

Sept. 16, 1952 R. T. MOORE 2,610,349
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LIKE FROM WALL SURFACES OF TEXTILE MILL ROOMS
Filed April 16, 1948 4 Sheets-Sheet 1

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Sept. 16, 1952

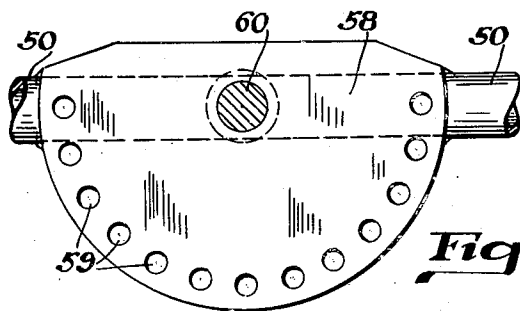
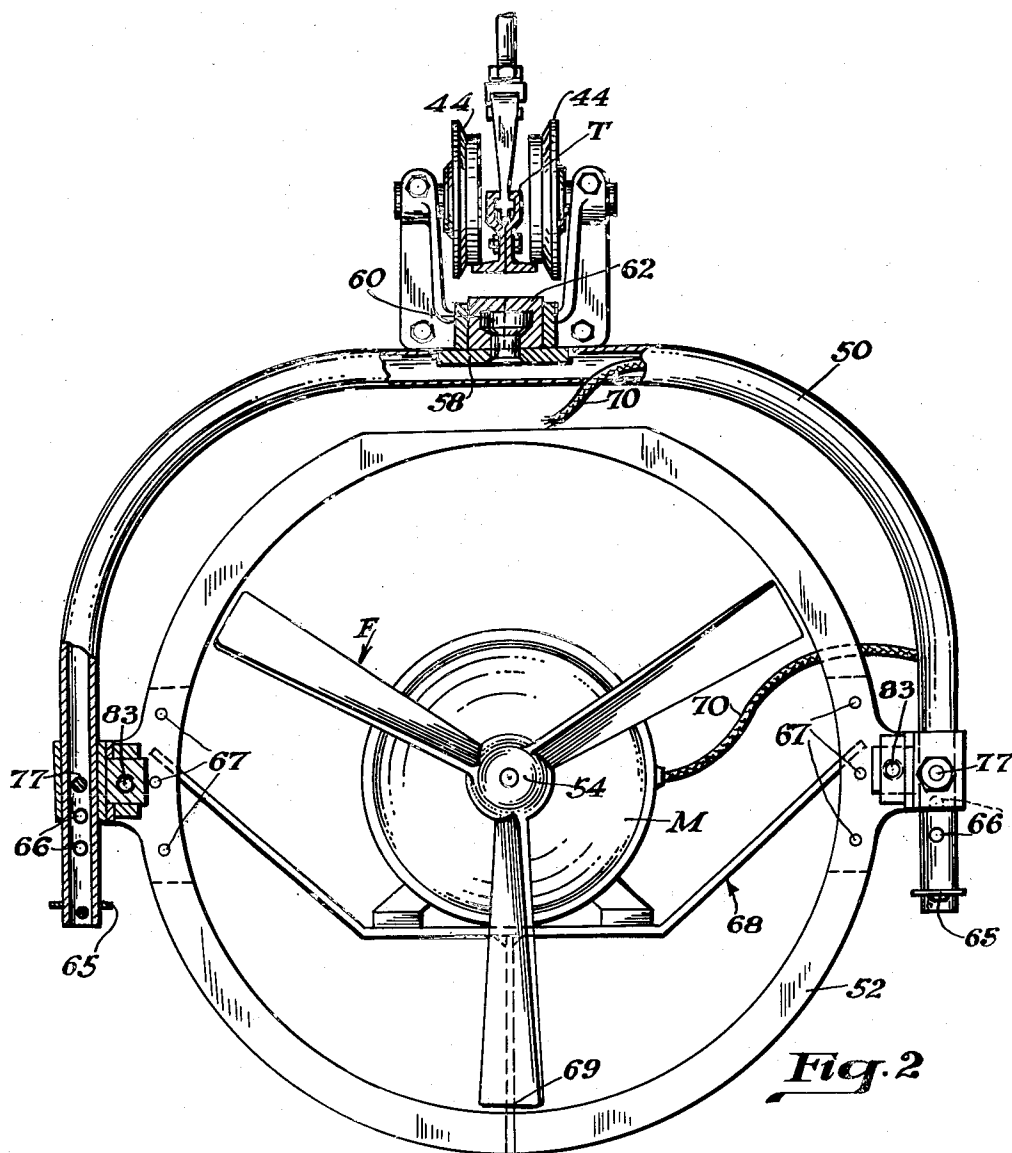
R. T. MOORE

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4 Sheets-Sheet 2



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Sept. 16, 1952

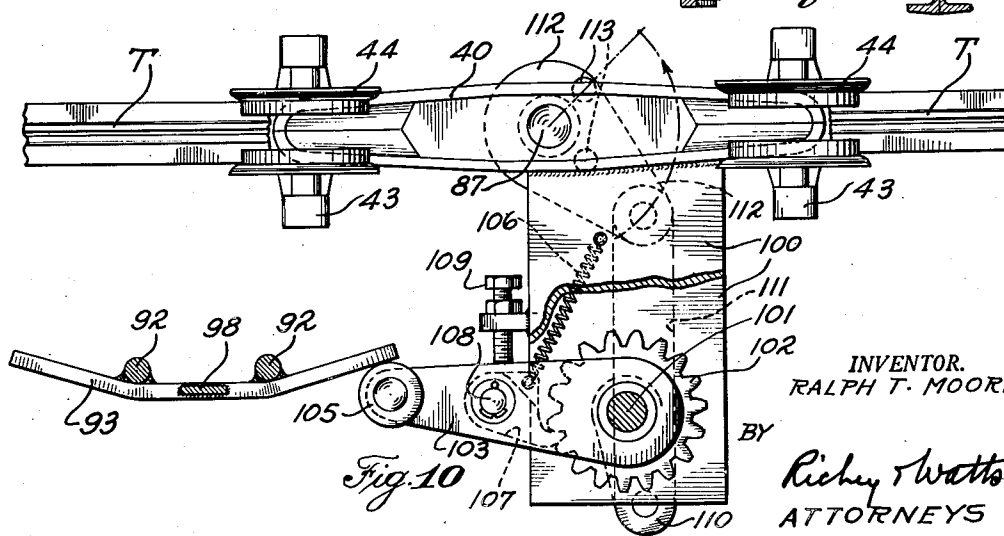
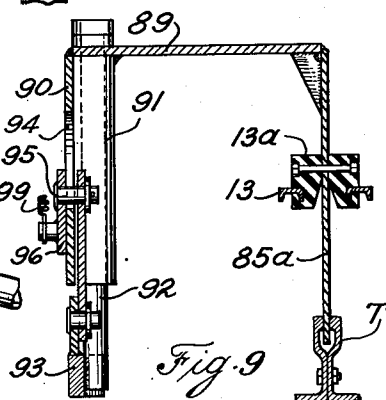
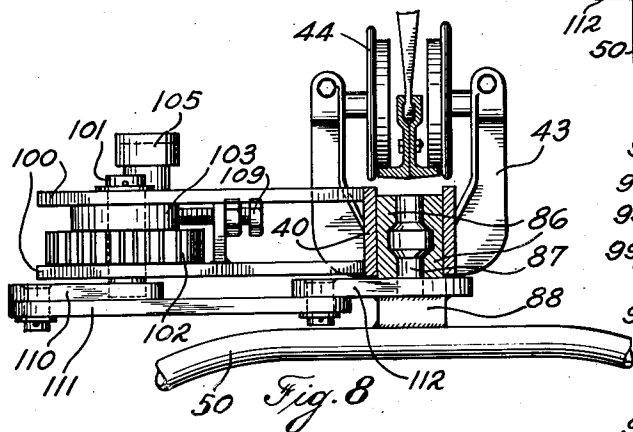
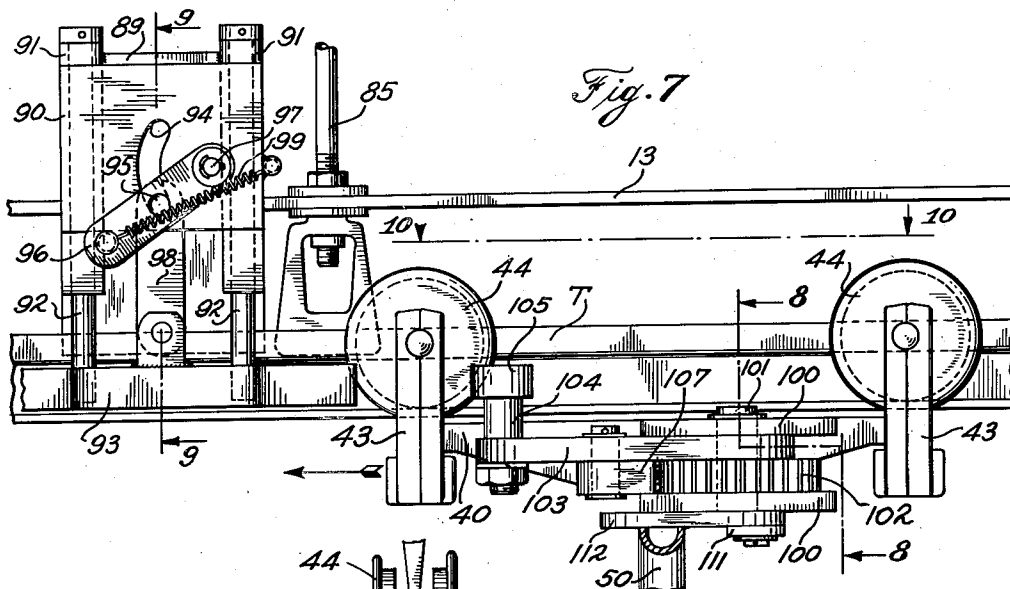
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4 Sheets-Sheet 4



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UNITED STATES PATENT OFFICE

2,610,349

SUSPENDED TRAVELING BLOWER FOR REMOVING LINT AND THE LIKE FROM WALL SURFACES OF TEXTILE MILL ROOMS

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Application April 16, 1948, Serial No. 21,441

7 Claims. (Cl. 15—312)

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The present invention relates generally to the art of removing loose foreign particles from surfaces, and is more particularly concerned with novel means for cleaning and maintaining clean the walls and ceilings of textile mill rooms.

In certain textile mill operations, particularly carding, lint, fly and dust are dispersed and rapidly accumulate on the ceilings and walls of rooms in which the operations are carried out. Within a short time after a carding operation is begun, these accumulations of lint, fly and dust become so great that pieces fall into textile machinery impairing the textile-making process and decreasing the efficiency of such machinery. This difficulty has long been recognized and others have sought to overcome it by blowers and other equipment specially designed to prevent accumulation of fly, dust and lint on structures above carding machines and the like. These devices have met with varying degrees of success but have involved as essential elements special baffles and other parts and have been of only limited effect in preventing the accumulations. Furthermore, the means by which ceiling cleaning previously has been carried out while sufficiently versatile for many requirements, always lacked the mobility which would make it ideally suited to cleaning tasks in textile mills of all ceiling types.

This invention is predicated on the discovery that such lint, fly and the like can be kept from accumulating on ceilings, side walls and other upright fixed objects of a card room or the like and can be collected on the floor of the room by means of a stream of air produced by a co-relation of the factors of velocity and angularity of the air stream and the time cycle of the blower which creates that stream. I have found that by means of such a stream of air the lint and the like may be kept in suspension in the air and may be prevented from accumulating in substantial amounts on those walls and objects and may be forced down toward the floor where it may collect.

The velocity of the air stream, when co-related with the other factors, should be high enough for the air stream to penetrate into static air at least far enough to reach, and to dislodge lint from, the walls and fixed objects. Since the ceilings or side walls or other fixed objects are usually not more than about 16 feet away from the blower, good results may be obtained by air streams having a velocity of about 1000 to about 1500 feet per minute at the surface to be cleaned which, for example, may be at a distance of about 16

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feet from the blower. An air stream having such a velocity will penetrate static air between the blower and the ceilings or side walls and will dislodge lint and the like therefrom. Velocities lower than about 1000 feet per minute are usually too low for efficient wall cleaning, while velocities above about 1500 feet per minute may produce undesired currents which may even injure the material being manufactured. A velocity of about 1200 feet per minute measured about 16 feet from the blower has given particularly good results in commercial operation when co-related with the other factors above mentioned.

The angularity of the air stream, when co-related with the other factors, should be that angle at which the air stream will flow smoothly along the surface to be cleaned and will exert wiping effect on the surface to dislodge lint and the like therefrom without creating any undesired turbulence. Good results have been obtained when the angle included between the air stream and the surface to be cleaned was between about 30° and about 60°, with particularly good results being obtained with included angles of about 40° when co-related with the other factors.

The time cycle of the blower, when co-related with the other factors, should be such that the air stream will penetrate the desired distance into substantially static air. This time cycle will vary from a maximum time interval when smooth walls only are being encountered by the air stream, to a minimum time interval when there are obstructions which will cause turbulence of the air or interfere with its smooth flow. When the walls are smooth and the air may flow along them uninterruptedly, the cleaning effect of the air stream may extend over a long distance ahead of the blower and hence the maximum time may elapse between successive trips of the blower past a given point. When the flow of the air stream is interfered with, as by obstructions along the walls, vertical posts, pipes and the like, the space ahead of the blower over which the air stream will have wall cleaning effect will be relatively short and hence it will be necessary for the blower to pass a given point more frequently than when smooth walls only are encountered. With each given velocity of air, the time cycle will vary because as the velocity increases the time cycle may be increased to obtain approximately the same penetration of the air stream in the static air. The time cycle of the blower may be such that the blower will pass a given point at least once every 15 minutes while traveling at a rate between about 80 feet and about 150 feet per min-

ute, with particularly good results having been obtained with a time cycle of 15 minutes and a blower speed of about 120 feet, when co-related with the other factors above mentioned. This blower speed is also desirable because it is a suitable speed at which to move a frame cleaner over spinning frames and the like.

The optimum co-relation of the foregoing factors is an air velocity of about 1200 feet per minute measured at a wall at a distance of about 16 feet from the blower, an included angle between the air stream and the wall to be cleaned of about 40° and a 15 minute time cycle of the blower traveling at about 120 feet per minute when a smooth wall is to be cleaned.

There are conditions under which it is desirable or even necessary that the air stream be directed at a different angle to the path of travel of the blower in successive movements of the blower around the same course. One such condition is where the air stream delivered by the blower in one setting cannot effectively clean the ceiling above the aisles on opposite sides of a line of machines. Unless the direction of the air stream is changed, parts of the ceiling will not be cleaned at all or all parts will not be cleaned to the desired extent. Another such condition is where there are side walls or other fixed vertical objects, such as posts, along the line of travel of the blower, and where the air stream from a single setting of the blower will not effectively clean the fixed objects on both sides of the line of travel of the blower.

Under these conditions it is desirable to shift the direction of the air stream from time to time and apparatus is provided by this invention for not only manual, but also automatic reciprocating of the blower step by step between two extreme predetermined positions to direct the air at various angles to the line of travel of the apparatus.

A further understanding of the novel means of this invention for carrying out this cleaning method may be gained by referring to the accompanying drawings, in which:

Fig. 1 is a side elevational view of a self-propelling blower fan assembly embodying this invention;

Fig. 2 in an end elevational view, with parts in section, of the blower fan of the assembly of Fig. 1;

Fig. 3 is a side elevational view, with parts in section, of the same blower fan assembly;

Fig. 4 is a plan view of a bracket for securing together the body and the fan hanger of the fan assembly of Fig. 2;

Fig. 5 is a plan view of a portion of a bracket for securing together the fan hanger and the ring frame of the assembly of Fig. 2;

Fig. 6 is a plan view of a trunnion fitting for engaging the bracket partially shown in Fig. 5;

Fig. 7 is a fragmentary side elevational view showing certain of the parts of the apparatus of Fig. 1 together with automatic blower positioning means;

Fig. 8 is a transverse sectional view partly in section taken on line 8—8 of Fig. 7;

Fig. 9 is a transverse vertical sectional view taken on line 9—9 of Fig. 7; and

Fig. 10 is a top plan view partly in section taken on line 10—10 of Fig. 7.

The apparatus of this invention generally comprises an endless track, a self-propelled blower unit supported by the track, a propeller fan adapted to discharge a stream of air in the di-

rection of the surfaces to be cleaned, and means for driving the fan.

The illustrated apparatus more specifically includes an endless track T disposed below the ceiling to be cleaned, a blower unit B supported by the track T, a propeller fan F disposed to discharge an air stream in a particular direction and at a particular velocity, and a motor M for driving the fan.

The self-propelling blower unit B includes a main frame 10 and upwardly extending yokes 11 pivotally secured thereto. The supporting wheels 12 are mounted on suitable bearings on yokes 11, and contact members are adapted to engage a current conducting trolley wire 13 which extends parallel to and above the track 14 and may be suitably supported in any convenient manner, as by hangers 15 secured to the ceiling. The driving motor 16 for the blower unit is vertically mounted on the frame 10 and is provided with a shaft which extends into a suitable gear box 19 from which a sprocket 20 is driven. A chain 21 extends from the sprocket 20 to an upper sprocket 22 which is adapted to drive an upper drive wheel 23 preferably mounted on the same shaft as sprocket 22. This drive wheel is frictionally engaged with the under side of the track T and propels the blower unit along the track according to the dictates of motor 16. A propeller fan 25 is mounted on the upwardly extending end 26 of the shaft of the motor 16 to direct a stream of air upwardly against the track and trolley wire immediately above, thereby to maintain the track and wire substantially free of fly, etc.

The frame 10 is provided with a vertically disposed plate-like bracket 31 to which a box 32 housing control mechanism for the motors 16 and M is attached by suitable means. A connecting bar 35 having apertured end portions is attached to the body 10 by means of a pin 37 extending through one of said apertures in bar 35 and engaging said body. The other end of the bar is likewise attached to the fan assembly by means of a pin 38.

The fan assembly comprises a load bar 40 extending substantially horizontally between and connecting two upwardly extending wheel yokes 43 to which wheels 44 are attached by suitable bearings. The pin 38 is secured to one end of said bar. The bar is provided with a downwardly extending portion 45 having a threaded aperture, and in its middle portion defines a vertically disposed aperture.

The propeller fan F of this apparatus is incorporated in an assembly depending from bar 40 and comprising a hanger 50, a ring frame 52 disposed around the periphery of fan F, and an electric motor M secured to frame 52 and having a rotor shaft 54 keyed to the fan.

The hanger 50 is tubular and of generally U-shape, and is normally disposed with end portions pointing down, as shown in Fig. 2. The top mid-portion of the hanger is provided with a plate-like bracket 58 having a plurality of apertures 59 spaced around a 180° arc in its outer edge portion, and having a knob-like pin 60 secured to the inner edge portion over the hanger. The hanger is pivotally secured to load bar 40 by means of a pair of blocks 62 adapted to cooperate in engaging pin 60 and by means of pins 63 disposed through said blocks and appropriate apertures in the sides of bar 40. The hanger is secured in position relative to bar 40 by means of a stud 64 extending through one of the apertures 59 and threaded into the aperture 46 in portion 45. The

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ends of the hanger are fitted with washers 65 secured in place by means of cotter pins extending through suitable transverse apertures 66 in the hanger.

The ring frame 52 comprises a metal sheet of frusto-conical shape defining an inlet Venturi for fan F. Frame 52 is disposed around the periphery of fan F to guide air into fan F, which is disposed at the throat of the Venturi, and is provided with a flanged top or leading edge. Six apertures 67 are provided at substantially diametrically opposite points in groups of three in the flanged portions of the ring frame. A sheet metal frame 68 for supporting motor M is secured to the frame 52, extending across frame 52 in a generally U-shaped form with end portions welded at substantially diametrically opposite points on frame 52. A sheet metal member 69 is secured at its ends to the mid-section of motor frame 68 and to the portion of frame 52 adjacent thereto. Member 69 is included to increase the stability and load carrying capacity of frame 68.

Motor M is disposed substantially at right angles to the plane of rotation of fan F and is secured to and supported by frame 68. The rotor shaft 54 is disposed co-axially with fan F and is keyed thereto. Lines 70 for delivering electricity to motor M extend from the control box 32 through hanger 50 to said motor.

The hanger 50 and ring frame 52 are secured together for rotation of the ring frame relative to the hanger by means of a pair of trunnions 73 and a pair of brackets 74 adapted to be engaged with said trunnions. Each trunnion 73 is provided with an aperture 75 to receive an end of the hanger and with an aperture 76 extending at substantially right angles to aperture 75 to receive a pin 77 disposed through an appropriate transverse aperture in a lower end portion of the hanger. The brackets 74 are each provided with three apertures for registry with the apertures 67 and are secured to the ring frame 52 by means of pins 78. The brackets are each further provided with an enlarged portion 79 having a recess for receiving one of the trunnions. A transverse aperture 81 is provided in each bracket to receive a set screw 83 to prevent relative movement of the bracket and trunnion when such movement is not desired.

It will be understood from the foregoing description and the accompanying drawings that the hanger 50 includes an intermediate portion and downwardly extending end portions, all lying in a vertical plane with the hanger being supported by the trolley for rotation about a vertical axis lying in the plane of said hanger. As shown in Figure 3 a ring is positionable parallel to and at one side of the hanger plane and has diametrically opposite brackets extending from the ring towards the hanger and connected to the end portions of the hanger for rotational movement about a horizontal axis lying in the hanger plane. The motor is supported by a frame which is connected to the ring and is positioned in the hanger plane and extends on either side thereof and projects beyond opposite sides of the hanger plane with the motor shaft being substantially coaxial with the ring and extending towards the ring and with a frusto-conical wall attached to the ring extending past the fan towards the hanger when the parts are positioned as shown in Figure 3.

This arrangement of parts results in a construction which is approximately balanced. That

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is, the weight of the motor on one side of the hanger plane is approximately balanced by the weight of the ring, the frusto-conical wall, the brackets, the fan and the part of the motor which lies on the other side of the hanger plane.

In the operation of the illustrated apparatus to maintain clean ceiling and wall portions of a textile mill card room, the propeller fan is adjusted to deliver an air stream in the desired direction and the fan is started by manipulation of the controls in the box 32. With the fan delivering an air stream of the required velocity, the blower unit is started upon its course around the endless track at a rate determined by regulation of the controls. The blower unit is maintained in motion so long as cleaning of the ceiling and upper wall portions is required due to carding resulting in dispersion of fly, dust and lint in quantities sufficient to require constant air agitation. Without any attention, the blower unit will automatically travel the endless track continuously for protracted periods of time. When the unit is to be stopped for inspection, service, or because carding operations have ceased, the control levers are appropriately manipulated or the electric current flow into the trolley lines is cut off.

Adjustments in the position of the fan F relative to load bar 40 and the ceiling and walls of the room to be cleaned by the fan, may be made by raising or lowering the ring frame 52 relative to the hanger 50. Also, by loosening set screws 83 the fan may be moved through substantially 360° with the ring frame relative to the hanger and by tightening the set screws when the fan is in a predetermined position relative to the hanger, the fan may be fixed in position to direct air at a predetermined desired angle to the hanger and wall and ceiling surfaces to be cleaned. In addition, by removing stud 64 from aperture 46 the hanger and fan may be moved relative to the load bar 40 through 180° in either direction, i. e., a total of 360°, the pin 60 being rotatably mounted in load bar 40. The hanger and fan may be fixed in any one of three different positions relative to the ceiling and wall portions to be cleaned by disposing the pins 77 through any one of the apertures 66 and positioning stud 64 in one of the apertures 59 in bracket 58 and securing it in the aperture 46 in portion 45 of the load bar 40, as described.

It is thus clear that the novel fan of this invention is rotatable through 360° about each of two different axes disposed at substantially right angles to each other and may be temporarily securely fixed in any one of a variety of positions relative to a surface to be cleaned in accordance with the method of this invention.

The apparatus shown in Figs. 7 to 10 inclusive, may be generally similar to that shown in Fig. 1 but embodies means for automatically shifting the blower step by step from a position to discharge air at an extreme angle to one side of the track to a corresponding extreme angle on the other side of the track.

The apparatus of these figures comprises a rail T, like that shown in Fig. 1, hanger 85 to suspend the track T from the ceiling or an overhead support, and a trolley assembly comprising a load bar 40, wheel yokes 43 and wheels 44 which run on the lower flanges of the rail T, and means such as pin 38 for connecting the assembly to the propelling means, such as unit B of Fig. 1. Bus bars 43 are supported above rail T

by insulators 13a which are, in turn, carried by hangers 85 and by a plate 85a.

The trolley load bar 40 carries two blocks 86 which are provided with a shouldered recess in which is retained a pin 87, to the lower end of which is connected a spacer block 88, from which is suspended a blower frame 50. This frame and the blower carried thereby, and its pertinent parts, may be the same as is shown in Figs. 2 and 3.

The apparatus for shifting the position of the blower step by step comprises actuating mechanism disposed on one side of the rail, and actuated mechanism carried by the load bar for movement by said actuating mechanism to shift the blower.

The actuating mechanism is illustrated in Figs. 7, 9 and 10. It comprises a plate 89 extending laterally from bus bar supporting plate 85a. At its outer end, plate 89 is attached to a vertical plate 90 which carries two parallel vertical tubes 91 in which rods 92, connected at their lower ends to a cam or shoe 93, may slide vertically. Plate 90 is provided with an arc-shaped slot 94 to receive a pin 95 which extends through a lever 96 pivoted on pin 97 carried by plate 90. Pin 95 is pivoted to the upper end of vertical lever 98 which is pivotally connected at its lower end to cam or shoe 93. Spring 99, anchored to plate 90 and lever 96, serves to maintain pin 95 at either end of slot 94. In the position shown in Fig. 7, pin 95 is at the lower end of slot 94 and shoe 93 is in a horizontal plane where it will engage with parts carried by the load bar. When the shoe 93 is lifted so that pin 95 is in the upper end of slot 94, the shoe will be out of possible contact with the blower frame shift means carried by the load bar. By reason of the location of spring 99 and its anchor points, the shoe may be maintained in either the upper or down position.

The blower frame actuating means carried by the load bar includes the following parts: A pair of parallel upper and lower plates 100 extend laterally out from load bar 40 on the side of the rail on which the actuating mechanism, above described, is positioned. A pin 101 extends vertically through plates 100. Between these plates gear 102 is keyed to pin 101 while one end of lever 103 is rotatably mounted on that pin. Lever 103 has an upstanding post 104 at its free end and is there provided with a roller 105 which will engage with shoe 93 when the latter is in its lowermost position. Tension spring 106 is anchored at one end to upper plate 100 and at its other end it is anchored to dog 107 which is rotatably mounted on pin 108 carried by lever 103. Dog 107 is positioned beneath lever 103 in position to engage with the teeth of gear 102. An adjustable stop 109 serves to limit the retracted position of lever 103 caused by contraction of spring 106.

At its lower end pin 101 is keyed to one end of a short lever 110. A link 111 is pivotally connected to the other end of lever 110 and is also pivotally connected to long lever 112 which is fixedly attached to filler block 88 about pin 87 of the blower frame. If desired, lever 112 may be provided with depressions into which may project spring-pressed steel balls or pins carried in recess in load bar 40. Such apparatus is indicated diagrammatically at 113 in Fig. 10. These balls or pins and depressions serve to retain the blower frame in one position until it is positively shifted to another position where it may be re-

tained by this mechanism until subsequently shifted.

The operation of the apparatus of Figs. 7 to 10 is quite like that of the apparatus of Figs. 1 to 6, the main difference being in that the shifting is automatically performed. Assuming that the actuating mechanism is in the position shown in Figs. 7 and 10, i. e., with the shoe 93 in the same horizontal plane with roller 105, and also assuming that there is only one such actuating mechanism in a single endless loop of track, and assuming that the blower frame is being propelled along the track, it will be understood that the following operation takes place: When roller 105 contacts the shoe 93, the roller runs along the shoe and gradually moves lever 103 and thereby rotates pin 101 and gear 102. Such movement also rotates short lever 110 and moves link 111 and rotates long lever 112 upwardly (as viewed in Fig. 10) or toward the right (as viewed in Fig. 8). The extent to which lever 103 is moved by shoe 93 is sufficient to shift lever 112 a predetermined number of degrees and to move one recess thereof away from contact with the positioning spring-pressed ball or pin and to bring the next recess into contact with such positioning means. Coincident with this rotational movement of lever 112, frame 50, and the fan carried thereby, is shifted to a corresponding extent. When roller 105 passes beyond shoe 93, spring 106 retracts lever 103 and dog 107 is retracted relative to gear 102 to engage the following tooth. The gear 102 and levers 110, 111 and 112 remain in that actuated position until roller 105 again encounters shoe 93, whereupon the foregoing operation takes place. In this way the angle of the air stream to the rail is shifted one step for each time the device travels around the endless track.

It will be noted that the short lever 110, long lever 112 and link 111 are positioned relative to each other so that lever 110 will make a half revolution while lever 112 is moving from one to the other of the two extreme positions illustrated in Fig. 10, i. e., from an extreme position on one side of the center line of the track to a corresponding extreme position on the other side of the track. It follows, therefore, that during the second half revolution of lever 110 the lever 112 will be retracted step by step from its extreme position on the far side of the track to its original starting position.

Since the frame 50 is actuated as just described, the direction of the stream of air delivered by the fan carried by that frame will likewise be shifted. It will be understood that in most cases it will be convenient and satisfactory to shift the blower frame from one position to another position only once during the time the blower is traveling around a single looped track. However, the number of positions to which the blower frame may be shifted may be varied as desired and depending upon operating conditions. Ordinarily, six or eight different positions for the blower frame are sufficient. When the air stream is to be shifted from one extreme position where it makes an angle of 60° with a vertical wall on one side of the track to the other extreme position where it makes an angle of 60° with another vertical wall on the opposite side of the track, the angle between these extreme positions is only 120° and the air stream can be shifted through that angularity in eight steps of 15° each or six steps of 20° each. Of course, it will be understood that the angularity of the air stream to

vertical side walls may be altered as above described and also that the angularity to the ceiling may be selected and changed as above described. By using more than one actuating mechanism with one loop of track the fan may be shifted more frequently. Obviously, several blowers may be used on one loop of track if it is long enough to make the use of a plurality of fans desirable and in that case a plurality of actuating mechanism may be used to advantage.

This is a continuation-in-part of my copending application, Serial No. 707,064, filed November 1, 1946, now abandoned.

Having thus described the present invention so that others skilled in the art may be able to understand and practice the same, I state that what I desire to secure by Letters Patent is defined in what is claimed.

What is claimed is:

1. Cleaning apparatus for use in cleaning wall surfaces in a textile mill comprising a trolley to run on an overhead track adjacent to the wall surfaces to be cleaned, a blower frame supported by said trolley and movable therewith along said track, said frame being adjustable about a vertical axis to direct an air stream against said wall surfaces to be cleaned ahead of the blower frame at an included angle of between about 30° and about 60° with the surface being cleaned, means to shift the frame back and forth between two extreme predetermined positions, said means including actuating mechanism, positioned on one side of said track and actuated mechanism including a pivoted lever supported by the trolley and engageable with said actuating mechanism, a long lever fixed to said frame, and means for transmitting motion from the said pivoted lever to said long lever including a short lever actuated by said pivoted lever and a link connecting said long and short levers, a blower fan supported by the frame, said fan being tiltable on a horizontal axis between an upper extreme position above said horizontal axis and a lower extreme position, and means associated with said frame and fan to maintain the fan in a predetermined position between said upper and lower extreme positions.

2. Cleaning apparatus for use in cleaning wall surfaces in a textile mill comprising a trolley to run on an overhead track adjacent to the wall surfaces to be cleaned, a blower frame supported by said trolley and movable therewith along said track, said frame being adjustable about a vertical axis to direct an air stream against said wall surfaces to be cleaned ahead of the blower frame at an included angle of between about 30° and about 60° with the surface being cleaned, means to rotate the blower frame stepwise to direct the airstream therefrom at different angles to the track, said means including a shoe positioned at one side of the track, a first lever fixedly secured to said frame, a second pivoted lever engageable with said shoe and means including a third lever shorter than said first lever and a link connected to said first and third levers and operatively associated with said second lever for actuation thereby, a blower fan supported by the frame, said fan being tiltable on a horizontal axis between an upper extreme position above said horizontal axis and a lower extreme position, and means associated with said frame and fan to maintain the fan in a predetermined position between said upper and lower extreme positions.

3. Apparatus for removing lint and the like from the surfaces of side walls and ceilings of a textile mill room comprising a trolley to run on

an overhead track adjacent to at least one surface to be cleaned, an inverted U-shaped hanger suspended from said trolley and rotatable about a vertical axis, an annulus mounted in said hanger and rotatable about a horizontal axis, a motor, means within said annulus for supporting said motor with its shaft substantially coaxial with said annulus, a fan on the motor shaft and disposed within said annulus, said annulus serving to direct air into said fan, and means for reciprocating said hanger about a vertical axis through an angle of about 120°, said means comprising a lever connected to said hanger, a shorter lever, means rotatably supporting said shorter lever and supported by said trolley, a link connecting the free ends of said levers, and means for rotating said shorter lever.

4. Apparatus for removing lint and the like from the surfaces of side walls and ceilings of a textile mill room comprising a trolley to run on an overhead track adjacent to at least one surface to be cleaned, an inverted U-shaped hanger suspended from said trolley and rotatable about a vertical axis, a ring mounted in said hanger and rotatable about a horizontal axis, a motor, means within said ring for supporting said motor with its shaft substantially coaxial with said ring, a fan on the motor shaft, a frusto-conical member connected to said ring encircling said fan and serving to direct air into said fan, and means for rotating said hanger step by step about a vertical axis through an angle of about 120°, said means comprising a lever connected to said hanger, a shorter lever, means rotatably supporting said shorter lever and supported rotatably by said trolley, a link connecting the free ends of said levers, and means for rotating said shorter lever successively through small angles less than about 120°.

5. Apparatus for removing lint and the like from the surfaces of side walls and ceilings of a textile mill room comprising a trolley to run on an overhead track adjacent to at least one surface to be cleaned, an inverted U-shaped hanger suspended from said trolley and rotatable about a vertical axis, an annulus mounted in said hanger and rotatable about a horizontal axis, a motor, means within said annulus for supporting said motor with its shaft substantially coaxial with said annulus, a fan on the motor shaft and disposed within said annulus, said annulus serving to direct air into said fan, and means for rotating said hanger about a vertical axis through an angle of about 120°, a bracket projecting laterally from said trolley, a lever connected to said hanger, a shaft rotatably carried by said bracket, a shorter lever keyed to said shaft, a link connecting the free ends of said levers, a gear keyed to said shaft, a lever rotatable about said shaft, and a dog carried by said last named lever and engageable with the teeth of said gear to rotate the gear when the last named lever is rotated in one direction.

6. Apparatus for removing lint and the like from the surfaces of the walls and ceilings of textile mill rooms comprising trolley means to run on an overhead track adjacent to at least one surface to be cleaned, an inverted U-shaped hanger including an intermediate portion and downwardly extending end portions lying in a vertical plane, means connecting substantially the midpoint of said intermediate portion to said trolley means for rotational movement of the hanger about a vertical axis lying in said plane, a ring positionable on one side of and parallel to

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said hanger plane, brackets extending from diametrically opposite sides of said ring toward said hanger, pivots connecting said brackets to said hanger for rotation about a horizontal axis in the plane of the latter, means for securing the brackets in a selected position of adjustment about said axis, a motor support frame connected to said ring, a motor on said frame within and projecting beyond opposite sides of said hanger plane and having its shaft substantially coaxial with said ring and extending toward the plane of said ring, a fan on said shaft adjacent to said ring, a frusto-conical wall attached to said ring and extending past said fan toward the hanger plane to direct air into said fan, and means for rotating said hanger about said vertical axis including a member operatively associated with said hanger and engageable with an abutment fixed in position adjacent to said track.

7. Apparatus for removing lint and the like from the surfaces of side walls and ceiling of a textile mill room comprising wheels arranged in pairs to run on an overhead track adjacent to at least one surface to be cleaned, a yoke depending from and connecting each pair of wheels and a load bar connecting said yokes and carrying a pair of bearing blocks, having their opposed surfaces recessed to receive and support a headed

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member; an inverted U-shaped hanger having a headed member projecting from its midportion upwardly between said bearing blocks in said recess and supported by said blocks for rotation about a vertical axis, an annulus, bearing means connecting the end portions of said hanger to opposite sides of said annulus for rotation of the latter about a horizontal axis, a motor, means connected to said annulus adjacent to said bearing means for supporting said motor with its shaft substantially coaxial with said annulus, and a fan on the motor shaft disposed within said annulus, the latter serving to direct air into said fan.

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REFERENCES CITED

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

UNITED STATES PATENTS

Number	Name	Date
829,319	Cessna	Aug. 21, 1906
1,339,182	Farrell	May 4, 1920
1,517,961	Cummings	Dec. 2, 1924
2,179,976	Easley	Nov. 14, 1939
2,183,758	Walker	Dec. 19, 1939
2,225,406	Anderson	Dec. 17, 1940