disc 21, made for example of neoprene, the rod snugly fitting in the aperture of such disc.

On top of the disc 21 is a series of registered, washer-shaped paper-discs 22 in face-to-face contact with one another and with the rod fitting in the passage formed by the mating holes of such discs, these paper, or other comparable, discs being charged or impregnated with a medium, such as polymerized phenolic resin, as for instance that known in the trade as "Beckophen," which is unaffected and maintains the discs from being acted upon by the materials undergoing filtration and by their contaminants and diluents, the filtering action occurring by reason of the shallow spaces between the contacting surfaces of the discs of the stack rather than through the material of the discs, this type of filtration being known as edge-filtration.

Another neoprene, or other suitable resilient, washer 23 is employed between the uppermost paper disc of the pile and a final apertured metal disc 24 having inwardly directed ears 25, 25, 25 occupying marginal slots 26, 26, 26 in the three arms of the rod, the neoprene and paper discs being held forced against one another between the two parts 19 and 24, so as to provide a suitable pressure on the elements involved to assure the desired depth of spaces between the paper-discs to provide the required fineness of filtration.

Bearing on the upper face of the apertured disc 24 is a final top neoprene disc 27, and, to prevent leakage, the lower neoprene disc 21 is cemented to the end metal disc 19 and to the lowermost paper-disc 22 by a polymerized phenolic resin or comparable agent, and, in similar manner, the neoprene disc 23 is adhered to the topmost paper disc 22 just below it and to the metal-disc 24.

Also, the neoprene disc 27 is in like manner cemented to the metal disc 24 and to the under face of a cylindrical, cup-shaped valve 28 the bottom wall of which has a central aperture 29 fitted over the upper terminal part of the filter-pack rod 15, the round side-wall of the valve having a plurality of ports 31 therethrough some of

which normally communicate with the outlet 14.

As is clearly illustrated, this round valve fits snugly and slidably in the upper portion of the cylindrical chamber 11.

A coiled, expansion spring 32 is seated in the valve 28 bearing on the top face of its bottom wall and pressing at its top end against the under surface of a screw-threaded closure or plug 33 demountably occupying the top screw-threaded mouth of chamber 11.

Normally such spring holds the valve and filter-pack pressed down against a small, upward projection 34 constituting part of a screw-threaded plug 35 occupying a screw-threaded opening 36 in the bottom wall of the chamber, unintentional loosening of said plug being prevented by a lock or retaining wire 37.

From what precedes, it will be clear that the bottom-wall of the valve 28, which slidingly but snugly fits the cylindrical side-wall of the chamber 11, divides the latter into lower and upper compartments with the inlet 12 communicating with the lower compartment through passage 13 and with the outlet 14 connecting with the upper compartment through some of the valve-ports 31, the only connection between such compartments being through the filter-pack whose passage is in register with, and in communication with, the central aperture through the valve bottom-wall, whereby all fluid traversing the filter is subjected to filtration.

Under ordinary conditions (see Figure 1), the fluid under pressure, either gas or liquid, to be filtered and purified, enters the inlet 12, flows through passage 13 and is admitted into the lower compartment of chamber 11 below the valve, whereupon it flows through the filter-pack into its internal passage leaving its contaminants on the surface of the filter-pack, from which some of such eliminated material naturally falls down to the bottom of the chamber, the filtered liquid passing from the interior of the pack upwardly into the valve and then outwardly through those of its ports in register with the outlet 14 into the latter.

The pressure of the unfiltered fluid in the lower compartment of the chamber acts upwardly on the bottom of the pack tending to raise it, but normally such pressure is insufficient to move the pack and its associated valve against the downward pressing action of the spring.

However (see Figure 2), as the foreign-material segregated from the fluid undergoing purification gradually accumulates on the outer surface of the filter-pack, it more or less obstructs the flow of fluid through it, with the result that the pressure in the lower compartment of the

chamber rises, and, when this pressure increase is sufficient, it overcomes the downward pressing action of the spring and slides the whole pack and valve upwardly carrying the ports of the latter out of register with and out of communication with, the outlet, and, at the same time it forces the valve upwardly sufficiently to cause the lower part of the valve to partially open the outlet, so that, under such circumstances, the fluid entering the lower compartment of the chamber flows around the filter, not through it, and directly leaves the chamber through the now open outlet.

In other words, such upward travel of the filter-pack and valve, by reason of the augmentation in pressure in the cylinder, opens a direct by-pass around the filter-pack from the inlet to the outlet, whereby there is no lack of supply of the fluid fed from the filter to the device which is designed and arranged to receive it, but such delivered fluid under these circumstances is, of course, not filtered.

It is to be understood that the filter-pack and associated valve can be readily demounted from the filter and cleaned as occasion requires and then replaced, whereupon the filtering function of the device is resumed with customary efficiency.

Those acquainted with this art will readily understand that this invention as defined by the appended claims is not necessarily limited and restricted to the exact details of structure illustrated and described and that various modifications and changes may be resorted to without departure from the heart and essence of the invention and without the loss or sacrifice of any of its substantial benefits and advantages.

I claim:

In an edge-filtration filter-pack having a series of registered layers of filter-material surrounding a central longitudinal passage through the series, a rod in said passage, a pair of terminal-members mounted on said rod in spaced apart relation lengthwise the rod and fixed against movement on the rod longitudinally of the latter, said series of layers of filter-material being maintained pressed together in face-to-face contact with one another by and between said terminal-members, the novel improvement of said rod having a plurality of longitudinal transversely-radiating arms peripherally-recessed in register and of at least one of said terminal-members having an aperture accommodating said rod and with lugs extending inwardly of said aperture and occupying said recesses of said arms.

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