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TRAVELING CLEANER

3,004,277

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2 Sheets-Sheet 1

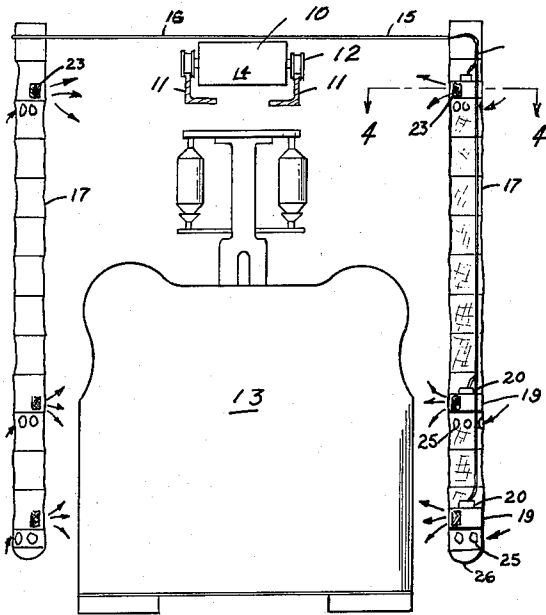


FIG. 1

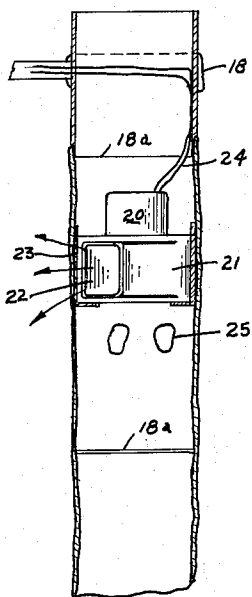


FIG. 2

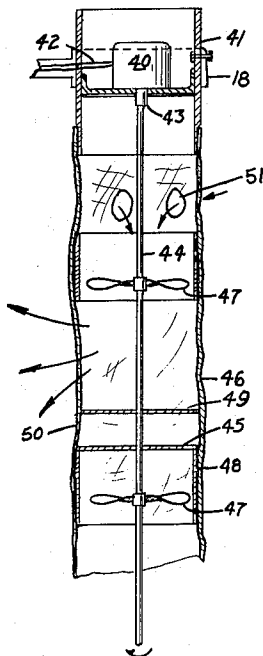


FIG. 3

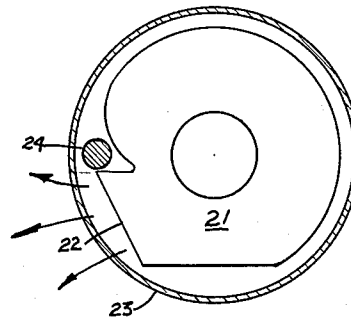


FIG. 4

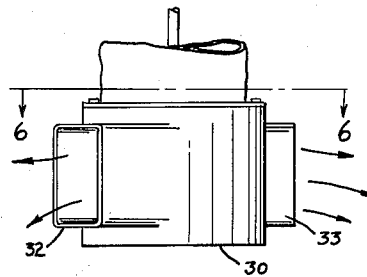


FIG. 5

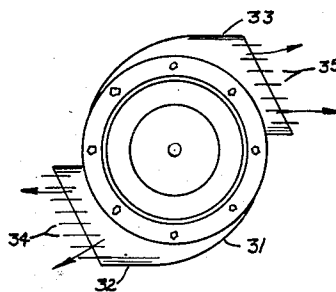


FIG. 6

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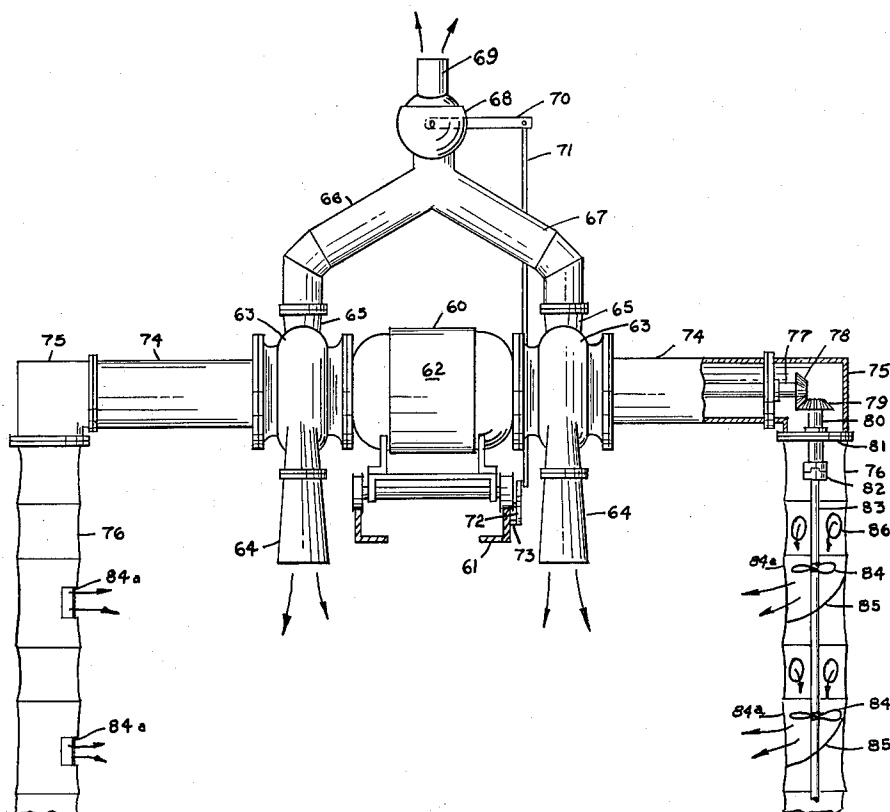


FIG. 7

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TRAVELING CLEANER

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10 Claims. (Cl. 15—312)

The present invention relates to cleaning apparatus for machinery and other equipment and relates more particularly to freely suspended means for generating and discharging a current of air at localized areas.

Presently, traveling cleaners in which a large motorized blower unit is supported move along a trackway suspended above the machinery to be cleaned. Discharge openings in a scroll or duct attempt to present adequate air under pressure at the required elevation but the inflexibility of the arrangements thus far utilized have made the installations of this equipment cumbersome and costly. Frequently a single impeller is employed to produce a large volume and high velocity of air which air will flow from a plenum chamber into various sheet metal outlet ducts which ducts due to their weight and inflexibility must be installed appreciably above the operating equipment. Remoteness of the impeller from the area to be cleaned requires greater motive power to produce adequate air volume and velocity for a specific application.

Therefore, it is an object of the present invention to provide a blower unit capable of discharging a volume of air at a specific elevation or a number of elevations with the blower unit being flexibly suspended.

Yet another object of the invention is to provide an apparatus for continuously discharging streams of air at selected elevations as well as along a floor surface.

Another object of the invention is the provision of a traveling cleaner for machinery in which a blower unit is suspended for flexible or unrestricted displacement about the position of suspension to discharge a stream of high velocity air at the desired elevation.

It is further contemplated to provide a traveling cleaner apparatus in which a plurality of blower units may be suspended freely at selected elevations from a traveling carriage by means of a flexible connection to produce a flow of a number of high velocity air streams.

Other objects and many of the attendant advantages of this invention for discharging high velocity streams of air for cleaning machinery at various elevations will become better understood from the following detailed description taken in conjunction with the accompanying drawings in which like characters of reference designate corresponding parts throughout the several views, and wherein:

FIG. 1 is an end elevational view of one embodiment of the present inventive concept with application to a spinning frame;

FIG. 2 is an enlarged partial longitudinal sectional view taken of the top portion of one blowing station within a flexible tubular casing;

FIG. 3 is an enlarged partial longitudinal sectional view of a modification of the blower units illustrated in FIG. 2 in which impeller blades are mounted in spaced vertical relationship;

FIG. 4 is a transverse sectional view taken substantially along the plane of section line 4—4 of FIG. 1;

FIG. 5 is a partial side elevational view illustrating a floor blower unit for attachment to the end of a flexible supporting means;

FIG. 6 is a transverse view of the floor blower unit taken substantially along the plane of section line 6—6 of FIG. 5;

FIG. 7 is a front elevational view of a modified form of combination traveling cleaner with portions of a suspended duct removed.

Referring to the drawings and particularly to FIG. 1

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there is illustrated an assembled cleaner traveling carriage 10 movable along a suspended trackway 11 by means of the carriage wheels 12 which trackway is suspended over a spinning frame 13 or other machinery to be cleaned by means of air streams passing thereover. The traveling carriage may be driven along the trackway by conventional means contained within the carriage housing 14 and this means does not constitute any portion of this invention. Conduit cross-arms 15 and 16 extend transversely from their mountings on the traveling carriage for a suitable distance beyond the carriage to receive a vertical duct 17 at the end thereof.

Each of the vertical ducts 17 mounted at the end of the cross-arm members 15 and 16 is connected to the cross-arm by means of a ring 18 or other suitable flange type connection. Although a fixed connection is illustrated, it is contemplated, where desirable that a swivel connection may be provided. Duct 17 extends vertically and is made of a woven tubular fabric that is freely displaceable or yieldable in any direction. To maintain the duct in extended substantially cylindrical contour, vertically spaced duct stiffener rings 18a or the equivalent may be provided to prevent collapse of the tube.

In the embodiment illustrated in FIGS. 1 and 2 there is included a plurality of individual motor driven fan blower units 19 each having a small motor 20 which drives an impeller within a scroll type casing 21. The motor driven fan units 19 are supported by suitable fastening means within the duct 17 in vertically selected spaced intervals depending upon the required discharge level for the air. The scroll casing 21 is provided with an outlet nozzle 22 that may be directed through an opening 23 within the vertical duct. Suitable vanes may be provided in the outlet opening or the duct to direct a stream of air discharged from the blower units. Electrical current may be supplied to the motors by means of the cable 24 which receives current from a bus bar (not shown) on the trackway. Cable 24 passes through a conduit cross-arm to the individual motors within the duct.

Air inlet openings 25 are provided in the duct 17 in spaced relation to the air intake of the blower casing 21. In some applications the terminal end 26 of the duct may be closed, and, in other instances an auxiliary blower unit may be used to blow lint or other material along the floor adjacent to the equipment or machinery.

One such modification to the terminal end of the duct to provide a floor sweeping unit 30 is illustrated in FIGS. 5 and 6. This floor sweeping unit 30 may be attached or assembled within the duct 17 at the lower end thereof so as to discharge air along the floor. In large spinning rooms the trackway is usually arranged in parallel runs and the machines in a bay will be cleaned prior to the carriage traveling to the next bay. Initially the blower unit at the floor will blow in one direction but as the carriage travels to the next bay the blower at the floor will blow in the opposite direction thus shifting any lint back to the original position. While the blower units in the higher levels of the duct may blow in opposite directions after making a traverse, the floor unit will have to continue to blow in a single direction. To carry out this objective the blower unit 30 is provided with a scroll casing 31 having double outlets 32 and 33 discharging in opposite directions. By means of the movable louvre baffles 34 and 35 in the outlets 32 and 33, respectively, the air stream direction may be controlled. Obviously, opening and closing or the sequential operation of the baffles 34 and 35 may be operated automatically by means of solenoids, micro-switches or by means of mechanical linkages.

Although it is preferred that individual motor blower units be employed within a vertical freely suspended duct, a vertically suspended strip may be used to fasten the

motors in vertical arrangement as well except that the casing of the units will be exposed. The objective sought is that the motors may be displaced freely upon striking an obstacle and then return to the desired vertical position as the carriage moves beyond the obstacle.

The use of individual motors as described above is most desirable, however, a single motor 40 may be supported in the hood 41 of a vertical duct, as shown in FIG. 3, with the motor being supplied with electrical current from the conductor leads 42 which leads communicate with a bus bar (not shown) at the trackway. The shaft 43 of the motor extends downwardly to drive a flexible shaft 44 that is suitably guided in spaced bearing plates, such as plate 45 supported in the duct 46. Propeller type blades 47 or impeller blades of other types may be mounted in spaced vertical relation within the duct on the flexible shaft. Expander sleeve members 48 are supported in the duct and surround the blades to eliminate the possibility of striking and cutting the fabric duct.

Division plates 49 are placed in the duct to baffle the flow of air outwardly from the duct through the discharge openings 50 therein. Air inlet openings 51 may be provided in the duct sleeve in spaced relation to the impellers.

A floor blowing unit as illustrated in FIGS. 5 and 6 may be assembled on the bottom end of the duct 46 and the blower unit will be driven by means of the flexible shaft.

A combination traveling blower unit is shown in FIG. 7 in which a traveling carriage 60 moves along an overhead track 61 with a motor 62 having a double end extending shaft for driving blower units adjacent to and distant from the motor. A double discharge scroll casing 63 is mounted on each end of the motor 62 which drives an impeller at each end thereof to discharge an air stream below the trackway from the discharge nozzle 64 and above the trackway from the discharge nozzle 65. Air discharged from the nozzles 65 at each end of the motor are conducted by means of the sheet metal ducts 66 and 67 to the plenum chamber 68 which will discharge the air upwardly from the pivotable nozzle 69.

It is frequently desirable to sweep a selected area above the trackway and by pivoting the discharge nozzle 69 through a selected arc the area above the trackway may be blown clean. The nozzle 69 is cooperatively received within the spherical plenum chamber. A projecting arm 70 is fastened to the nozzle 69 and a vertical link 71 is fastened at one end to the free end of the arm 70 with the other end of the link 71 fastened to an eccentrically mounted pin on the rotatable slotted wheel 72 which wheel is fastened to the carriage. As the carriage moves along the trackway, the wheel 72 will strike a cam plate 73 which plate will rotate the wheel through a predetermined arc of rotation thereby displacing the vertical link 71 which in turn will shift the end of the arm 70 to pivot the nozzle 69 to another position.

A duct 74 reaches from each scroll casing 63 and is provided with an elbow housing 75 to which is fastened a freely displaceable duct 76 similar to that described above in FIG. 3. A motor shaft extension 77 reaches horizontally into the housing 75 and has a bevel gear 78 mounted thereon to drive the bevel gear 79. Bevel gear 79 is supported on the vertical shaft 80 that is rotatably mounted in the plate flange 81. A coupling 82 connects the shaft 80 to the flexible shaft 83 on which flexible shaft there is mounted a plurality of vertically spaced impeller blades 84 for producing a flow of air in the duct which air will leave the duct through openings 84a therein to clean lint or other particles from machinery at selected levels. Suitable baffles 85 in the duct may lead the air from the duct to the discharge openings. Air inlet openings 86 are provided adjacent to the impellers.

It will be apparent that although the discharge openings are shown as blowing toward each other, the discharge of air may be located at any position. However, it is intended that the air stream may be generally hori-

zontal from the depending freely displaceable duct members. Floor cleaning units may be assembled at the ends of the flexible ducts of the type shown in FIG. 5.

Obviously many modifications and variations may be made in the construction and arrangement of the flexible or yieldable freely suspended duct and the disposition of the blowing units in the light of the above teachings without departing from the real spirit and purpose of this invention. It is, therefore, to be understood that within the scope of the appended claims many modified forms of structure as well as the use of mechanical equivalents may be reasonably included and modifications are contemplated.

What is claimed is:

1. Apparatus for cleaning machinery comprising a trackway supported over the machinery, a blower unit supporting carriage movable along the trackway, and a blower unit freely suspended from the carriage, said blower unit including a motor driven fan, a motor for driving said fan, and a freely flexible means including a substantially cylindrical housing for supporting the fan there within in spaced vertical relation to the carriage and aperture means for discharging air from the blower unit onto the machinery to be cleaned.

2. Apparatus for generating and discharging a current of air at machinery comprising a trackway supported above the machinery, a traveling carriage mounted on the trackway, a flexible housing suspended from the carriage, and a motor driven fan supported within the housing at a desired elevation, said housing having an aperture in juxtaposition to the fan, said fan discharging a stream of air substantially horizontally through said aperture and a motor for driving said fan.

3. Apparatus for generating and discharging a current of air at machinery comprising in combination a trackway supported above the machinery, a traveling carriage mounted on the trackway, a flexible tubular casing supported at one end for free vertical suspension, said casing having an air discharge opening therein, and an impeller mounted in the flexible tubular casing for rotation to discharge a stream of air from the discharge opening, said impeller being supported intermediate the length of the casing for free movement with the casing, and a motor for rotating said impeller.

4. In combination, apparatus for generating and discharging streams of air at high velocity to clean machinery comprising a trackway supported above the machinery, a traveling carriage mounted on the trackway, a flexible casing having air discharge openings therein suspended at the top thereof from the carriage and extending downwardly, said casing being readily yieldable upon striking objects during travel of the carriage, a plurality of motor driven impellers spaced vertically from each other within the flexible casing whereby said impellers may discharge high velocity air against or around the machinery at selected levels through the discharge openings, and means including a flexible shaft for rotating said impellers.

5. In combination, a trackway supported over machinery, a blower unit traveling carriage movable on said trackway, a blower unit secured to the carriage to travel therewith, said blower unit comprising a series of vertically spaced impellers, a flexible impeller supporting means for maintaining the impellers in vertical arrangement, said supporting means being suspended from the carriage to swing freely therefrom, a flexible casing suspended from the carriage to partially enclose said impellers, said casing having air discharge openings therein, and a motor for rotating said impellers to discharge individual streams of air directed through the discharge openings at different levels on the machinery.

6. In combination, a trackway mounted over machinery, a blower unit traveling carriage movable along the trackway, a cross-arm reaching transversely from the carriage,

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a freely flexible duct suspended from the cross-arm, said duct having discharge and intake openings therein in spaced vertical relation, a series of individual motor driven fans selectively spaced vertically from each other in said duct to discharge high velocity air through the discharge openings at the selected elevation and a motor for driving each of said fans.

7. For use in combination with a traveling carriage movable along an overhead track, a cleaning apparatus for cleaning machinery comprising a motor and a fan driven by said motor, a scroll encasing said fan and having a discharge nozzle therein to direct a stream of air toward the machinery, and a flexible vertical housing for freely suspending the motor fan and scroll therewithin, said housing having an air discharge opening in communication with the discharge nozzle.

8. For use in combination with a traveling carriage movable along an overhead track, a cleaning apparatus for cleaning machinery comprising a flexible fabric duct suspended from the carriage, said duct having at least vertically spaced air discharge openings therein, a motor mounted in said duct, a plurality of fan blades spaced vertically in said duct for rotation to discharge air through said air discharge openings, and a flexible shaft connecting said motor to said impellers for rotating said impellers.

9. For use in combination with a travelling carriage movable along an overhead track, a cleaning apparatus for cleaning machinery comprising a vertical flexible duct secured to the carriage, said duct having an air discharge

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opening at a selected position, and a motor driven fan and motor supported in said duct for flexible movement with said duct and for discharging a stream of air through the discharge opening.

10. Apparatus for cleaning machinery comprising a trackway supported over the machinery, a blower unit supporting carriage movable along the trackway, and a blower unit including a motor driven fan, a motor for driving the fan and a freely flexible casing for supporting the fan in spaced vertical relation to the carriage, said casing having an air discharge opening therein in juxtaposition with said fan, and said fan being displaceable upon deflection of the casing.

References Cited in the file of this patent

UNITED STATES PATENTS

1,078,609	Chaney	Nov. 18, 1913
1,273,077	Lund	July 16, 1918
1,332,875	Ainsworth	Mar. 9, 1920
1,392,029	Turner	Sept. 27, 1921
1,920,768	Smith	Aug. 1, 1933
2,063,874	Hodge	Dec. 8, 1936
2,291,546	George	July 28, 1942
2,291,598	Lawrence	Aug. 4, 1942
2,524,797	Holtzclaw	Oct. 10, 1950
2,610,349	Moore	Sept. 16, 1952
2,741,971	Wheeler	Apr. 17, 1956

FOREIGN PATENTS

500,204	Germany	June 19, 1930
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