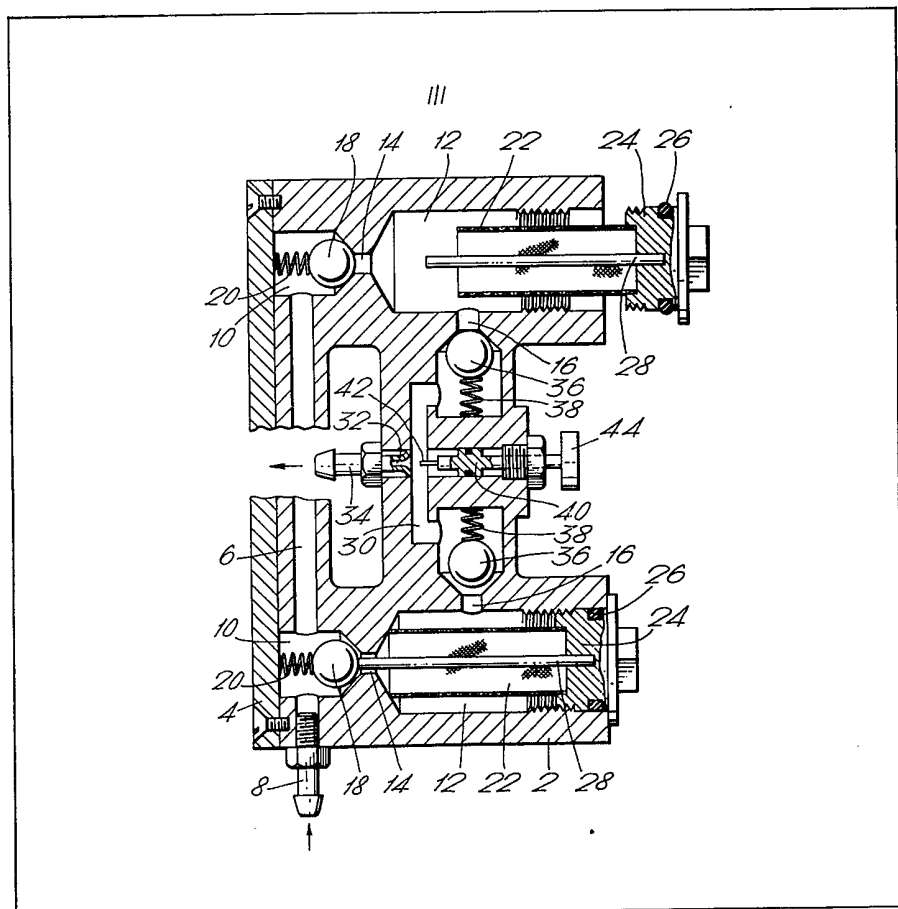


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**GB 822322**  
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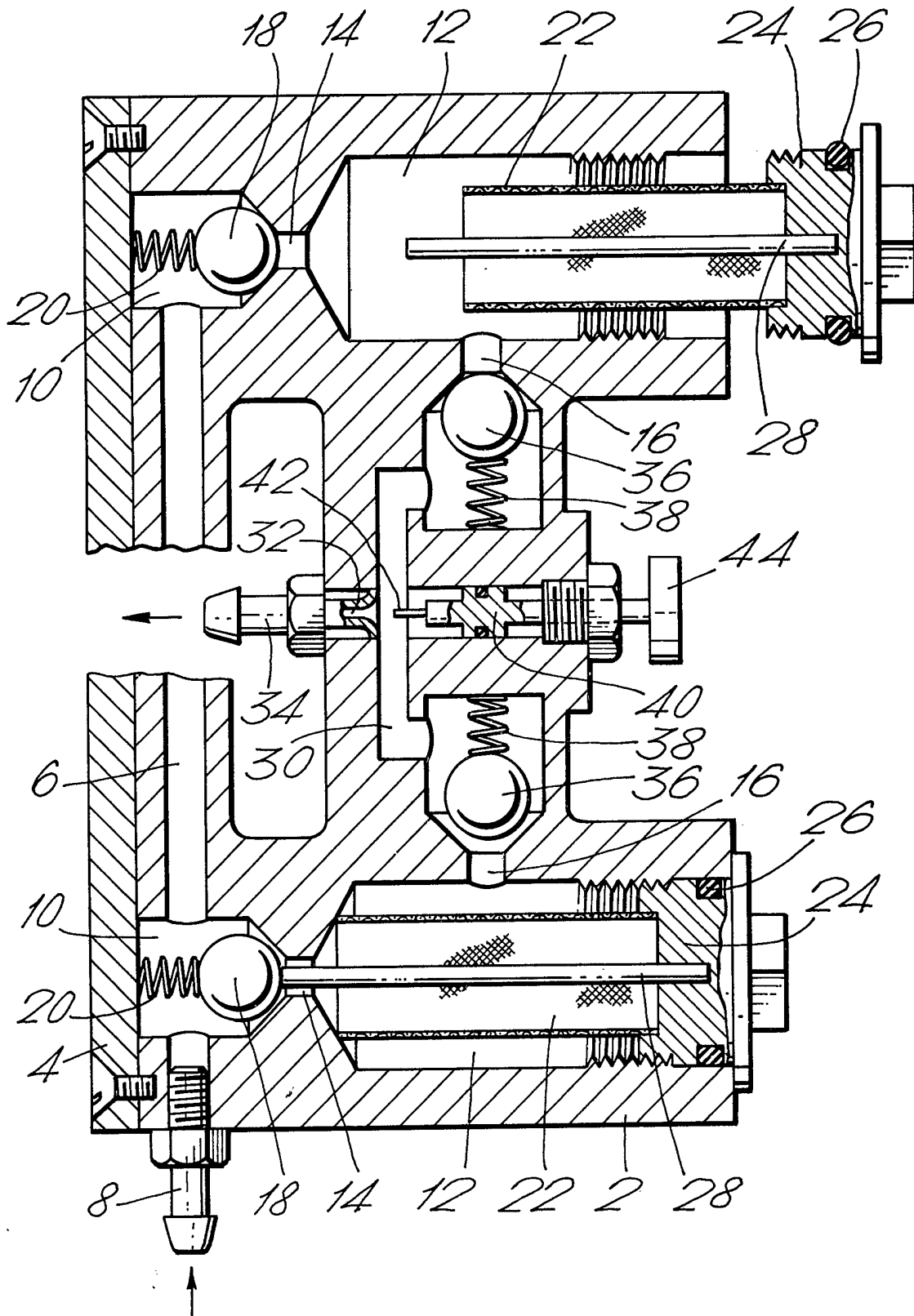
## (54) Filtering device

(57) In order to ensure continuous fluid supply, the filtering device has two filter chambers 12 connected in parallel. When a filter element 22 is removed from one chamber 12 the inlet to that chamber is closed by a spring-loaded ball 18 released by a pin 28. The other chamber then functions as a bypass of the first chamber.



The drawing originally filed was informal and the print here reproduced is taken from a later filed formal copy.

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## SPECIFICATION

### Filtering device

5 The present invention relates to a filtering device for filtering a fluid which preferably continuously flows through the filtering device.

Certain constructions require a continuous supply of a fluid for their function. If the fluid supply is interrupted when the construction is operated, the construction can be destroyed. An example of such a construction is a stuffing box for shafts, in which a fluid must be supplied to the space between the shaft and the seals in order to prevent the seals from being overheated. Seals made from polytetrafluoroethylene are especially sensitive in this respect. It is necessary that the fluid which is supplied to the construction does not contain any contaminants in the form of solid particles, as the seals can be damaged by such particles. Therefore, it is necessary to direct the fluid through a filtering device before the fluid enters the stuffing box. Also other constructions, for example constructions requiring the supply of a cooling liquid, are dependent on the supply of filtered fluid.

Filtering devices usually comprise a filter element which frequently must be cleaned or replaced. The problem is that the supply of fluid to the construction from the filtering device must be interrupted during the cleaning or replacement operations. This fact can represent a drawback but it is of course even worse if the supply of fluid is interrupted while the construction is operating, as this leads to damage to the construction. What is desired is a filtering device which allows a continuous supply of fluid to the construction while a filter element of the filtering device is being cleaned or replaced.

The present invention provides a filtering device for filtering a fluid flowing through the filtering device, comprising an inlet and an outlet, a filter element positioned in a filter chamber between said inlet and said outlet, the filter chamber having an inlet opening and an outlet opening at opposite sides of the filter element, and a closure means which is adapted to close the inlet opening of the filter chamber when the filter element is removed therefrom, the filtering device including a bypass device which is adapted to maintain a connection between the inlet and outlet of the filtering device at least when the filter element has been removed from the filter chamber and the inlet opening thereto is closed.

It is preferred that the bypass means is constituted by a filter chamber having a filter element positioned between an inlet opening and an outlet opening. In this case it is suitable that the bypass device comprises closure means adapted to close the inlet opening of the bypass filter chamber when the filter element is removed from it. Thus, when the filter element of the bypass means is being replaced or cleaned, the first-mentioned filter chamber will constitute a bypass.

When the filtering device is used in connection with a given construction, exchange or cleaning of a filter element can take place without making it

necessary to interrupt the operation of the construction which is supplied with filtered fluid from the filtering device. Thus the risk of damaging the construction by interrupting the fluid supply to the construction while the construction is operated is obviated by means of the filtering device.

Because of the automatic function of the filtering device with regard to the interruption of the fluid supply to the chamber from which the filter has been removed for cleaning or replacement, there are not required any shut-off valves in connection with the filtering device, which obviates the risk of wrong operation of valves which could lead to an interruption of the fluid supply to the construction.

80 The invention will be described further, by way of example, with reference to the accompanying drawing, whose sole Figure shows a section of an embodiment of the filtering device.

The filtering device shown in the drawing comprises a housing 2 and a plate 4 connected with the housing by means of bolts or the like. In the housing 2 there is an inlet chamber 6, which is supplied with fluid through an inlet stud 8 connected with the chamber. The inlet chamber 6 has two enlarged portions 10, each of which is connected with a filter chamber 12. Each filter chamber 12 has an inlet opening 14 and an outlet opening 16.

In the portions 10 of the inlet chamber 6 there are closure means 18, each of which is biased by means of a spring 20 towards a position wherein the inlet opening 14 of the associated filter chamber 12 is closed. In each filter chamber 12 there is a substantially cylindrical filter element 22 supported by an externally threaded closure plug 24 screwable into a threaded portion of the part of the housing 2 which constitutes the filter chamber 12. The plugs 24 are provided with O-rings 26 for sealed closure of the filter chambers 12 when the plugs 24 are screwed into the housing. Centrally in each plug 24 and centrally extending within the associated filter element 22 there is a control pin 28 adapted to act on the closure means 18 by displacing it against the action of the spring 20 in order to open the inlet opening 14 to the chamber 12 when the filter element 22 is placed in the filter chamber. The position wherein the pin 28 acts on the closure means 18 is shown in the lower part of the drawing. In the upper part of the drawing the engagement of the pin 28 with the closure means 18 has been discontinued because the filter element 22 has been removed from the filter chamber to be cleaned, the closure means 18 having been displaced by the spring 20 to a position wherein the closure means closes the inlet opening 14 to the filter chamber 12. The action of the spring 20 on the closure means is of course assisted by the pressure of the fluid which is supplied to the inlet chamber 6.

The outlet openings 16 from the filter chambers 12 are connected with a common outlet chamber 30 which has a central fluid-restricting outlet nozzle 32 and an outlet stud 34. In the outlet chamber 30 there are respective closure means 36 for closing the outlet openings 16 when the pressure in the filter chambers 12 is discontinued because the filter elements are removed and the closure means 18

thereby closes the inlet openings 14. Thus, the closure means 36 prevent the fluid from flowing into a filter chamber 12 from the outlet chamber 30 when the filter element 22 has been removed and the

5 closure means 18 closes the inlet opening 14. The closure means 36 are biased by means of springs 38 for assuring the closure function of the closure means 36. A plunger 40 having a cleaning pin 42 is centrally positioned in the outlet chamber 30. The

10 plunger 40 is operable from outside by means of a knob 44 which when pressed displaces the plunger 40 to a position wherein the cleaning pin 42 extends into the nozzle 32 in order to remove contaminants. In the drawing the cleanable throttling device comprising the nozzle 32, the plunger 40, the cleaning pin 42, and the knob 44 is shown as being a part of the housing 2; if desired it is possible to design this device as a separate unit which is connectable with the housing 2.

20 By way of example, it is possible to use the filtering device described above for filtering a fluid which is continuously supplied to a stuffing box in order to preventing overheating of the seals. During the normal operation of the filtering device the two

25 filter elements are positioned in their filter chambers 12, the fluid thereby entering the inlet chamber 6 through the inlet 8. From the inlet chamber 6 the fluid arrives centrally into the filter elements 22 through the open inlet openings of the chambers 12.

30 The fluid flows radially through the filter elements 22 and leaves the filter chambers 12 through the outlet openings 16. From the outlet openings 16 the fluid arrives in the outlet chamber 30, which the fluid leaves through the outlet nozzle 32 and the outlet

35 stud 34.

When it is necessary to clean or replace one of the filter elements 22 it is only necessary to displace the filter element 22 by screwing out the plug 24, whereby the action of the pin 28 on the closure

40 means 18 is interrupted and the closure means 18 closes the inlet opening 14 of the filter chamber 12 from which the filter element is removed. When the fluid pressure in the filter chamber 12 decreases, the outlet opening 16 from the filter chamber 12 is

45 closed by the closure means 36. The filter chamber 12 in which the filter element 22 is still positioned maintains the function of the filtering device by filtering the fluid flowing through the filtering device. Thus, all operational functions which are necessary

50 with regard to the changing or cleaning of a filter element are automatically obtained when the filter element 22 is removed from the filter chamber 12 without requiring any interruption of the operation of the stuffing box (or other apparatus) which is

55 supplied with filtered fluid from the filtering device. When the filter element which has been cleaned or a new filter element is positioned in the filter chamber, the closure means 18 is displaced from the position closing the inlet opening 14 by the pin 28. If desired it

60 is thereafter possible to remove the other filter element 22 for cleaning or replacement, the filter chamber 12 containing the previously cleaned or new filter element 22 thereby maintaining the filtering function of the filtering device.

65 The filtering device can be modified within the

scope of the following claims. Thus, it is possible to provide the filtering device with a bypass device which is in function only when the filter elements have been removed for replacement or cleaning.

70 Thereby the filtering device can have one, two, or more filter chambers and replacement or cleaning of the filters of all the chambers can take place at the same time. It is also possible to design such a bypass device as an open channel without a filter element,

75 maintaining the connection between the inlet and outlet of the filtering device only on the occasions when cleaning or replacement of the filter elements takes place.

In the specification and claims the expressions

80 filter, filter element, filtering device, filtering and the like are intended to include all devices and methods for removing contaminants from a continuously flowing fluid.

## 85 CLAIMS

1. A filtering device for filtering a fluid flowing through the filtering device, comprising an inlet and an outlet, a filter chamber positioned between the

90 inlet and the outlet, a filter element positioned in the filter chamber between an inlet opening and an outlet opening therein, closure means adapted to close the inlet opening of the filter chamber when the filter element is removed, and bypass means

95 adapted to maintain a connection between the inlet and the outlet of the filtering device at least when the filter element is removed from the filter chamber and the inlet opening thereof is closed.

2. A filtering device as claimed in claim 1, in

100 which the bypass means comprises a second filter chamber containing a filter element positioned between an inlet opening and an outlet opening.

3. A filtering device as claimed in claim 2, including closure means adapted to close the inlet

105 opening of the second filter chamber when the filter element is removed from it.

4. A filtering device as claimed in any preceding claim, in which the or each closure means is adapted to be operated by means of a control element which

110 is connected with the filter element and is adapted to maintain the closure means in an open position when the filter element is operatively positioned in the filter chamber.

5. A filtering device as claimed in any preceding claim, including closure means adapted to close the

115 outlet opening of the or each filter chamber when the filter element is removed.

6. A filtering device substantially as described with reference to, and as shown in, the accompanying

120 drawing.