

1

2

3,380,591

**FLUID FILTER WITH AUTOMATIC
CLEANING DEVICE**

Jacques Muller, La Garenne-Colombes, Hauts-de-Seine,
France, assignor to Reliunit, Inter, S.a.r.l., La Garenne-
Colombes, Hauts-de-Seine, France, a corporation of
France

Filed May 31, 1966, Ser. No. 554,054

Claims priority, application France, June 11, 1965,
20,445

4 Claims. (Cl. 210—143)

ABSTRACT OF THE DISCLOSURE

Filtering or separating equipment, particularly that type in which a filter device consists of a stack of grooved discs or washers through which the fluid is passed, having self-contained cleaning means which automatically and rapidly effect cleaning of a plurality of the filter elements used in the equipment, one at a time, while the filtering occurs, said cleaning means being driven by a hydraulic motor mounted in the housing.

This invention relates to the art of filtering equipment, more particularly of the type having an automatically operated self-contained cleaning means for the filters incorporated therein.

As conducive to an understanding of the invention, it is noted that where fluid filters or separators are used of the type for example shown in Patent No. 3,214,368, in which the filter device consists of a stack of grooved discs or washers through which the fluid is passed, where the sediment or particles in the fluid (hereinafter generally referred to as particles) during use of the filter, clogs the grooves or passageways of the stack of washers so that no further fluid can pass therethrough, if the equipment must thereupon be disassembled and the filters removed for cleaning, such procedure is extremely time consuming and reduces the efficiency of the equipment.

It is accordingly among the objects of the invention to provide a filtering or separating equipment with self-contained cleaning means which will automatically and rapidly effect cleaning of the plurality of the filter elements used in the equipment, one at a time while the filtering occurs, so that the continuous filtering operation will not be interrupted, which cleaning action does not require disassembly of the equipment and hence avoids the need of skilled mechanics for this purpose and which does not require any additional power source other than the unfiltered fluid that is to be filtered by the equipment.

According to the invention, these objects are accomplished by the arrangement and combination of elements hereinafter described and more particularly recited in the claims.

In the accompanying drawings in which are shown one or more of various possible embodiments of the several features of the invention:

FIG. 1 is a longitudinal sectional view of a filter having an automatic cleaning system according to one embodiment of the invention;

FIG. 2 is a transverse cross section taken along line 2—2 of FIG. 1;

FIG. 3 is a view similar to FIG. 1 of another embodiment of the invention;

FIG. 4 is a transverse sectional view taken along line 4—4 of FIG. 3;

FIG. 5 is a view similar to FIG. 4 showing a bypass arm of the automatic cleaning mechanism in another position;

FIG. 6 is a transverse sectional view taken along line 6—6 of FIG. 3;

FIG. 7 is a view similar to FIG. 6 showing a bypass arm of the automatic cleaning mechanism in another position, and

FIG. 8 is a view similar to FIGS. 1 and 3 of still another embodiment of the invention.

Referring now to the drawings, in the embodiment shown in FIGS. 1 and 2, the filter comprises a housing 1 having an annular connecting flange 2 at each end. The ends of the housing are closed by means of cup-shaped bottom and top covers 3 and 4, each of which also has an annular connecting flange 5 and 5' which are secured to the corresponding flanges 2 by bolts 6.

The flanges 2 also extend inwardly into the housing 1 as at 7 and the flange portion 7 adjacent the top cover 4 has mounted thereon a plate 8 which is secured in position by bolts 9. Supported between the plate 8 and a plate 11 positioned beneath the plate 8 are a plurality of filter elements 12 arranged in a circle and circumferentially spaced as shown.

Each of the filter elements comprises a stack of grooved discs or washers 13 such as is shown in Patent No. 3,214,368. Each of the stacks of washers 13 is positioned in a cylindrical jacket 14. The upper end of each jacket 14 is defined by a substantially frusto conical end portion 15 which fits into a corresponding frusto conical opening 16 in plate 8, said end portion 15 having a central opening aligned with the bore of the stacked washers 13, the topmost washer of the stack abutting against the inner end of the end portion 15. The lower end of each of the jackets has a frusto conical portion 16' which fits into a corresponding frusto conical opening 17 in plate 11. The lower end of the stack of washers is closed by an end cap 18 which has spaced legs 19 that rest on a shoulder 21 defined by the lower end of the jacket 14. The plates 8 and 11 are urged together by tie rods 22 which also serve to compress the individual washers 13 together.

The upper plate 8 serves to define a chamber 23 with respect to the top cover member 4 and has a port or opening 24 to which one end of a conduit 25 is connected, said conduit extending through the wall of the housing and defining the discharge port 26 for filtered fluid.

Positioned beneath the plate 11 is the automatic cleaning mechanism for the filter elements 12. Such mechanism comprises a bypass arm 27 extending laterally outward from a hub 28. The upper end of hub 28 carries a stud shaft 29 rigidly secured thereto and which extends through a central bearing opening 31 in plate 11, a ball bearing 32 providing ready rotation of said arm 27. The lower end of hub 28 has a vertical bore 33 in communication with a passageway 34 in arm 27 which terminates in an opening 35 in the top surface of the free end of arm 27. The opening 35 is of dimension slightly smaller than the openings 17 in the plate 4 and adapted to be successively aligned with the plurality of openings 17 as the arm 27 is rotated in the manner hereinafter to be described. The top surface of the free end of arm 27 defines a sliding seal with respect to the undersurface of plate 11, being retained against such undersurface by a spring 36 encompassing the stud shaft 29. The lower portion of hub 28 extends through a bearing 37 located in the vertical opening of a hub 38 positioned at the end of a horizontal conduit 39 which extends through the housing defining a discharge port 41. The hub 38 is rigidly supported by suitable braces 42 extending to the wall of the casing.

As shown in FIG. 1, the lower portion of hub 28 has a plurality of openings 43 aligned with an annular groove in hub 38 to which the bore of conduit 39 is connected so that at all times there will be communication between passageway 34 in arm 27 and conduit 39.