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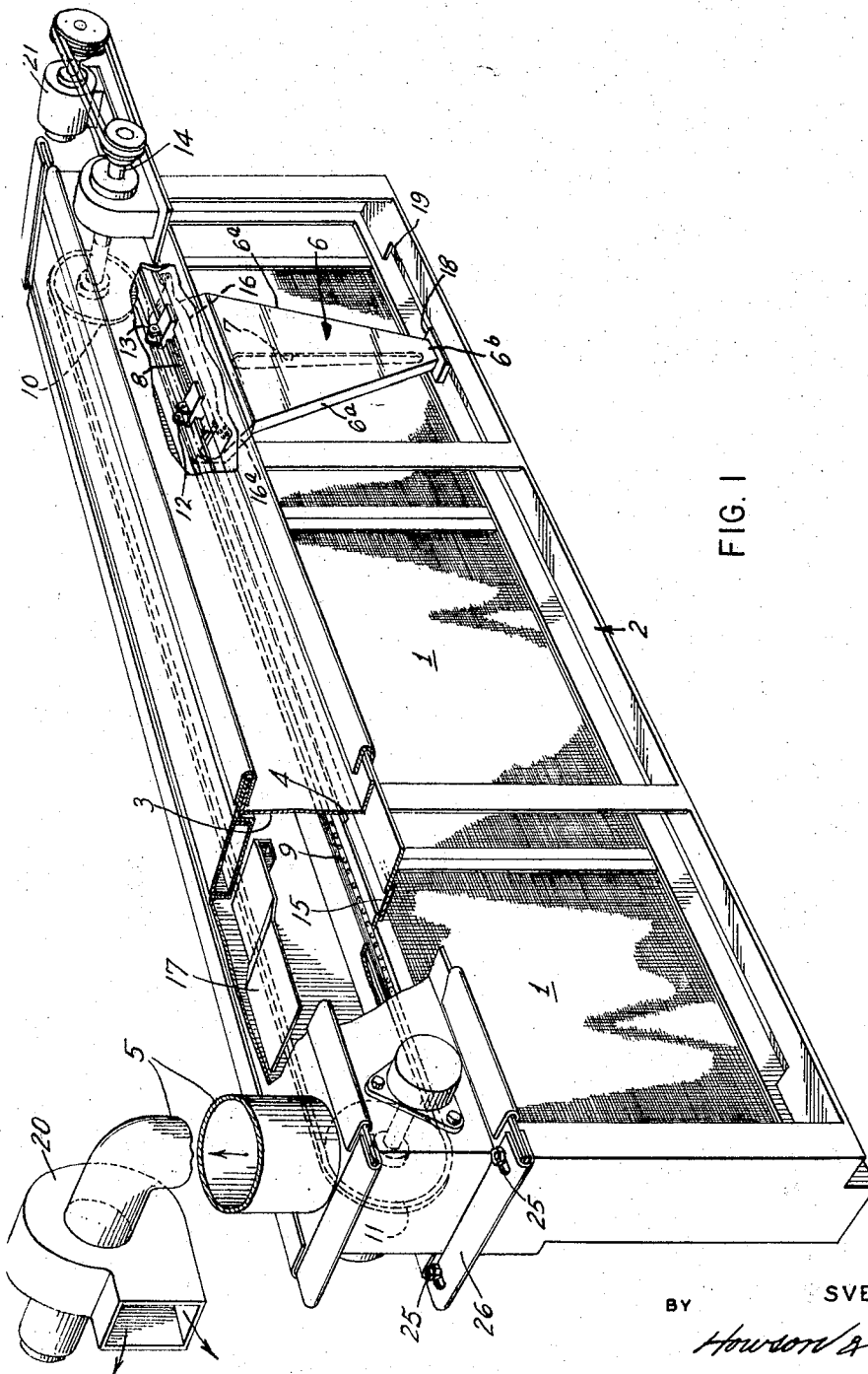
S. WALLIN

3,306,012

CLEANING DEVICE FOR FRAME-MOUNTED NET FILTERS

Filed March 30, 1966

2 Sheets-Sheet 1



INVENTOR;
SVEN WALLIN
BY
Howson & Howson
ATTYS.

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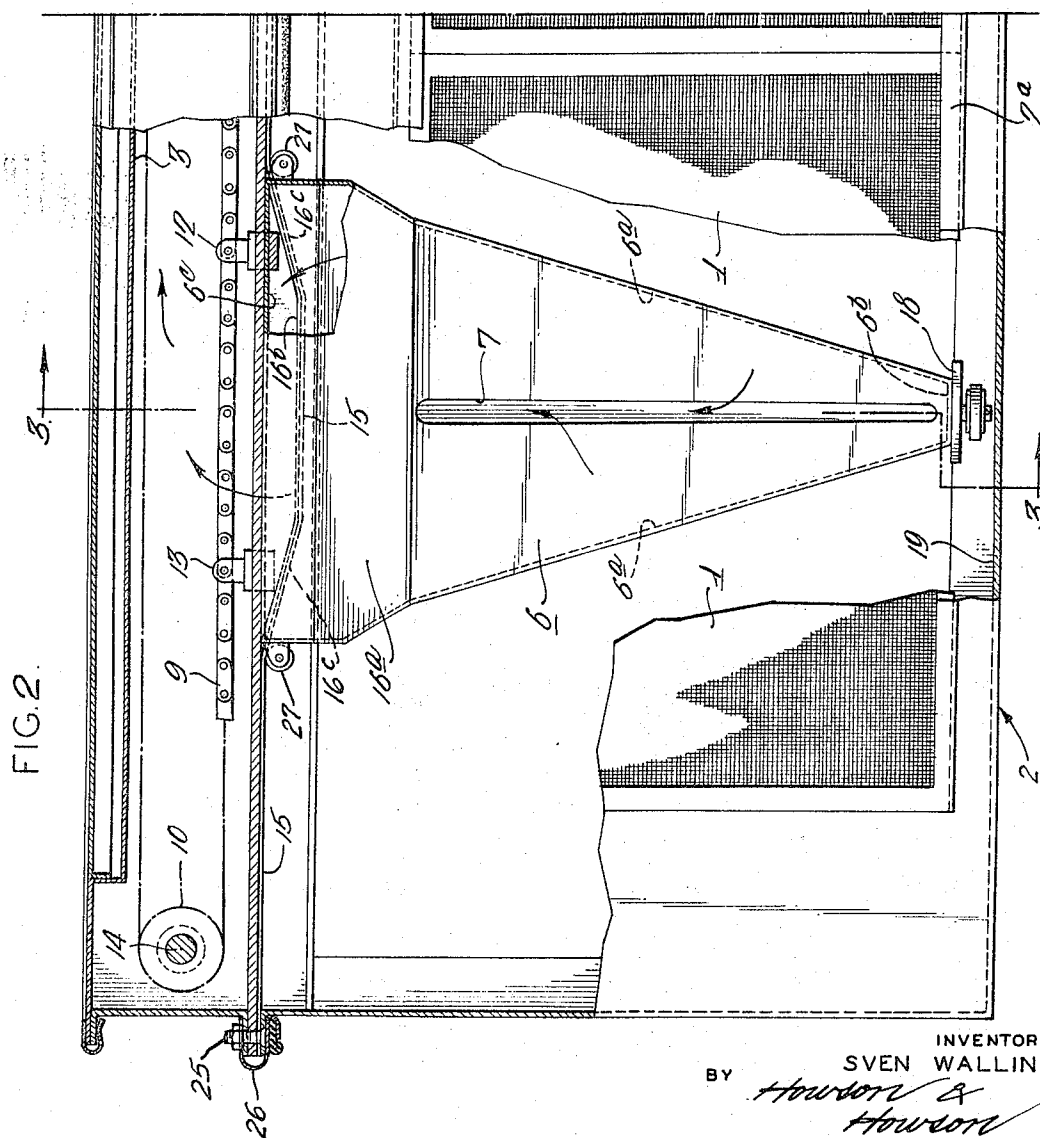
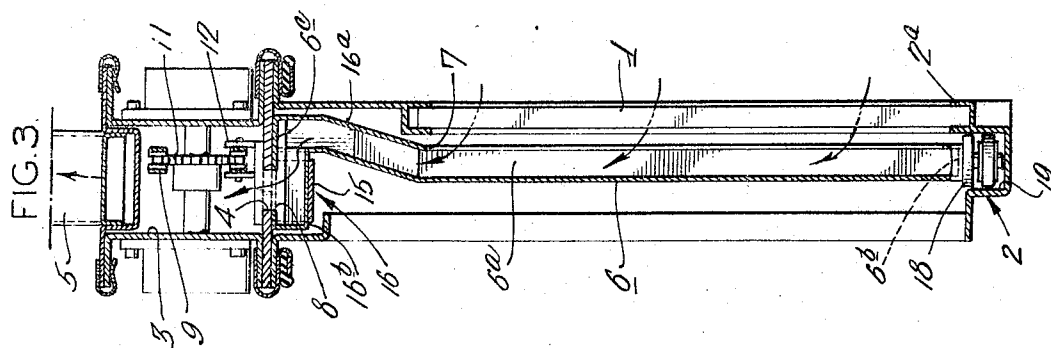
S. WALLIN

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INVENTOR:
SVEN WALLIN
BY *Howardson &*
Howardson
ATTYS.

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CLEANING DEVICE FOR FRAME-MOUNTED NET FILTERS

Sven Wallin, Taby, Sweden, assignor to Aktiebolaget Svenska Flaktfabriken, Stockholm, Sweden

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5 Claims. (Cl. 55—294)

Cross references to related applications

This application is a continuation-in-part of my co-pending application filed July 10, 1964, Serial Number 381,656, now abandoned.

Abstract of the invention

The present invention relates to cleaning devices for frame-mounted net filters, and more particularly to a cleaning device including a suction duct connected to a suction means.

The novel apparatus includes a frame having means to receive therein at least one filter of the net type and a suction head mounted adjacent the receiving means to accommodate the filter. As will be described more fully hereinafter, the suction head contains an extended suction slot which faces and is transverse to the net filter. A suction box is mounted adjacent the suction head, the box having a longitudinally extending opening covered by displaceable sealing means while the head is provided with separating means to disengage locally the sealing means so as to uncover the opening and permit connection of the suction slot with the interior of the suction box by way of the longitudinal opening. Of course suction means are connected to the suction box in order to draw a suction through the suction slot and thereby the filter. In addition, drive means are provided for connection to the suction head in order to reciprocate the head relative to the filter receiving means.

State of the prior art

Frame-mounted net filters are typically used in dryers and other processing equipment where a circulating, or in some instances even a non-circulating treating agent is liable to be mixed with dust, fiber particles and the like coming from either the material to be treated, in the instance of a circulating type dryer, or from the atmosphere in a non-circulating type. Frequently, operational breakdowns occur in such equipment as heat exchangers and efficiency is impaired directly due to the failure to remove the impurities. On the other hand even when filters are used, impurity build-up increases the air resistance through the filter thus necessitating periodic cleaning of the filters. In certain instances the filters may be cleaned manually but in large apparatus containing large filter areas any downtime of the machine is economically costly and it is preferable to remove the filters to be cleaned and insert new ones, where possible, without interrupting the operation.

Various systems have been suggested for cleaning separate filters, such as described by Honan in U.S. Patent Number 3,147,098. However, the manner in which the suction cleaning head of Honan is connected to its vacuum source limits to some extent the amount of vacuum able to be drawn by the head and thus does not permit as thorough a cleaning job as the apparatus of the present invention. In addition, a device such as suggested by Honan is limited to the size of filters it is capable of cleaning as well as to the number of filters it may clean at one time.

Description of the invention

In view of the above it is a principal object of the present invention to produce a novel and simple device for automatically cleaning frame-mounted net filters.

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Another object of the present invention is to provide a device for automatic filter cleaning which makes it possible to remove the impurities effectively by suction with a minimum of air consumption and operating time to effect economies in operation.

Still another object of the present invention is to provide a device necessitating a minimum of movement of the filters to minimize dust pollution of the surrounding atmosphere.

Other objects and a fuller understanding of the invention may be had by referring to the following description and claims taken in conjunction with the accompanying drawings in which:

FIG. 1 is a fragmentary perspective view of a cleaning device constructed in accordance with the present invention;

FIG. 2 is an enlarged fragmentary sectional view of a portion of the device illustrated in FIG. 1 as viewed from the reverse side thereof; and

FIG. 3 is a sectional view taken along line 3—3 of FIG. 2.

Referring now to the drawings, and especially FIG. 1 thereof, a plurality of net filters 1 is shown positioned in filter receiving support means, in the present instance a channel-like frame 2a (see FIG. 3), mounted on a common frame 2 of a cleaning apparatus. As shown in FIG. 1 a longitudinally extending suction box 3 is connected to the frame 2 along one longitudinal side thereof, in the present instance the upper portion, and is provided with a longitudinal opening 4 opening downwardly toward the filter receiving support means. As schematically illustrated, one end of the suction box 3 is connected to the suction side of a fan or blower 20 by a conduit 5.

In accordance with the invention, cleaning means is provided for traversing across the filter receiving support means and connecting the suction box with the cleaning means as it traverses the area adjacent the filter receiving support means. To this end, a hollow suction head 6, in the present instance comprising a depending duct having upstanding and downwardly tapered side walls 6a, a bottom wall 6b and a top wall 6c, is mounted movably in the opening 4 of the suction box 3. The tapered formation of the duct whereby the taper extends away from the suction source (i.e. the suction box 3) aids in the function of drawing a uniform suction through a filter 1 into a suction slot 7. In the present instance the suction slot is vertically oriented and extends transverse to the filter. As best illustrated in FIGS. 2 and 3, communication between the suction slot 7 and the box 3 is effected through a connecting slot 8 at the top wall 6c of the duct, which slot mates with the opening 4 of the box.

In order to permit the suction head 6 to traverse across the filters mounted in the filter receiving support means, an endless chain 9 connects the suction head to drive means to effect reciprocation of the suction head longitudinally of the frame 2. To this end, longitudinally spaced sprocket wheels 10 and 11 may be mounted interiorly of the suction box 3, the sprocket 10, in the present instance, being connected through a support shaft 14 to a reversible control motor 21. As best illustrated in FIGS. 2 and 3, the chain 9 is connected to the suction head 6 by longitudinally spaced fastening means, in the present instance yokes 12 and 13, which project upwardly from the suction head 6 through the slots 8 and 4.

In order to prevent lateral movement of the suction slot 7 relative to the filter receiving support means, that is to keep the suction slot 7 at a predetermined distance from the filter, the bottom wall 6b of the suction head is provided with a shoe 18 slidable in a guide groove 19 located in the lower portion of the frame 2.

In accordance with another feature of the invention, it is desirable to prevent, as much as possible, leakage

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from the suction box 3 through the opening 4 in the lower portion of the suction box while permitting the connecting slot 8, associated with the suction head, to communicate with the box through the opening 4 at any position along its line of travel. To this end, the longitudinal opening 4 of the suction box 3 is sealed by sealing means, in the present instance a thin, flexible steel strip 15 supported at either end of the frame 2 as by bolts 25 and a clamp 26. For reasons which are quite evident, i.e. having a negative pressure in the suction box 3 with respect to the atmosphere, the strip 15 preferably underlies the suction slot and is separated from the opening 4 by separating means 16 mounted on the reciprocable suction head to afford local disengagement of the sealing means thus permitting the connection of the suction slot 7 with the interior of the suction box.

As best illustrated in FIG. 2, the separating means 16 comprises an offset portion 16a and a downwardly extending bulge 16b with tapered ends 16c to depress or locally disengage the sealing strip 15 thus exposing the slot 8 associated with the suction head 6 to the opening 4 associated with the suction box 3. In operation the sealing strip 15 is positioned beneath the separating means, the gradual tapered ends 16c coupled with terminating press rollers 27, positioned on either side and outboard of the suction box 3, insuring local separation while maintaining a good seal between the suction box 3 and the atmosphere. Of course other separating means may be provided to insure local separation of the sealing strip from the opening 4, but the apparatus above-described has been found to be effective for the intended purpose.

Under certain conditions it is desirable to temporarily disrupt the suction through the slot 7, for example when loading or unloading filters from the frame 2. To this end, a slide plate 17 may be mounted on the chain 9 such that when the suction head is in its farthest position either to the right or left, in the present instance right as viewed in FIG. 1, the plate will block the inlet of the conduit 5 at its point of entry into the suction box 3.

Thus the present invention provides a novel and relatively simple device for automatically cleaning net filters, which device permits automatic cleaning of a plurality of filters in an aligned series and makes it possible to remove the impurities therefrom effectively by suction with a minimum of air consumption and operating time to effect economies in operation.

Although the invention has been described with a certain degree of particularity, it is understood that the present disclosure has been made only by way of example and that numerous changes in the details of construction and the combination and arrangement of parts may be made without departing from the spirit and the scope of the invention as hereinafter claimed.

What is claimed is:

1. In a filter cleaning device comprising a net filter, a frame having support means to receive at least one

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net filter therein, a hollow suction head mounted adjacent said support means, said suction head having an extended suction slot therein facing and transverse to the support means, suction means connected to said suction head to draw suction through said suction slot and said filter, and drive means connected to said suction head to reciprocate said head relative to said filter-receiving support means; the improvement wherein said suction means includes a suction box coextensive with said support means and mounted adjacent said suction head, said box having a longitudinally extending opening, a replaceable sealing strip secured to said box at its opposite ends and covering said opening throughout its length, said head having an offset portion disposed intermediate said opening and said strip to locally disengage said strip from said opening, a connecting slot in said offset portion mating with said opening to afford free communication between said suction box and the interior of said head, said portion sliding longitudinally of said opening upon reciprocation of said head, and means carried by said head at the opposite ends of said offset portion operable to press said strip against said opening to prevent leakage through said opening adjacent said portion.

2. A device according to claim 1, wherein said suction head comprises a duct having said offset portion at one end thereof, said duct tapering from said one end toward the opposite end in the direction of said suction slot, the connecting slot in said offset portion being coextensive with said one end to afford free communication throughout its length, whereby said suction slot draws uniform suction throughout its length.

3. A cleaning device for net filters in accordance with claim 2 wherein said duct has a shoe connected on the opposite end thereof, and said frame includes a guide groove parallel and coextensive with said opening and dimensioned for receipt and guiding of said shoe.

4. A device according to claim 1 wherein said drive means comprises an endless chain mounted within said suction box for longitudinal displacement parallel to said opening, and fastening means connecting said head to said chain, said fastening means projecting through said opening and said connecting slot.

5. A device according to claim 4 including a suction inlet in said box and a slide plate carried by said chain operable to close said inlet at a selected position of said chain and thereby said suction head in its reciprocating travel.

References Cited by the Examiner

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FRANK W. LUTTER, *Primary Examiner*.

ROBERT F. BURNETT, *Examiner*.

B. N. NOZICK, *Assistant Examiner*.