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RUN-OUT SWITCH ARRANGEMENT FOR SIDE-BY-SIDE ROLL-TYPE FILTER

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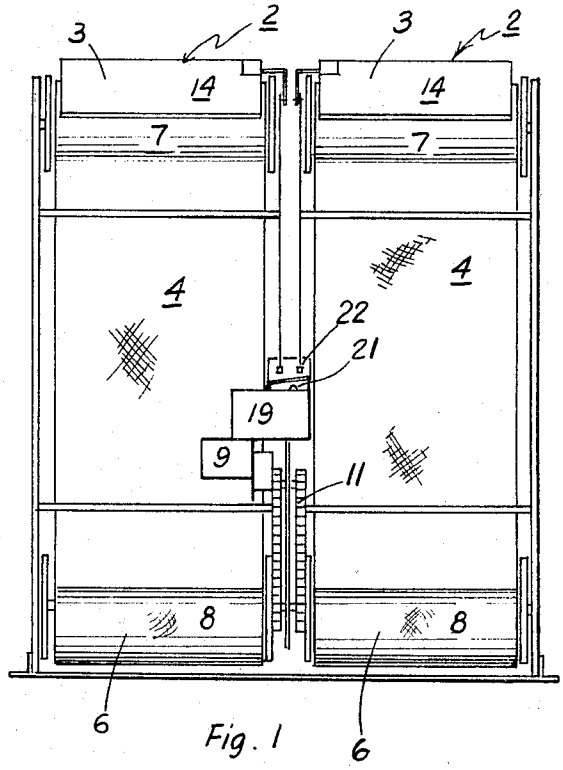


Fig. 1

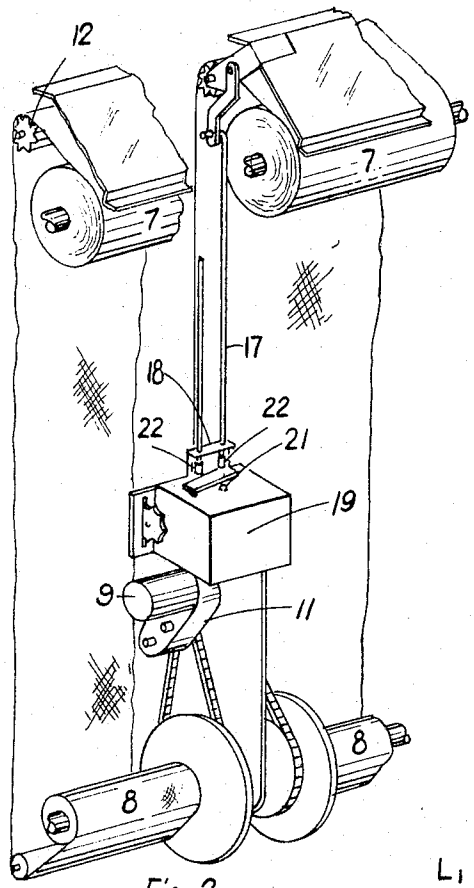


Fig. 2

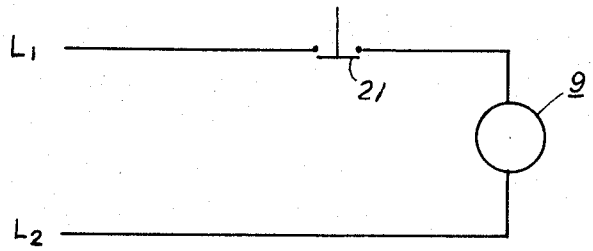


Fig. 3

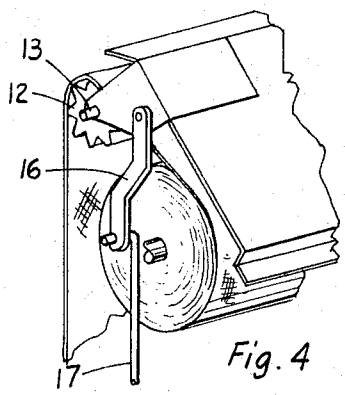


Fig. 4

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RUN-OUT SWITCH ARRANGEMENT FOR SIDE-BY-SIDE ROLL-TYPE FILTER

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ABSTRACT OF THE DISCLOSURE

An improved gas filter assembly including side-by-side filter housings having a common power means and a switch control means disposed between the housing and connected to the power means, the switch control means being actuatable by either one of two filter medium run-out responsive means associated with each of the side-by-side housings.

The present invention relates to filter apparatus of the type wherein filter medium is moved from a supply section through a fluid-treating section to a take-up section, and more particularly, to an on-off switch assembly for a side-by-side arrangement of such filter apparatus.

In the fluid filtering art, it frequently is desirable to place filter assemblies in parallel side-by-side relationship to accommodate large fluid volumes. In the past, whenever such arrangements have utilized unit filters of a type which pass filter medium from a supply section through a fluid treating section to a take-up section, it has been necessary to provide completely separate assemblies including separate medium run-out control arrangements. Recognizing that separate medium run-out arrangements are expensive in construction, operation, and maintenance, the present invention provides an improved switch arrangement which accommodates a pair of side-by-side filter housings with a minimum of parts and with a minimum of operation, eliminating many of the past problems of maintenance heretofore known in the art. In addition, the present invention provides a medium run-out switch device which not only serves to indicate the amount of medium in the supply sections, but at the same time, provides a desired drag or braking effect on the medium as it is moved from its supply section to the gas treating section. In addition, the present invention also provides means which prevents contact of the upper portion of the medium in the supply sections by the dirty gas stream being treated.

Various other features of the present invention will become obvious to one skilled in the art upon reading the disclosure set forth hereinafter.

More particularly, the present invention provides a filter assembly comprising: a pair of side-by-side filter housings each including a filter medium supply section, a fluid-treating section, and a filter medium take-up section; power means to move filter medium simultaneously from the supply sections in both of the housings through the respective gas treating sections to the respective take-up sections; a unitary "on-off" switch control means for the power means; and filter medium runout responsive means cooperative with each of the housing to actuate the unitary "on-off" switch control means to "off" position when the quantity of filter medium is at a preselected condition in one of the side-by-side housing supply sections.

It is to be understood that various changes can be made in the arrangement, form, and construction of the apparatus disclosed herein without departing from the scope or spirit of the present invention.

Referring to the drawing which discloses one advantageous embodiment of the present invention:

FIGURE 1 is a front elevational view disclosing a pair of side-by-side filter housings incorporating the novel on-off switch control arrangement of the present invention;

FIGURE 2 is an enlarged, isometric view of a portion of the assembly of FIGURE 1 disclosing in further detail the novel aspects of the present invention;

FIGURE 3 discloses schematic circuitry setting forth the manner in which the switching arrangement of FIGURES 1 and 2 is utilized to open the circuit to the drive motor which moves the medium through the gas-treating sections from the supply sections to the take-up sections; and

FIGURE 4 is a further enlarged isometric view of a portion of a supply section of the apparatus of FIGURE 2.

Referring to FIGURE 1 of the drawing, a pair of side-by-side filter housings 2 are disclosed. Each of these housings 2 includes filter medium supply section 3, fluid-treating section 4, and filter medium take-up or rewind section 6.

Supply section 3 serves to receive and support a roll of filter medium material 7. Roll 7 can be comprised of a web of suitable filter medium material such as glass fiber. This web is progressively advanced through fluid-treating filter section 4 which frames a gas stream passage through which the gas to be treated must flow. The contaminant loaded web 7 is then progressively advanced to take-up section 6 where it is wound onto discharge roll 8, which ultimately can be thrown away or reconditioned. A suitable drive motor 9 known in the art (not described in detail herein) can be utilized to advance the medium progressively in the manner aforedescribed. Drive motor 9 is positioned along the side wall of one of the side-by-side housings 2 adjacent the roll take-up section 6 and is connected to discharge rolls 8 of both housings 2 through a suitable gear and chain drive assembly 11.

In accordance with the present invention, pivotally mounted to the ends of fluted idler roll 12 over which the filter medium passes from supply section 3 of each housing 2 to fluid-treating section 4 are end mounting brackets 13 which are fixed to the sides of longitudinally extending run-out plate 14. Run-out plate 14 in each housing 2 is sized to movably engage in drag relationship against the upper side of filter medium roll 7 in supply section 3, serving to cover the upper side of this section so as to protect the clean air side of the filter medium from the dirty fluid stream to be treated at the same time that it provides the desired drag and run-out function. Fastened to each of the two adjacent mounting brackets 13 of the side-by-side housings 2 is one end of a link arm 16 and fastened to the other end of such link arm is a longitudinally extending rod member 17. Each of rod members 17, in turn, is positioned and sized to pass through the apertures of a common rod guide bracket 18. Bracket 18 is mounted on switch box and medium metering assembly 19 so that the aperture guides on the bracket and the rods 17 passing therethrough are immediately above the pivotally mounted switch arm 21 for the switch box 19, the movement of which switch arm 21 controls "on-off" movement of drive motor 9 (FIGURE 3). It is to be noted that at the end of each rod member 17 adjacent switch arm 21, there advantageously is provided a slidably adjustable end sleeve 22 which can be held in fast position by a suitable set screw (not shown) to permit preselected adjustment of each of the switch actuating rod members 17 above switch arm 21. Since the guide rods 17 for each of the side-by-side filter housings 2 are positioned above the same switch arm 21, when the filter medium in one of the supply sections 3 reaches a certain predetermined level, the pivotally mounted run-out plate 14 of such section is so displaced as to cause the rod member 17 connected thereto to move

so that the end sleeve **22** thereof abuts against the switch arm **21** and accordingly turns "off" power supply **9**. Thus, in an efficient manner, it is possible to control the "on-off" movement of motor **9** in accordance with the preselected amount of filter medium in either one of the supply sections **3** of the two side-by-side housings **2** so that when the supply of medium is exhausted in one of such supply sections, the drive motor **9** is shut off and new medium can be added to insure efficient treatment of the gas stream passing through the gas treating sections **4** of the parallel side-by-side housings **2**.

The invention claimed is:

1. A filter assembly comprising: a pair of side-by-side filter housings each including a filter medium supply section, a fluid treating section, a filter medium take-up section, and a supply of filter medium supported in roll form upon a mandrel in said supply section; common power operated means to move said filter medium simultaneously from said rolls in said supply sections in both of said housings through the respective fluid treating sections to their respective take-up sections, a single unitary common "on-off" control switch disposed between said side-by-side housings and connected to said power operated means; each of said housings including a run-out plate pivotally mounted to said housing to movably engage against said filter medium in said supply section; and switch actuating linkage for each of said housings, each of said switch actuating linkages being connected at one end to said run-out plate and extending between said side-by-side housings to communicate with said common "on-off" control switch to actuate said control switch to "off" position when said supply roll of either of said housings has a preselected quantity of medium remaining thereon.

2. The apparatus of claim **1**, each of said run-out plates comprising a longitudinally extending run-out member extending substantially the breadth of said filter medium and being pivotally mounted to its housing to movably engage in drag relationship against the upper side of the filter medium in said supply section; said switch actuating linkage for each of said housings being connected at adjacent ends of said run-out members of said housings.

3. The apparatus of claim **1**, and a slidably adjustable end sleeve mounted on at least one of said switch actuating linkages at the end communicating with said "on-off" control switch to permit preselected adjustments of switch actuation.

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