

Sept. 26, 1961

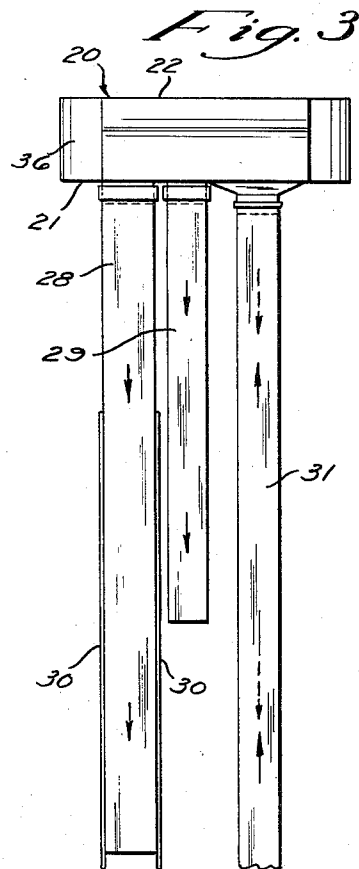
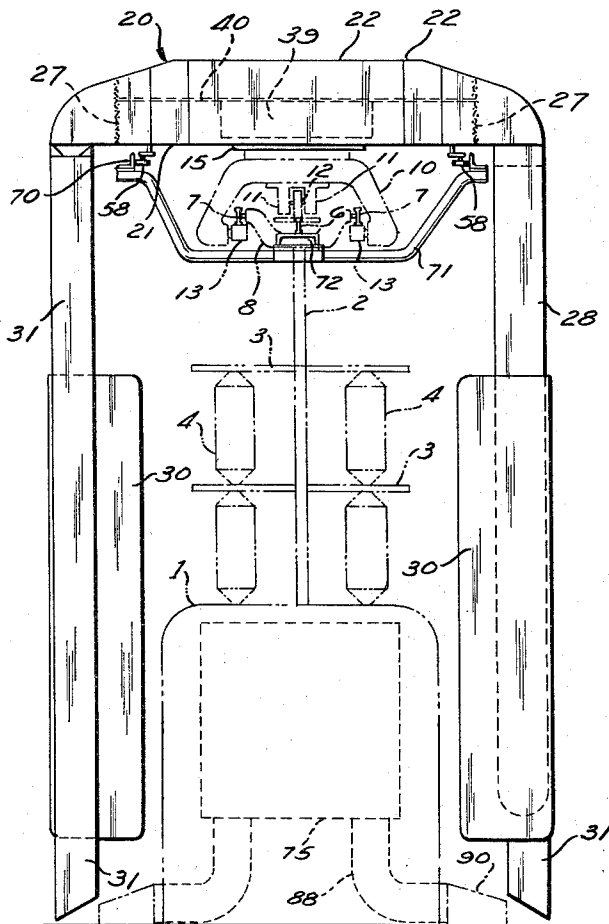
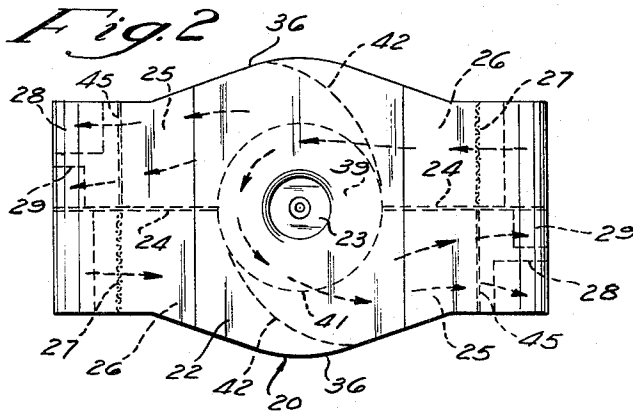
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3,001,222

VACUUM CLEANER FOR TEXTILE MACHINES

Filed Sept. 25, 1959

3 Sheets-Sheet 1



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3 Sheets-Sheet 2

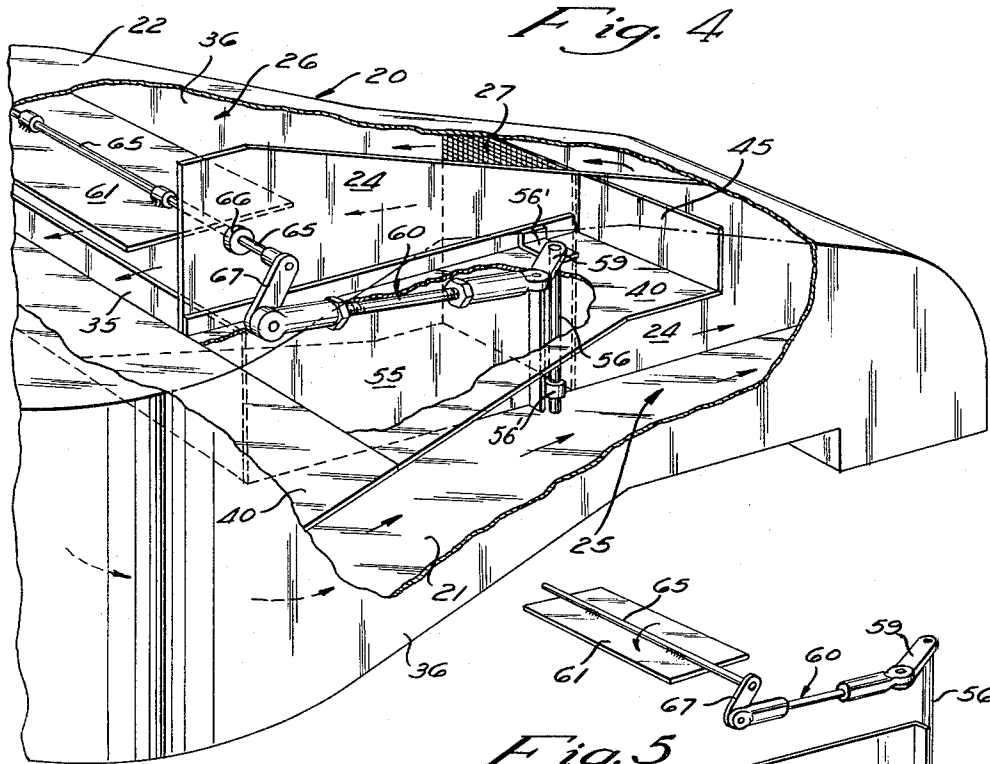


Fig. 5

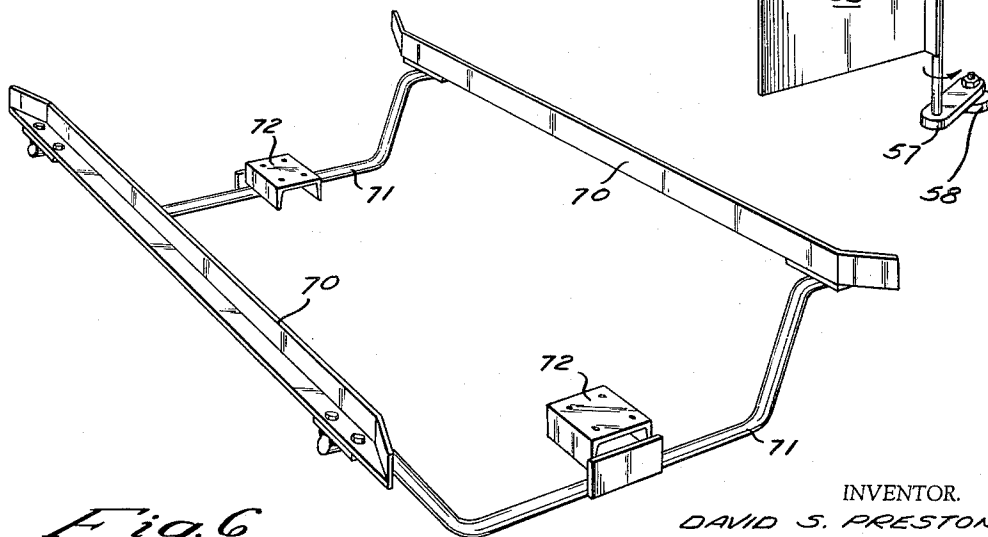


Fig. 6

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3 Sheets-Sheet 3

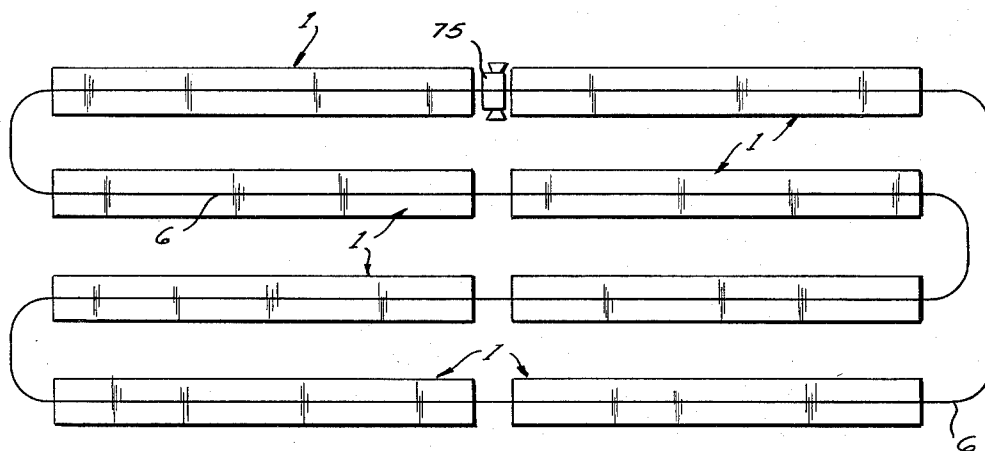


Fig. 7

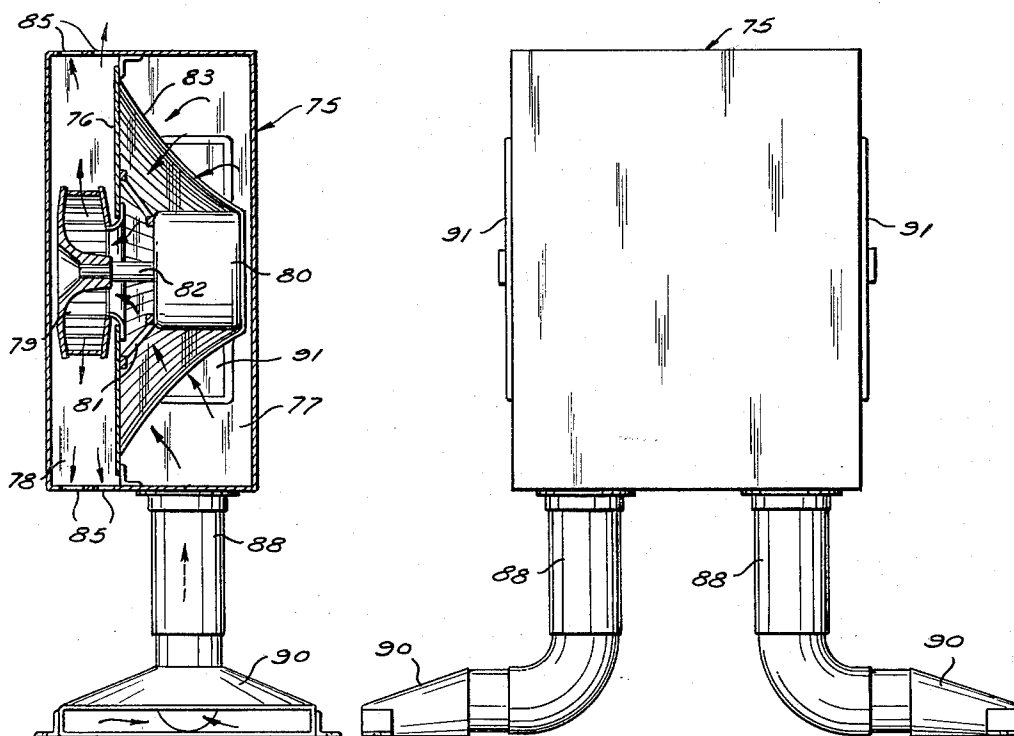


Fig. 9

Fig. 8

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VACUUM CLEANER FOR TEXTILE MACHINES
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5 Claims. (Cl. 15—312)

This invention relates to the textile cleaning art and is particularly concerned with new apparatus for dislodging lint from textile machines, picking up and collecting such dislodged lint and periodically transferring the collected lint into a storage box.

The problem of cleaning textile machines, that is, freeing them and keeping them free of lint, is of long standing but certain parts of the problems have been solved satisfactorily heretofore, particularly the dislodging of lint from textile machines. However, the apparatus used for dislodging the lint made no provision for collecting the lint so dislodged. As a result the dislodged lint was free to float around in the air with some of it coming to rest on the machines and other parts of it collecting on the floor whence it had to be removed, usually by sweepers, and in a dirty condition which made it unfit for reworking into yarn.

More recently, apparatus has been devised for collecting lint floating in the air and lying of the floor of a textile machine room, with or without means for dislodging lint from the textile machines but such apparatus lacked means for automatically removing the collected lint to storage.

The present invention is embodied in apparatus which dislodges, picks up, collects and transfers lint to storage in a textile machine room and is predicated on the new principle of utilizing a fan or blower wheel to create, simultaneously, a high pressure air stream flowing in a conduit to dislodge lint from textile machines, a vacuum created low pressure air stream flowing in another conduit for picking up lint from the floor of the textile machine room and deposit it in a collecting chamber, periodically using the high pressure stream of air to discharge the collected lint through the low pressure conduit, and suction means to transport such discharged lint into a storage box.

The present invention will be better understood by those skilled in the art from the following specification, reference being had thereto to the drawings accompanying and forming a part thereof, in which:

FIGURE 1 is an end elevational view of apparatus embodying the present invention in its operative position relative to a spinning machine which is shown in phantom;

FIGURE 2 is a top plan view of the apparatus of FIGURE 1 with certain hidden parts indicated by dotted lines and with arrows indicating the direction of flow of air streams therein;

FIGURE 3 is a side elevational view of the apparatus of FIGURE 1 showing parts of the high pressure and low pressure conduits;

FIGURE 4 is a fragmentary perspective view with parts broken away and showing the interior construction of the casing of the apparatus of FIGURES 1 to 3;

FIGURE 5 is a perspective view of the two doors mounted within the casing of the apparatus of FIGURE 1;

FIGURE 6 is a perspective view of the means by which the doors of FIGURE 5 are actuated;

FIGURE 7 is a schematic plan view layout of a plurality of textile machines and the suction storage box, and

FIGURES 8 and 9 are, respectively, side elevational central vertical cross sectional views of the suction storage box and associated parts.

In FIGURE 1 the end of a spinning frame is shown in

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phantom at 1. It includes a plurality of track supports 2, reel boards 3 and roving packages 4. A track which extends in a loop over a plurality of aligned machines 1 consists of a middle rail 6 and side rails 7 fixed to arms 8 on supports 2. A traveling unit is mounted to run on the trackway and comprises two trucks 10, each of which is provided with depending brackets 11 in which is rotatably mounted a support wheel 12 to run on the top of rail 6. The ends of the trucks extend downwardly and carry rollers 13 which bear against the underside of rails 7 to prevent tilting of the traveling unit.

Trucks 10 are pivotally connected by a plate 15 and a motor (not shown) is attached to the underside of plate 15 between trucks 10. The rotor shaft of this motor extends up into a housing 20 which is supported on plate 15 and is equipped with a centrifugal fan (not shown) positioned within the casing.

The traveling unit, just described, may be substantially like that disclosed in U.S. Patent No. 2,851,716, issued September 16, 1958.

The casing 20 extends transversely of the row of machines 1 and its interior is divided into a plurality of chambers and passages by means of walls. The bottom wall 21 of the casing is substantially continuous, as is also the top wall 22 except for an access opening 23 above the fan, which opening is totally or partially closed by a cover when the apparatus is in use.

Vertical walls 24, joined to bottom and top walls 21 and 22, extend inwardly from the ends of the casing and form parallel outlet and inlet passages 25 and 26. Screens 27 extend across the inlet passages 26. At their outer ends, outlet passages 25 communicate with downwardly extending flexible tubes or boots 28 and 29 having openings (not shown) in the sides facing machines 1 for egress of air flowing under pressure or considerable velocity toward the machines to dislodge lint therefrom. Flaps 30 on boots 28 prevent parts of the machine from catching in the egress holes in boots 28 and damaging them.

Inlet passages 26 communicate at their outer ends with depending flexible tubes or boots 31 having open ends close to the floor. Vertical walls 35 extend across the inner ends of inlet passages 26 from the adjacent side walls 36 of the casing to partition wall 24 and from bottom wall 21 to top wall 22 of the casing, thus completely closing the inner ends of the inlet passages. The upper parts of these walls 35 are provided with doors, presently to be described.

The inner ends of outlet passages 25 open out of a fan chamber 39 which is defined by the bottom and side walls 21 and 36 of the casing, and a horizontal wall 40 which extends between side walls 35 and walls 36. Wall 40 has a central opening 41. Vertical volute walls 42 within the fan chamber 39 serve to direct air under high pressure and velocity into the entry ends of outlet passages 25.

Wall 40 is extended lengthwise in passages 25 and intersects with vertical walls 45 which join walls 36, 40, 22 and 24 thereby defining a closed chamber in which most of the door actuating mechanism is located.

The space between side walls 36, top wall 22 and horizontal wall 40 is the vacuum chamber. It communicates through opening 41 with the fan chamber 39 and with the inner ends of inlet passages 26 through the door controlled openings in walls 35.

Vertical walls 24 are provided with doors 55 between each screen 27 and the adjacent wall 35. Each door 55 is mounted on a vertical shaft 56 which is rotatably carried in suitable bearings supported by brackets 56' from partition wall 24. Each shaft 56 extends down through bottom wall 21 of housing 20 and at its lower end is provided with a crank arm 57 which carries a cam roller 58. Shaft 56 extends up through horizontal wall 40, and

at its upper end is provided with a crank arm 59 which is pivotally connected to a turn buckle type rod end unit 60. Door 61 is mounted on a rotatable shaft 65 which is supported in bearings 66 in the adjacent outer side wall 36 of the casing and in vertical wall 24 above horizontal wall 40 and at its inner end carries a crank arm 67 which is pivotally connected to the other end of rod end unit 60.

Means for actuating doors 55 and 61 is indicated in FIGURE 1 and is shown in more detail in FIGURE 6. That means includes a pair of cam rails 70 which are substantially parallel, and are supported by transverse arms 71 attached to the rail-supporting structure, parts of which are brackets 72. Cam rails 70 are so positioned that they will be engaged by cam rollers 58 when the traveling unit moves into position over the cam rails, and such engagement of rails 70 and rollers 58 will rotate shafts 56 and 65 with resultant opening of doors 55 and closing of doors 61. Spring means (not shown) of any suitable shape and form may be used to return the doors, shafts and cam rollers to their position in which door 55 will be closed and door 61 will be open.

Means is provided below the location of the cam rails 70 for transferring to a storage chamber lint discharged from the lower ends of tubes 31. The location of this means is better shown in FIGURE 7 and the means is shown in some detail in FIGURES 8 and 9.

In FIGURE 7, several textile machines 1 are shown in aligned, parallel rows with rail 6 running lengthwise of each row in an endless loop. A single suction box 75 is shown in one of these rows of textile machines but it will be understood that more than one such box may be used as required or desired. The suction box 75 is provided with a partition 76 which forms chambers 77 and 78 therein and which has a central opening. A fan 79 and its drive motor 80 are supported from the partition 76 by an annular, conically shaped bracket 81 with the shaft 82 of the motor extending through a central hole in partition 76 and with motor 80 being in chamber 77 and the fan in chamber 78. A screen 83, generally frusto-conical in shape, is secured at its large end to partition 76 and encloses the motor 80 and bracket 81.

Chambers 77 and 78 serve, respectively, as intake and exhaust chambers. Chamber 78 has air outlet holes 85 to permit air to escape therefrom while fan 79 serves to create a vacuum-induced flow of air into chamber 77. Inlet tubes 88 extend from chamber 77 toward the floor and terminate in horizontally long, vertically short intake nozzles 90.

The operation of the above-described apparatus is substantially as follows:

When the unit is being propelled along the track over a row of aligned textile machines 1 and the fan in fan chamber 39 is being rotated, streams of air under relatively high pressure will be discharged from the fan chamber into passages 25 and thence down through tubes 28 and 29 and toward machines 1 with resultant dislodgement of lint from the machines. Simultaneously, streams of air carrying lint picked up from the floor adjacent to the machines 1 will flow under the influence of vacuum created in the vacuum chamber by rotation of the fan up through tubes 31 through screens 27 and in passages 26 to the vacuum chamber 39 whence the air will flow into the inlet side of the centrifugal fan. Since the traveling unit has considerable lint carrying capacity, it is generally not necessary to provide more than one set of cam bars 70 on each loop of track to remove the collected lint from the screens. When shafts 56 are rotated with resultant movement of doors 55 into open position and movement of doors 61 into closed position, the application of vacuum to passages 26 will be interrupted and air under pressure from the fan chamber will be discharged into the inlet or low pressure passages 26 and will flow through screens 27, will remove lint therefrom and will carry the lint which has accumulated on the inlet screen 27 down through tubes 28 and 29 and discharge

it adjacent to the machines. When the unit has moved the cam rollers 58 out of contact with the cam bars 70, suitable springs will restore doors 55 to their closed position and doors 61 to their open position and will ready rollers 58 for engagement with the cam bars 70 when the traveling unit again approaches those bars. Thereupon, suction will be applied to passages 26 and the foregoing operation will begin the next cycle.

The motor 80 constantly rotates fan 79 and constantly causes a stream of air to flow through nozzles 90 and tubes 88 into chamber 77, then through screen 83 and into chamber 78 and finally out of that chamber through openings 85. Since nozzles 90 have their open ends closely adjacent to the lower ends of suction tubes 31, the nozzles are in position to apply the suction force to lint discharged downwardly through tubes 31 when those tubes pass nozzles 90 and when the doors 55 are opened and the doors 61 are closed and the high pressure air passes downwardly in tubes 31. Since the high pressure air flowing out of tubes 31 is directed toward nozzles 90, some of that air will enter nozzles 90 and will carry lint with it. The vacuum-induced flow of air into nozzles 90 will cooperate with the high pressure air in transporting lint from the bottom ends of tubes 31 into nozzles 90 and thence into the storage chamber 77. By reason of the extended horizontal dimension of the nozzles 90 and the conjoint action of the high and low pressure air streams, the lint discharged from tubes 31 will enter nozzles 90 while the tubes are moving past them.

The screen 83 in suction box 75 intercepts the lint and retains it while the air passes through the partition and escapes from the box. At intervals, the doors 91 on either end of box 75 may be opened and the lint removed from chamber 77.

A method which may be carried out by means of the apparatus claimed herein is being claimed in applicant's co-pending application Serial No. 842,402, filed September 25, 1959.

Having thus described this invention in such full, clear, concise and exact terms as to enable any person skilled in the art to which it pertains to make and use the same, and having set forth the best mode contemplated of carrying out this invention, I state that the subject matter which I regard as being my invention is particularly pointed out and distinctly claimed in what is claimed, it being understood that equivalents or modifications of, or substitutions for, parts of the above specifically described embodiment of the invention may be made without departing from the scope of the invention as set forth in what is claimed.

What is claimed is:

1. Apparatus for handling lint which comprises a carriage adapted to travel on a trackway over a row of aligned textile machines, a casing mounted on said carriage and extending transversely of the row of textile machines, a plurality of interior walls forming in the casing a fan chamber, a vacuum chamber communicating with said fan chamber and outlet and inlet passages connecting the fan chamber and vacuum chamber, respectively, with separate openings in one end of said casing, means in the fan chamber for creating a flow of air under high pressure from said fan chamber and through said outlet passage and for creating a vacuum-induced flow of air through said inlet passage and into the vacuum chamber, a screen extending across said inlet passage to separate lint from lint carrying streams of air flowing in said passage, and means for removing the collected lint through the inlet passage including a first door in the wall between the inlet passage and the vacuum chamber, a second door in the wall between the inlet and outlet passages and between the fan chamber and the screen whereby air under the high pressure is directed out through said screen and inlet passage, and means fixed at one place along said trackway to close the first said door and to open the other of said doors.

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2. Apparatus for handling lint which comprises a carriage adapted to travel on a trackway over a row of aligned textile machines, a casing mounted on said carriage and extending transversely of the row of textile machines and including a plurality of interior walls forming in the casing a fan chamber, a vacuum chamber communicating with said fan chamber, and outlet and inlet passages connecting the fan chamber and vacuum chamber, respectively, with separate openings in one end of said casing, a centrifugal fan in the fan chamber for creating a flow of air under high pressure from said fan chamber and through said outlet passage and for creating a vacuum-induced flow of air through said inlet passage and into the vacuum chamber, a screen extending across said inlet passage to separate lint from a lint carrying stream of air flowing in said inlet passage, and means for removing the thus collected lint through the inlet passage, said means including a first door in the wall between the inlet passage and the vacuum chamber, a second door in the wall between the inlet and outlet passages whereby air under high pressure is directed out through said screen and inlet passage and means to close the first door and open the second door simultaneously including a cam rail fixed relative to one of said textile machines, rotatable shafts connected to the said doors and to each other, one of said shafts projecting through a wall of the casing, a crank arm connected to said projecting end of the shaft and carrying a cam roller engageable with said cam rail and serving to rotate said shaft when the carriage travels past said cam rail.

3. Apparatus for handling lint which comprises a trackway over a row of aligned textile machines, a carriage mounted to travel on said trackway, means to propel said unit along said trackway, a casing mounted on said carriage and extending transversely of the row of textile machines and including a plurality of interior walls forming in the casing a fan chamber, a vacuum chamber communicating with the fan chamber, and outlet and inlet passages connecting the fan chamber and vacuum chamber, respectively, with separate openings in the ends of said casing, boots depending from the ends of the casing and communicating with said openings, a fan in the fan chamber, means carried by the carriage to rotate the fan for creating a flow of air under high pressure from said fan chamber and through said outlet passages and for creating a vacuum-induced flow of air through said inlet passages and into the vacuum chamber, a screen extending across said inlet passage to separate lint from the lint carrying stream of air flowing in said inlet passage, and means for moving the so collected lint in the reverse direction through said inlet passage and the boot communicating therewith by the flow of air under high pressure including a first door in the wall between the inlet passage and the vacuum chamber, a second door in the wall between the inlet and outlet passages and between the fan chamber and the screen, and means to close the first door and open the second door simultaneously.

4. Apparatus for handling lint which comprises a car-

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riage adapted to travel on a trackway over a row of aligned textile machines, a casing mounted on said carriage and including a plurality of interior walls forming in the casing a fan chamber, a vacuum chamber communicating with said fan chamber, and outlet and inlet passages connecting the fan chamber and vacuum chamber respectively with separate openings from the casing, means in the fan chamber for creating a flow of air under high pressure from said fan chamber and through said outlet passage and for creating a vacuum-induced flow of air through said inlet passage and into the vacuum chamber, a screen extending across said inlet passage to separate lint from a lint carrying stream of air flowing in said passage and means for moving lint so collected in the reverse direction through said inlet passage by the flow of air under high pressure including a first door in the wall between the inlet passage and the vacuum chamber, a second door in the wall between the inlet and outlet passages, and means to close the first door and open the second door simultaneously.

5. Apparatus for handling lint which comprises a carriage adapted to travel on a trackway over a row of aligned textile machines, a casing mounted on said carriage and including a plurality of interior walls forming in the casing a fan chamber, a vacuum chamber communicating with said fan chamber and outlet and inlet passages connecting the fan chamber and vacuum chamber, respectively, with separate openings in one end of said casing, outlet and inlet tubes communicating with said outlet and inlet passages and depending from said casing, means in the fan chamber for creating a flow of air under high pressure from said fan chamber through said outlet passage and tube and for creating a vacuum-induced flow of air through said inlet tube and passage and into the vacuum chamber, a screen extending across said inlet passage to separate lint from a lint carrying stream of air flowing in said passage, means to admit said high pressure stream of air into the inlet passage and inlet tube to discharge lint from said inlet passage through said inlet tube, fixed means adjacent to said trackway to actuate said high pressure air stream admitting means, and means to store lint discharged from the lower end of said inlet tube including a nozzle disposed adjacent to the lower end of the inlet tube, a storage chamber communicating with said nozzle and means to create a vacuum induced flow of air through said nozzle and into said chamber.

References Cited in the file of this patent

UNITED STATES PATENTS

1,463,583	Holleran	July 31, 1923
1,538,292	Lindsay	May 19, 1925
1,892,751	Smith	Jan. 3, 1933
2,128,207	Hodge	Aug. 23, 1938

FOREIGN PATENTS

1,178,163	France	Dec. 8, 1958
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OTHER REFERENCES

Parks-Cramer: Adv. No. 411, published Sept. 25, 1958.