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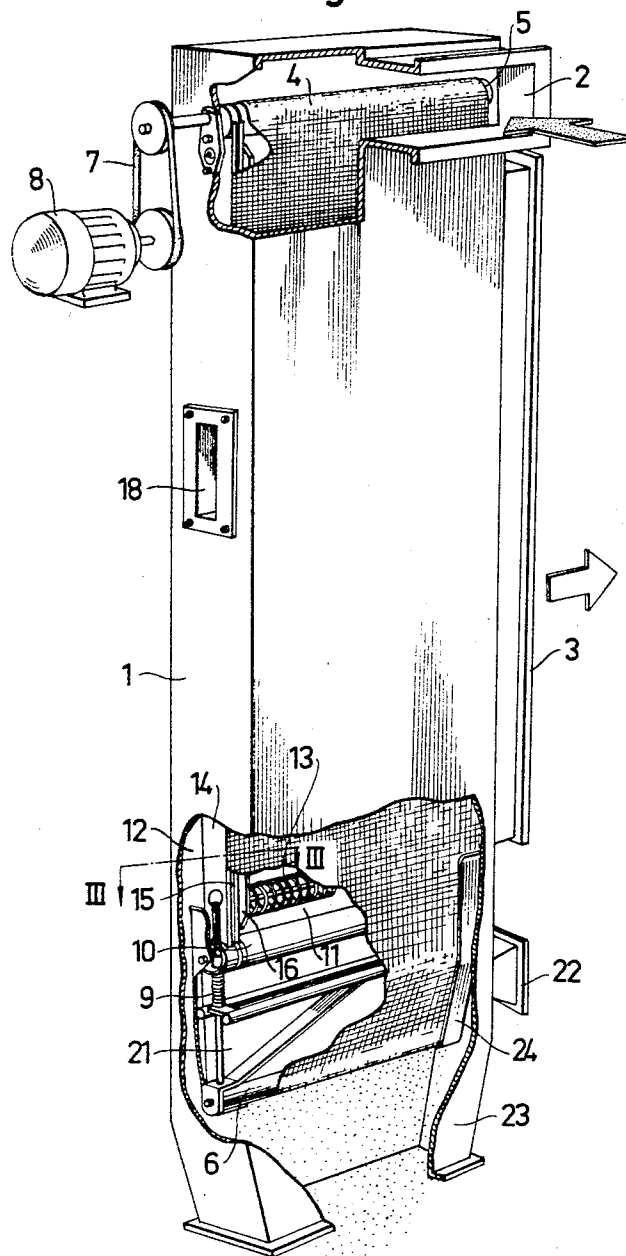
3,398,511

SEALING MEANS FOR BAND FILTERS

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2 Sheets-Sheet 1

Fig. 1



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Fig. 2

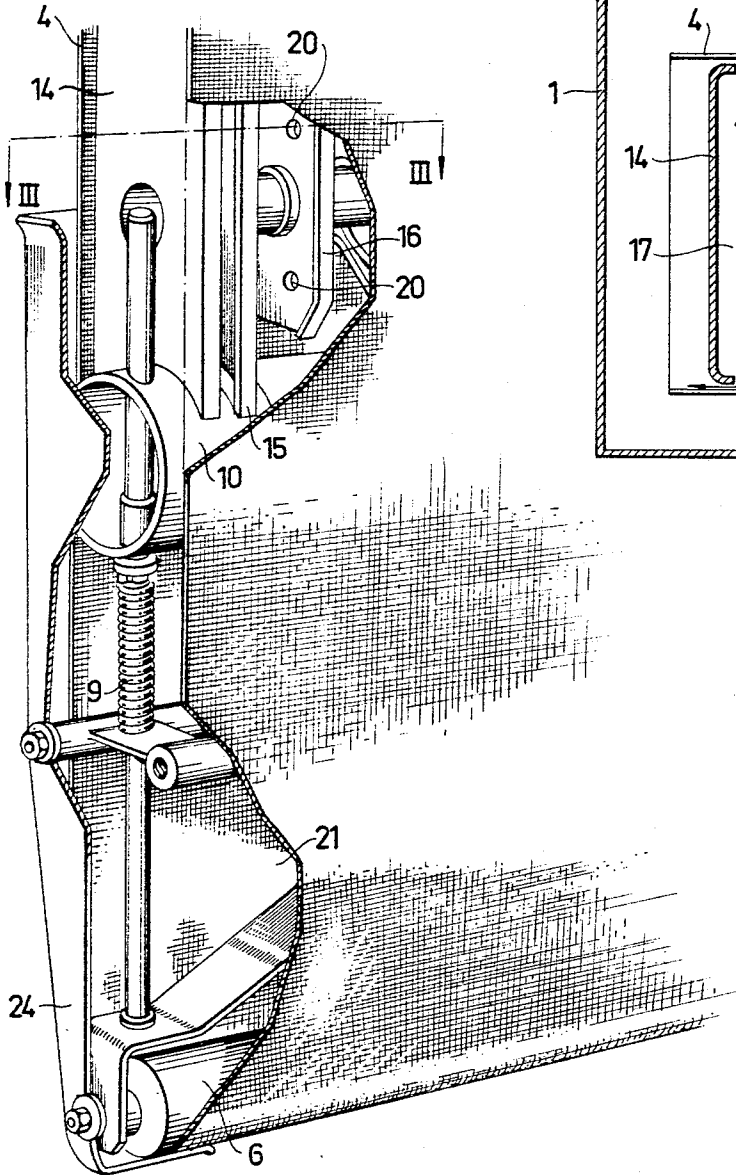
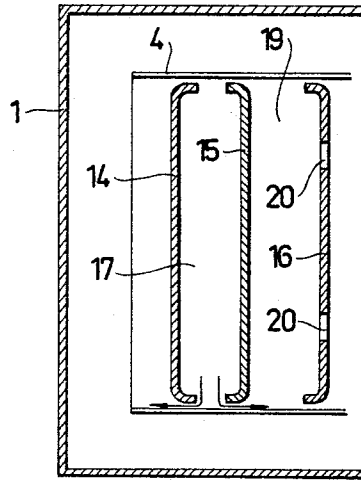


Fig. 3



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SEALING MEANS FOR BAND FILTERS

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5 Claims. (Cl. 55—290)

ABSTRACT OF THE DISCLOSURE

An apparatus for filtering air by a continuous filter band with the inner space between the opposite runs of the filter band being effectively sealed from the outer space around the band by longitudinally extending plate walls. Between the two outermost walls is provided a high pressure channel and between the two innermost is provided a low pressure channel; the filter band being pressed against the edge of the innermost one of the walls. The constant flow of air from the high pressure channel outwardly to the outer space and inwardly to the inner space around the band effectively forms a seal by preventing the entry of uncleaned air into the inner space from which the clean air is withdrawn. In the case where the pressure of the air to be cleaned in the outer space is less than atmospheric, the air within the high pressure channel can be supplied by connection to the atmosphere.

This invention relates to an arrangement for band filters including an endless travelling filter band arranged in a housing in such a manner that it divides an outer space between the band and the housing for supplying of raw gas from an inner space lying between the opposite runs of the band; the inner space receiving the gas cleaned after its passage through the band, and the edge portions of the band abutting against side parts defining the inner space to insure passage of all of the gas through the filter.

In known filters of this kind it has been found, that it is very difficult to attain an effective seal between the raw gas space outside the band and said inner space, that is between edge portions of the travelling filter band and the adjacent edges of the side parts provided for this purpose without producing undesirable great friction between the sealing surfaces, and accordingly, it is an object of this invention to solve said problem in a simple and satisfying manner.

In accordance with the invention, this is attained by constructing the critical side parts that perform the sealing function so as to comprise three parallel plate walls spaced from each other and positioned at right angles to the surface of the band. The two outermost walls form a channel in which a pressure is maintained higher than the pressure prevailing in the raw gas or uncleaned air space outside the band and the two inner walls form a second channel connected to the inner space within the band in which due to the fall of pressure on passage through the band there prevails a pressure lower than the pressure prevailing in the raw gas space, whereby the band is held tightly against the side part.

The above and other novel features of the invention will appear more fully hereinafter from the following description when taken in conjunction with the accompanying drawings showing an embodiment of the invention.

FIGURE 1 is a fragmentary sectional view in perspective showing the band filter according to the invention.

FIGURE 2 is an enlarged fragmentary view in perspective of the lower part of the band filter, the housing of the filter being omitted and some parts being in section to show more clearly the essential details of the invention.

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FIGURE 3 is a sectional view taken on the line III—III of FIGURES 1 and 2.

In the illustrated embodiment of the invention, the band filter is arranged in a housing 1 having an inlet opening 2 and an outlet opening 3 for the medium to be cleaned in the filter. The filter comprises a filter band 4 either manufactured as an endless band or as a web, the ends of which are joined together to form a continuous band. The filter band is stretched by means of rolls 5 and 6, the roll 5 also serving to drive or effect the movement of the band 4 by means of a suitable electrical motor 8 via a belt transmission 7. The lower roll 6 has a smaller diameter than the roll 5 and is resiliently movable in the longitudinal direction with respect to the filter band 4 by mounting of its ends so as to be spring-loaded by a spring 9 pressing down the roll 6, thus insuring the stretching of the band. Above the roll 6, there is a further roll 10 with the same diameter as the upper roll 5 and which forms a tightening or sealing roll to confine the inner space together with said upper roll 5 and the side parts of the invention lying between the rolls 5 and 10, which parts cooperate with the edge portions of the filter band. The inner space 11 is thereby separated from the outer space or raw gas space 12 formed between the runs of the band 4 and the housing 1. In the inner space 11 is arranged a number of support rolls 13 which prevent the runs of the band from being pressed together and which rolls are freely journaled in the side parts. These rolls 13 are preferably manufactured in the form of screw springs as shown.

In accordance with the present invention, each of the side parts comprises three parallel plate walls 14, 15, 16 spaced from each other and arranged at right angles to the surface of the filter band 4. The two outermost walls form a channel 17 in which a pressure is maintained higher than the pressure prevailing in the raw gas space 12, and of course, is also higher than the pressure in the inner space 11, because as already pointed out in the introduction, the pressure in said inner space 11 is lower than the pressure in said raw gas space 12 due to the inherent pressure loss as the air passes through the filter band 4. In the illustrated embodiment the high pressure channel 17 is connected to a suitable source of pressure via the connection piece 18, shown in FIGURE 1. Between the two inner plate walls 15 and 16, there is formed a second or low pressure channel 19 connected to the inner space 11 via a number of openings 20 in the innermost wall 16. In order to prevent the band 4 from abutting against any relatively sharp edges of the plate walls, these edges are bent at right angles. The edges of the outer walls 14 and 15 are bent towards each other to form a blow slot and the edge of the inner wall 16 is bent towards the wall 15 to form a suction slot.

By this arrangement, an air stream is continuously flowing between the edge portions of the band 4 and the outermost wall 14 from the channel 17 to the raw gas space, whereby it effectively prevents raw or uncleaned gas from flowing into the inner space 11 without having passed through the band 4. Simultaneously, an air stream is passing from the channel 17 to low pressure channel 19 thereby reducing the friction between the band and the middle wall 15 (note flow arrows in FIGURE 3). However, as a result of the lower pressure in the channel 19 and the inner space 11 the filter band 4 is held tight in guided relationship against the bent edge of the wall 16.

Furthermore, in the illustrated embodiment the space 21 lying beneath the tightening roll 10 and between the band parts is connected via a tube branch 22 to a source of air under pressure in such a manner that an air stream is caused to pass through the band filter 4 from the inner to the outer sides to clean or blow out the separated dust particles adhering to the band, the dust par-

ticles being removed through an outlet opening 23 at the lower end of the housing 1. In order to prevent the edges of the band 4 from being pressed outwards by this cleaning air stream, the edges of the same are guided by a guideway 24 surrounding the outer edges.

In an installation wherein the pressure of the uncleaned air in the outer space 12 is lower than atmospheric, it will be clear that the higher pressure within the channel 17 may be provided by allowing the connection piece 18 to be open to the atmosphere, as shown in FIGURE 1.

I claim:

1. In a band filter arrangement including a housing, spaced stretching means positioned in said housing, a continuous filter band mounted on said stretching means defining a pair of oppositely directed runs, said band defining separate inner and outer spaces within said housing, first means for supplying gas to be processed to said outer space, means for withdrawing the processed gas from said inner space, the improvement comprising first and second spaced plate members extending longitudinally along each side of said band between said stretching means, said members having a width so as to extend substantially between said runs and being substantially perpendicular to said band and parallel to each other to form a first elongated channel along each side, second means for supplying gas to said channel at a pressure higher than the pressure in said outer space, said band filter being sufficiently flow restrictive to cause the pressure in said inner space to be lower than said pressure in said outer space to create a differential in pressure across said band, means in said inner space to hold said band against said plate members and to guide said band along said runs to prevent the same from collapsing due to said differential in pressure, whereby a constant flow of gas is provided from said high pressure channel between said side edges of said filter band and said plate members for sealing said inner space from said outer space along the side edges of said band and thereby pre-

vent the entry of gas to be processed to said inner space except through said filter.

2. The combination of claim 1 wherein the operative edges of said first and second plate members adjacent said band are bent toward each other to form a restriction for said constant flow of air to effectively form a seal.

3. The combination of claim 1 wherein said guiding and holding means includes a third plate member spaced from and substantially parallel to and coextensive with the innermost one of said plate members so as to form a suction slot, the operative edges of said third plate member being bent toward said first and second plate members so as to form a guide and seal with said filter band.

4. The combination of claim 1 wherein said pressure in said outer space is less than atmospheric and wherein said second pressure means is provided by the atmosphere.

5. The combination of claim 1 wherein said guiding and holding means comprises a third plate member substantially parallel to and coextensive with said first and second plate members and cooperating with the innermost one of said plate members to form a second elongated channel, means for interconnecting said second channel with the remainder of said inner space so as to form a suction slot, whereby said remainder of said inner space is separated from said high pressure channel by said second channel.

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