

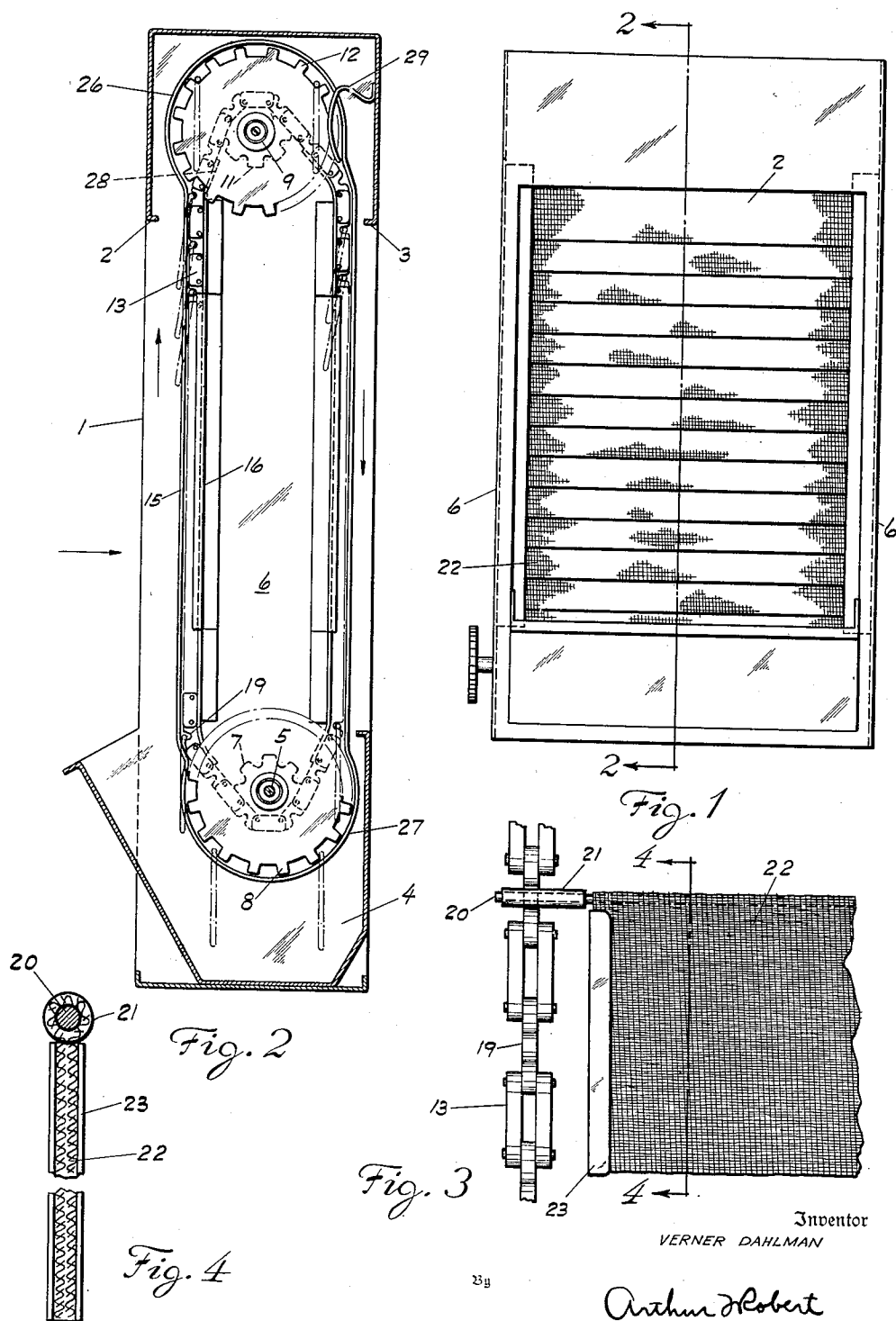
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2,586,616

CONTINUOUS IMBRICATED PANEL TYPE FILTER

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CONTINUOUS IMBRICATED PANEL TYPE
FILTERVerner Dahlman, New Lennox, Ill., assignor to
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The present invention relates to an air filter of the overlapping panel type, in which a series of overlapped filter panels coated with liquid are carried along on an endless conveyor to form a vertical filter bed or curtain extending across the path of air flow. One such type of air filter is disclosed in Patent 2,167,283, issued July 25, 1939, to Arthur Nutting.

As ordinarily operated, the panels on one flight of the filter are properly presented in imbricated relation to the air stream, but on the other flight they are turned and are so imbricated that the pressure of the air stream can separate the panels and pass therebetween, unless additional means is provided to restrain the panels. Furthermore, the turning of the panels causes them to present downstream the face which was formerly presented upstream, with consequent disadvantage that dust accumulated on that filter face may be blown off into the air stream.

It is an object of the present invention to provide an overlapping endless panel type filter in which the panels are rearranged at the return flight in inversed overlapping relation to successively restrain the panels against separation by the force of the air stream passing therethrough.

A further object is the provision of an overlapping panel double curtain type filter in which the panels present the same face upstream in each flight or curtain.

A further object is the provision of an endless type panel filter having a transfer and rearranging mechanism for transposing the panels successively from one flight to the next flight in inversed imbricated relation.

In accordance with the present invention there is provided conveyor means for removably carrying imbricated panels of a filter medium across the air stream to be filtered, and a transfer means is arranged at the end of the course to remove and separate the panels and successively replace the panels in inverse overlapped relation for the return travel across the air stream. This provides a double curtain of imbricated panels in which the panels present the same face upstream in both courses and in which the panels overlap in such manner in both courses that the force of the air stream presses them together at the overlap. In one embodiment of the invention this is accomplished by the provision of a transfer

mechanism meeting or intersecting an endless conveyor and which serves to bodily remove each filter panel from the conveyor when that filter panel reaches the end of a course, bodily transfer the panel to the beginning of the return course, and there reassemble the filter panel in inversed overlapping relation to the preceding panel on the conveyor for the return course.

The invention will be described in greater detail in connection with the accompanying drawings in which is illustrated a preferred embodiment of the invention by way of example, and wherein:

Figure 1 is a front elevation of the invention, Figure 2 is a vertical sectional view taken on line 2-2 of Figure 1.

Figure 3 is an enlarged view of a detail, and Figure 4 is a section taken on line 4-4 of Figure 3.

Referring to the drawing, there is shown a cabinet or casing 1 having a front inlet opening 2, a rear outlet opening 3, and a trough 4 at the bottom for washing fluid. At the bottom a shaft 5 is suitably journaled at each side 6, 6' of the housing, and carries at each end chain sprockets 7 and transfer sprockets 8, which sprockets rotate together. At the top of the casing are supported stub shafts 9 at each side, and each shaft carries a chain sprocket 11, and a transfer sprocket 12. An endless conveyor chain 13 extends around each pair of chain sprockets comprising a sprocket 7 and 11, and may be driven from shaft 5 at the bottom. As the construction and operation of the two sides are alike, only one side will be described in detail.

Each chain 13 travels between two guide flanges 15 and 16 which may be made of angle irons suitably secured to the side 6 of the housing, and the side 6' carries similar guide flanges (not shown). Chain 13 has notches 19 in its outer periphery in links located at suitably spaced intervals, the notches being formed, in the modification illustrated, in the thin or inner links of the chain. Transverse support rods 20 carrying sleeves or bearings 21 at their ends are received in corresponding notches 19 of each chain, and carry panels 22 or sheets of a suitable filter material. As shown, each panel is formed of a sheet of metal mesh fabric folded double over a rod 20 and suitably embraced at its edges by a

clip 23. However, any other suitable filter material may be employed, which may be mounted on any suitable swivel or pivot carried in notches 19. As shown, the panels 22 are substantially double the distance between notches in the chain, so that on the straight flights the panels are imbricated to form a substantially continuous filter curtain on the exterior of the chain on the upstream side, with one face, hereinafter designated as the upstream face, presented to the air stream.

The invention, which is directed to an arrangement for reversing the individual filter panels at one end of their travel so as to cause them to present the same face upstream on the return flight of their travel, now will be described. The exterior track or guide channel 15 is expanded at the top end at 26 to embrace the periphery of transfer sprocket 12, and the track may be similarly expanded at 27 at the bottom to embrace the bottom transfer sprocket 8. The inner track deflects inwardly at 28 to guide the chain inwardly to the chain sprocket 11 and when a notched link registers with a notch in the transfer sprocket 12 the rod 20 in the link is picked up by the pair of transfer sprockets 12 and carried around thereby to the point where the chain again registers with the transfer sprocket, at which point the rod 20 reenters a chain notch. The absence of a cross shaft between sprockets 12 at the top allows the filter panel to cross over without interference. A leaf spring 29 is provided at the top to engage the panels as they come around on the discharge side of the transfer sprocket to compel their overlap on the interior, so that when the rods 20 are picked up by the chain at the beginning of the downward flight the panels are arranged with each panel overlapping the adjacent lower panel on the inside of the chain, and all panels present their upstream faces upstream, as they move downwardly toward the oil bath. Thus, each panel is braced by the rod of the next lower panel so the panels cannot separate to allow air to blow through. The downstream opening 3 is sealed with respect to the filter curtain by sealing strips in known manner to prevent air bypassing the curtain.

At the bottom, the swivel rods 20 are picked up from the chain by the transfer sprockets 8 and are carried around the expanded guide track 27 through the washing bath where they are washed and, upon rising on the discharge side, are again taken up by the chain in overlapping position on the exterior of the chain with the same face upstream. This avoids dipping the chain into the washing fluid and gives each panel an opportunity to drain before it is picked up by the chain.

The operation of the invention now will be described. The chains 13 are driven from shaft 5 and may be advanced intermittently as required or at a slow continuous rate. As each rod 20 carrying a filter panel 22 reaches the bottom transfer sprockets 8, it is removed from the chain and is lowered in the track formed by sprocket 8 and flange 27 into the washing bath in trough 4. Accumulated dust is washed off the panel and the panel receives a fresh coat of liquid. The panel is given an opportunity to drain and is then picked up by the chain and carried into the opening 2 in overlapped relation to the next following panel. At the top, as each rod reaches the transfer sprockets, it is picked up out of the chain notch and is carried

around 26 while it dangles from the sprockets. At the opposite side the leaf spring 29 deflects the panel inwardly to cause it to overlap the preceding panel on the inside, and on the downward course the same face of each panel is presented upstream as on the upward course. This eliminates the danger of the stream of air dislodging dust from the downstream panel.

If desired, the filter curtain may be driven at the top from a shaft carrying gears or sprockets meshing with the transfer sprockets 12 and of such diameter that the filter panels will clear the shaft in their transfer. Various other modifications may be made in the invention without departing from the spirit or scope thereof.

I claim as my invention:

1. In an air stream filter of the imbricated panel type: pairs of spaced conveyor sprockets; a pair of endless chains having slotted links passing around said conveyor sprockets providing advancing and return courses across an air stream; rods carried in said slotted links, each rod carrying a filter panel, the length of the filter panels and the spacing of the rods providing an imbricated panel curtain; and pairs of rotatable transfer sprockets of larger diameter than the chain sprockets located at the ends of the courses to engage and remove said rods successively from one course and transfer the rods to the other course in inversed imbricated panel relation.

2. In a filter of the overlapped panel type: an endless conveyor providing advancing and return air-cleaning passes across an air flow passage and a crossover course from the end of each pass to the beginning of the other pass; a succession of lapping panels along each pass, each panel extending transversely across the conveyor, each being removably mounted on the conveyor along each pass and each presenting the same face upstream on each pass but being arranged on one pass to overlap the front side and one transverse edge of the following panel and being inversely arranged on the other pass to underlap the back side and the opposite transverse edge of the following panel so as to form an imbricated curtain on each pass with the adjacent panels of one curtain in one relationship and of the other curtain in relatively inversed relationship; and transfer means located adjacent one crossover course to remove successive panels from the conveyor at the end of one pass, move each panel outwardly from the conveyor and around the adjacent crossover course to clear the panel from and inverse its relationship to the following panel and then feed the inversed panel back to the conveyor at the beginning of the other pass, said transfer means including a panel-engaging member mounted for movement in timed relationship to the conveyor over a predetermined path which loops outwardly around the adjacent crossover course from one side of the conveyor to the other.

3. In the filter of claim 2 wherein: at least a portion of that section of the conveyor, providing said one crossover course, extends about an axis in a circular path; and said member moves about the same axis over a larger circular path.

4. In the filter of claim 2 wherein: at least a portion of that section of the conveyor, providing said one crossover course, passes around conveyor sprockets; and said member is in the form of a larger sprocket mounted for rotation with the conveyor sprocket about the same axis.

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5. In the filter of claim 2 wherein: a corresponding transfer means is located adjacent the other crossover course.

6. In the filter of claim 5 wherein: the conveyor extends around conveyor sprockets at each crossover course; and said member for each transfer means is in the form of a larger sprocket mounted for movement with the adjacent conveyor sprocket and about the same axis.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,836,131	Richter	Dec. 15, 1931
2,070,872	Strindberg	Feb. 16, 1937

FOREIGN PATENTS

Number	Country	Date
365,723	Great Britain	Jan. 28, 1932
576,709	Germany	May 18, 1933