This invention relates to the textile cleaning art and is particularly concerned with new apparatus for removing lint from textile machines and from the walls, including the floor of a textile machine room by a unit which travels over the row of machines, collecting such lint in the traveling unit and periodically transferring such collected lint to a fixed and remote storage chamber, the steps of removing and transporting the lint being carried out by means of streams of air which are caused to flow by means of vacuum.

Various kinds of textile machines are employed in the production of yarn from fibers of various kinds and types, and practically every one of these machines has the effect of releasing some of the fibers so that they may be carried outward in the air and eventually collect on the textile machines and on the floor and sides walls and ceiling of the building in which the machines are housed. Such fibers are commonly known collectively as "lint."

This lint is a source of considerable expense in the industry, partly due to the fact that fibers which become lint are lost so far as being used eventually as yarn, and partly because of the damage which this lint causes to yarns and fabrics when quantities of the lint become entangled with the yarn or are woven into the cloth with the yarn. The problem of keeping the machines and walls and ceilings of the buildings free from accumulations of lint which will damage the yarn or fabric has been well solved heretofore by means of various devices, many of which have been patented.

However, most of those machines served only to blow lint off the machines, ceilings and walls of the building into the air whence it eventually reached the floor, and from which it was carried by sweepers in such a dirty condition that it could not be worked up into the yarn and hence was a loss.

More recently, machines have been devised for removing lint from the floors of textile machine rooms, but these machines did not solve the problem of what to do with the lint collected from the floor and how to dispose of it.

The present invention aims to solve the problem of removing lint from the floor of a textile machine room and depositing it in a fixed chamber whence it can be removed in clean condition and worked up into satisfactory yarn. By means of the present apparatus and method of invention, the age-old problem of handling lint on the floor of a textile machine room has been solved by automatically operating mechanical means substantially without the need for any manual labor.

The present invention will better be understood by those skilled in the art from the following specification taken in connection with the drawings accompanying and forming a part thereof, in which:

FIGURE 1 is a side elevational view of one embodiment of the present invention shown in operative position relative to a spinning machine;

FIGURE 2 is an end elevational view of the apparatus of FIGURE 1;

FIGURE 3 is a perspective view showing the door-actuating cam mechanism of FIGS. 1 and 2;

FIGURE 4 is a fragmentary, end elevational view of the cam and door-actuating mechanism of FIGURE 3;

FIGURE 5 is a diagrammatic plan view showing a plurality of rows of textile machines in combination with apparatus of the present invention;

FIGURE 6 is an end elevational view similar to FIGURE 2 but showing a modified form of apparatus embodying the present invention;

FIGURE 7 is a fragmentary end elevational view showing the door-actuating means of the apparatus of FIGURE 6;

FIGURE 8 is a side elevational view of the door-actuating means of FIGURE 7; and,

FIGURE 9 is a top plan view of the casing of FIGURES 2 and 6 showing the direction of movement of air streams therein.

In FIGURES 1 and 2, the numeral 1 designates diagrammatically, spinning machines on which packages of roving 2 are carried by the creel boards 3.

A trackway is positioned above the row of spinning machines 1 and comprises a plurality of supports 5, arms 6 and rails 7. A lint collecting unit is positioned on the trackway to run lengthwise thereof. This unit includes a carrier which may be like that shown in FIGURES 1 and 4 of U.S. Patent No. 2,851,716 and a casing carried by said carriage. Briefly described, the said carriage consists of a plurality of trucks 8 which are connected together by a plate 9 which has projecting brackets 10 supporting a roller 11 positioned to run on the top of rail 7. Trucks 8 have hold-down devices, such as rollers 13, to engage the undersurface of the side rails 7 to prevent the carriage from tipping.

A casing 12 is mounted on the top of plate 9, extends transversely thereacross and comprises a central section 15 and outwardly and downwardly extending sections 16 to the lower ends of which are attached flexible tubes 17 which extend to points near the floor 18. Preferably, each tube 17 is provided with a pair of downwardly diverging tubes 19 which extend down close to the floor 18, for example, to within about an inch or less of the floor.

A motor (not shown) is supported between the pair of trucks 8 with its rotor shaft extending up into the central part 15 of the casing, and a centrifugal fan, indicated by the dotted rectangular outline 20 in FIGURE 2, is fixed to the rotor shaft within the casing. A horizontal partition 25 and vertical partitions 26 divide the interior of the central part 15 of the casing into an upper vacuum chamber and a lower fan chamber. Vertical partitions 26 and 27 and side walls of the casing define outlets 28 for air discharged from the fan chamber, as is better illustrated in FIGURE 9. The general direction of the flow of air streams in the casing is indicated by arrows in FIGURE 2 from which it will be seen that the fan draws air from the vacuum chamber into the fan chamber and discharges it through passages 28 to the atmosphere. By reason of the resultiing vacuum created in the vacuum chamber by the fan, a low pressure area is created in the chambers in the downwardly extending sections 16 and in the tubes 17 to the vicinity of the floor with resultant flow of air from the floor to the vacuum chamber.

In each of the sections or branches 16 of the casing, a screen 30 extends across the path of travel of the stream of air from tube 17 to the vacuum chamber of casing section 15. The chambers in sections 16 below the screens may be considered as collecting chambers. The lower walls of sections 16 of the casing below the screens are provided with doors 35 which are hinged thereto and when opened afford passages for removal of lint from the screens.

FIGURES 3 and 4 show in some detail these doors and their actuating mechanism. Each door 35 is pivotally connected to the casing and is attached by a short rod 36 to a lever 37 which is also pivotally connected to the
casing and which is provided with a spring 38 to urge the lever in a direction to close door 35 and to maintain it in that position. Each door has slots in which constitute parts of the sides of the casing when the door is closed, as a result of which a free passage across the casing adjacent to the screen is afforded when the door is opened. At its lower end lever 37 is provided with a roller 39. A cam bar which is in a fixed position is engaged by roller 39 when the unit travels over the cam bar. The parts of bars 40 which engage the roller 39 and open the doors 35 are indicated at 41, the parts 42 indicate the parts of the bars which are engaged by the rollers 39 when the doors are fully opened and the parts 43 indicate the parts along which the rollers may move under the force of springs 38 to close doors 35.

As stated above, FIGURE 5 shows diagrammatically in plan view, a layout of textile machines, with which trackway and apparatus, such as that shown in FIGURES 1 to 4 inclusive may be employed. As these figures show, a storage box 50 is fixed in position between the ends of a pair of the textile machines 1. Within this box is disposed means, such as a centrifugal fan (not shown), for creating a condition of vacuum within the box 50. A flexible tube 51 extends upwardly from the top of box 50 to a transversely extending tubular header 52. Flexible tubes 53 extend upwardly from header 52 and, when the doors 35 are opened and the casing is moved over tubes 53, the upper ends of the latter will project into the collecting chamber closely adjacent to screens 30 and lint thereon. The header 52 and the door-operating bars 40 may be supported in any convenient and suitable manner but, as shown, are supported from the tops of the creels 3 of spinning machines 1.

The operation of the apparatus of FIGURES 1 to 5 and 9 will be readily understood from the foregoing description as succinctly stated is as follows:

When the carriage is moved along the trackway and the vacuum-creating fan in casing 15 is rotated rapidly, streams of air carrying lint will be drawn up through tubes 17 and 19. The lint will be separated from these streams of air by screens 30 in the collecting chambers in portions 16 of the casing and the substantially lint-free air will then pass through the vacuum chamber of casing 15 and into the fan chamber and thence out of the casing through the outlets 28. As the apparatus moves along the trackway, the lint will be progressively removed from the floor along the sides of the rows of machines and collected in the collecting chambers. When the apparatus approaches the position occupied by the storage box 50, the rollers 39 of levers 37 will engage the curved portions 41 of the bars 40 and will be moved toward each other with resultant opening of the doors 35. These doors will be opened substantially to the position shown in FIGURE 2 and in dotted lines in FIGURE 4 just prior to the passage of the screens over tubes 53. As the screens, with the accumulations of lint thereon, pass over the tubes 53 and the latter project into the collecting chamber closely adjacent to the lint on the screens, lint will be drawn into the tubes 53 by the vacuum-created air streams flowing thereinto and the lint will then be transported through header 52 and tube 51 and deposited in storage box 50.

FIGURES 6, 7 and 8 show a modified embodiment of the present invention. Most of the apparatus shown in these figures is like that shown in FIGURES 1 to 5 inclusive, but certain of the parts are different and the arrangement of parts is different, as will now be specifically pointed out, it being understood that similar parts in both sets of figures are designated by the same numbers.

The downwardly extending portions 16 of the casing are provided with doors 35' in their upper walls, these doors being pivotally connected to the casing and having links 36' connecting the doors to levers 37' which also are pivotal to the casing and which are urged by spring 38' to move the doors to closed position.

Screens 30' extend across the collecting chamber within portions 16 of the casing to separate lint from air streams flowing through tubes 17 from floor 18 and retain such lint temporarily. A storage box 50 is positioned at one side of a row of machines 1 and has a tube 51 extended upwardly therefrom and thence laterally to a position substantially vertically above the trackway where it communicates with a header 52' having flexible tubes 53' near the ends thereof projecting downwardly therefrom with their lower ends lying close to screens 30' when the doors 35' are opened and the screens are brought beneath the tubes 53'.

The means for opening the doors may be quite like that shown in FIGURE 3 and this means together with the header may be suspended from a ceiling or other overhead structure as by rods 55.

The operation of the apparatus of FIGURES 6, 7 and 8 is substantially the same as that described above in connection with that of FIGURES 1 to 4 and 9.

Apparatus disclosed, but not claimed herein, is claimed in my copending application Serial No. 791,108, filed February 4, 1959. Methods disclosed, but not claimed herein, are claimed in my copending application Serial No. 832,008, filed August 6, 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 invention as particularly pointed out and distinctly claimed in what is claimed, is 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. Lint collecting and storing apparatus comprising in combination a track disposed above a row of textile machines, a carriage mounted on said track, means connected to the carriage for moving it along said track, a hollow casing supported by said carriage, walls in said casing defining a collecting chamber, a vacuum chamber and an exhaust passage, a screen between said collecting and vacuum chambers, a conduit extending from said collecting chamber down close to the floor on one side of the row of textile machines, means for creating a vacuum-induced flow of air up through said conduit, through said vacuum chamber and out through said exhaust passage, a door in a wall of the collecting chamber having door opening means, means fixed in position adjacent to said track for actuating said door opening means, a storage box fixed in position adjacent to the row of textile machines, conduit means extending from said box into the casing closely adjacent to said screen when the door is open, and means to create a vacuum in said box and conduit means thereby to remove collected fibers from said screen and to conduct them into said box.

2. Lint collecting and storing apparatus comprising in combination a track disposed above a row of textile machines, a carriage mounted on said track to travel over said machines, a hollow casing supported by said carriage, walls in said casing defining a collecting chamber, a vacuum chamber and an exhaust passage, a screen between said collecting and vacuum chambers, a conduit extending from said collecting chamber down close to the floor on one side of the row of textile machines, a door in a wall of the collecting chamber, door opening means attached to the casing and door, means fixed in position adjacent to said track and engageable with said door opening means to open the door, means carried by the carriage for creating a vacuum in said conduit, collecting chamber and vacuum chamber and thereby causing a stream of air to flow therethrough and into the exhaust passage, a storage box fixed in position adjacent to the row of textile machines, conduit means communi-
5. Collecting and storing apparatus comprising in combination a track disposed above a row of textile machines, a carriage mounted on said track to travel over said machines, a hollow casing supported by said carriage, walls in said casing defining a collecting chamber, a vacuum chamber and an exhaust passage, a motor supported by the carriage and having a rotor shaft extending into the casing, a fan on said rotor shaft in said vacuum chamber, a screen between said collecting and vacuum chambers, a conduit extending from said collecting chamber down close to the floor on one side of the row of textile machines, a door in a wall of the collecting chamber, door opening means attached to the casing and door means fixed in position adjacent to said track and engageable with said door means for actuating the latter, a storage box fixed in position adjacent to the row of textile machines, conduit means connected to the box and extending into the casing and having an open end disposed close to said screen when the door is open and means to create a vacuum in said box and conduit means whereby to remove collected fibers from said screen and to conduct them into said storage box.

6. Collecting and storing apparatus comprising in combination a carriage adapted to travel on a trackway above a row of textile machines, a hollow casing supported by and extending transversely of said carriage, walls in said casing defining a collecting chamber, a vacuum chamber and an exhaust passage, a fan mounted for rotation in said vacuum chamber, a screen between said collecting and vacuum chambers, a conduit extending from said collecting chamber down close to the floor on one side of the row of textile machines, a door in an upper wall of the collecting chamber, cam means fixed in position above the path of travel of said carriage, levers carried by said casing, connected to said door and engageable with said cam means for opening said door, a storage box fixed in position adjacent to the row of textile machines, conduit means extending from said box into the upper part of the casing closely adjacent to said screen when the door is open and means to create a vacuum in said box and conduit means whereby to remove collected fibers from said screen and to conduct them into said box.

7. Collecting and storing apparatus comprising in combination a carriage adapted to travel on a trackway above a row of textile machines, a hollow casing supported by and extending transversely of said carriage, walls in said casing defining a collecting chamber, a vacuum chamber and an exhaust passage, a fan mounted for rotation in said vacuum chamber, a screen between said collecting and vacuum chambers, a conduit extending from said collecting chambers down close to the floor on one side of the row of textile machines, a door in a lower wall of the collecting chamber, cam means fixed in position below the path of travel of said carriage, a lever carried by said casing, connected to said door and engageable with said cam means for opening said door, a storage box fixed in position adjacent to the row of textile machines, conduit means extending from said box into the lower part of the casing and closely adjacent to said screen when the door is open and means to create a vacuum in said box and conduit means whereby to remove collected fibers from said screen and to conduct them into said box.

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UNITED STATES PATENT OFFICE
CERTIFICATION OF CORRECTION

Patent No. 3,003,178 October 10, 1961

Loyd R. McEachern

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 6, line 58, for "2,033,911" read -- 2,003,911 --. Signed and sealed this 3rd day of April 1962.

(SEAL)
Attest:

ERNEST W. SWIDER
Attesting Officer

DAVID L. LADD
Commissioner of Patents