

**Sept. 29, 1964**

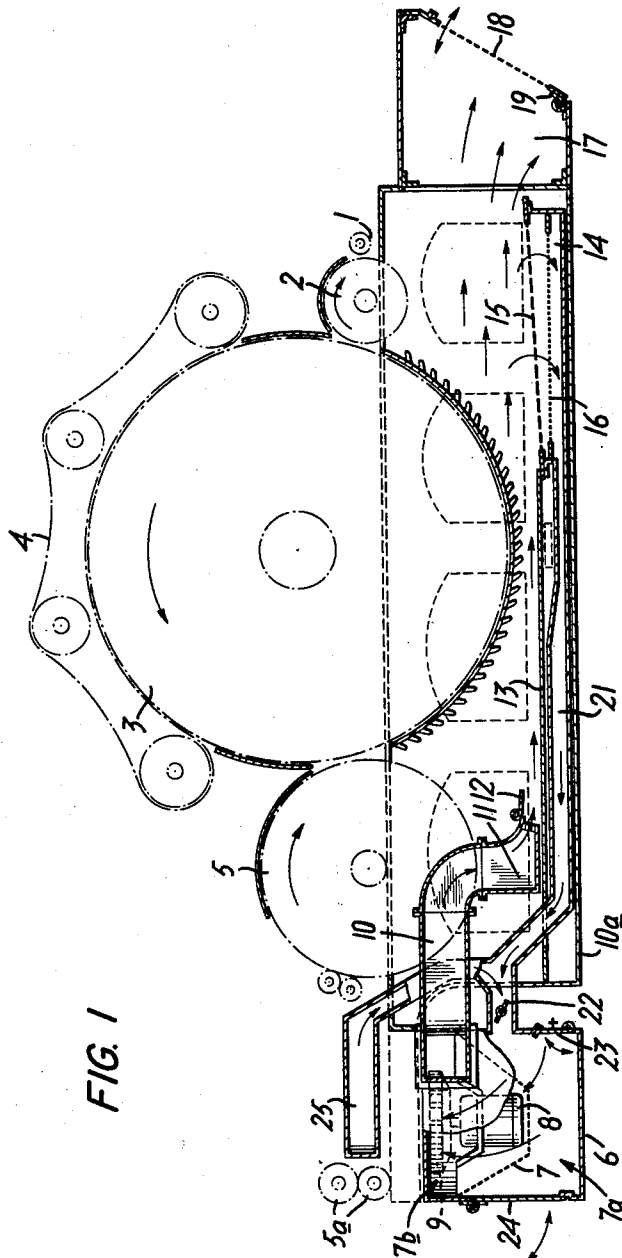
F. REITERER

**3,150,415**

# DUST REMOVING SYSTEM FOR CARDING MACHINES

Filed July 17, 1961

3 Sheets-Sheet 1



INVENTOR  
FERDINAND REITERER

BY  
Brennhaugh, Free, Graves & Donohue

his **ATTORNEYS**

Sept. 29, 1964

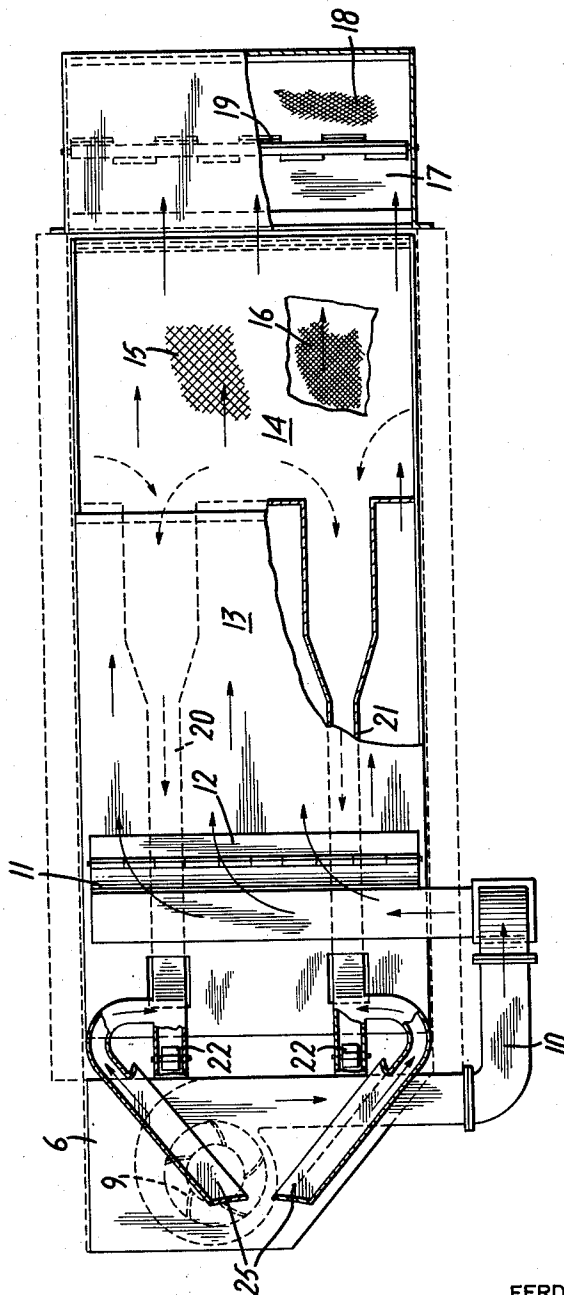
F. REITERER

3,150,415

DUST REMOVING SYSTEM FOR CARDING MACHINES

Filed July 17, 1961

3 Sheets-Sheet 2



INVENTOR  
FERDINAND REITERER

BY  
*Brunbaugh, Free, Graves & Donohue*  
his ATTORNEYS

Sept. 29, 1964

F. REITERER

3,150,415

DUST REMOVING SYSTEM FOR CARDING MACHINES

Filed July 17, 1961

3 Sheets-Sheet 3

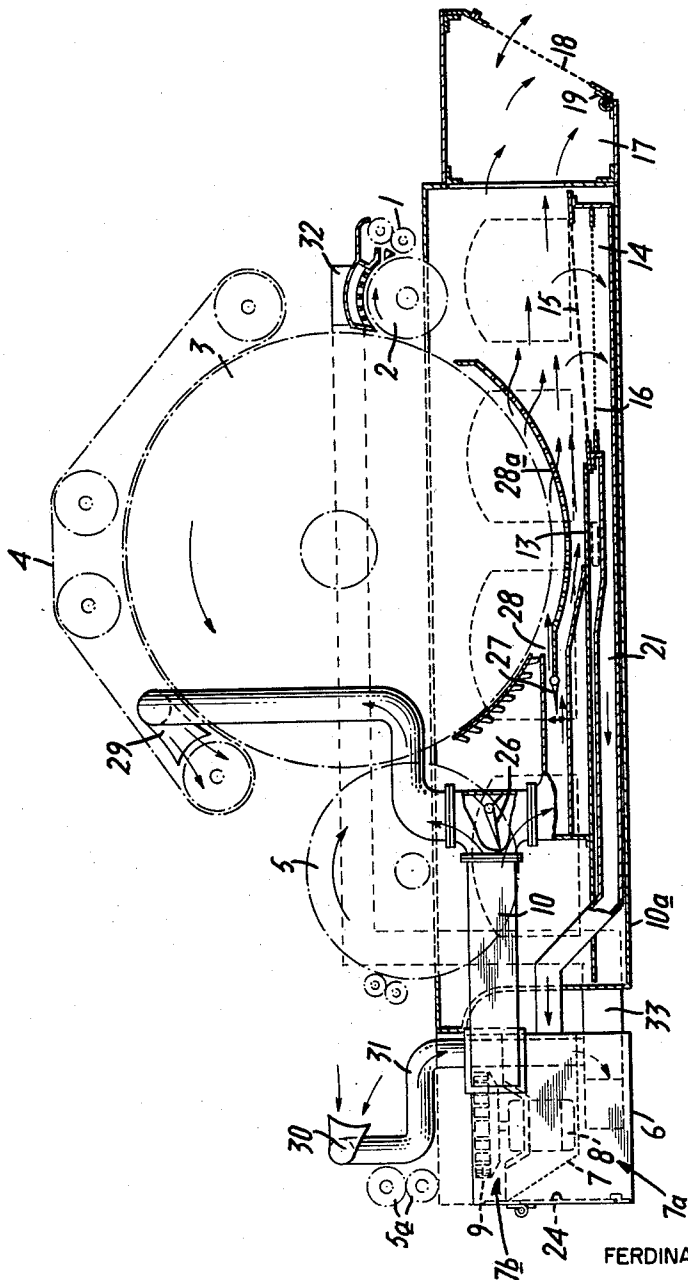


FIG. 3

INVENTOR  
FERDINAND REITERER

BY  
*Brunnengruber, Fae, Gross & Dondlue*  
his ATTORNEYS

1

3,150,415

## DUST REMOVING SYSTEM FOR CARDING MACHINES

Ferdinand Reiterer, Rueil-Malmaison, France, assignor, by direct and mesne assignments, to Whitin Machine Works, Whitinsville, Mass., a corporation of Massachusetts

Filed July 17, 1961, Ser. No. 124,427

Claims priority, application France July 27, 1960

14 Claims. (Cl. 19—107)

This invention relates to dust control systems for carding machines and, more particularly, to a new and improved dust control system incorporated in a carding machine for removing dust from both the interior and the exterior areas of the machine.

The operation of carding machines for carding cotton fibers or the like inevitably generates large quantities of dust comprising fibers of extremely short length and very fine sand or the like which has been carried into the machine by the fibers. Normally, both of these types of dust are distributed throughout the atmosphere surrounding the machine, making it unhealthy for the operators of the machine, and they are also deposited on the working parts inside the machine causing deterioration of these parts.

Heretofore, attempts have been made to control dust from carding machines by filtering the air which circulates in the workroom containing the machine or by placing suction nozzles at appropriate locations near or on the exterior of the machine. These arrangements, however, have not been very effective in removing dust from the atmosphere or exterior areas of the machine and they are completely incapable of preventing dust accumulations in the interior of the machine.

Accordingly, it is an object of the present invention to provide a new and improved dust removing system for carding machines which overcomes the above-mentioned disadvantages of the presently known system.

Another object of the invention is to provide a dust removing system for carding machines which effectively removes dust from the interior as well as the exterior areas of the machine.

A further object of the invention is to provide a dust removing system for carding machines which is contained within and utilizes the interior space in the machine.

These and other objects of the invention are accomplished by providing within the interior of a carding machine and adjacent to one end thereof a dust collecting device including an opening to receive air and airborne dust along with a duct supplying air under pressure to the interior of the machine at a point spaced from the collecting device and arranged to direct the air across interior dust accumulating portions of the machine toward the collecting device. The dust collecting device may comprise a dust container having a filtered air outlet to the atmosphere or a suction duct having a filtered intake opening. Moreover, the filter in the dust collecting device may include at least two different screens, a relatively coarse screen to trap fiber particles and a fine screen to catch the smaller particles such as sand. In addition, the dust removing system provided with a suction duct collecting device preferably utilizes a single fan connected between the suction duct and the pressure duct and a filter box is provided at the fan intake to remove dust particles from the air entering the fan.

To clean out wastes and dust which have accumulated on the collector device the system includes an evacuation container located beyond the collecting device with respect to the flow of air from the pressure duct and having a fine screen filter between the interior of the container and the atmosphere, valves being provided in the system to shut off the suction to the collecting device and to admit air through the filter box to the fan intake.

2

Moreover, the system may also be provided with suction nozzles above the lickering and at the front end of the machine where external dust generation is greatest and with a pressure outlet adjacent to the flat chain to drive dust from the flats and the doffer toward the front end suction nozzle.

Further objects and advantages of the invention will be apparent from a reading from the following description in conjunction with the accompanying drawings, in which:

FIG. 1 is a schematic view in elevation of a carding machine provided with a typical dust collecting system according to the invention;

FIG. 2 is a schematic plan view of the carding machine shown in FIG. 1; and

FIG. 3 is a schematic view in elevation of a carding machine similar to that of FIG. 1 showing a modified form of dust collecting system according to the invention.

In the embodiment of the invention shown in FIGS. 1 and 2 the carding apparatus is of the usual type and comprises a feed roller 1 arranged to deliver a lap of fibrous material to a lickering 2 which, in turn, carries the material to a main card cylinder or swift 3. Mounted above the swift and adjacent to its surface is the usual chain 4 of carding flats arranged to move in the opposite direction as the swift or in the same direction at a different speed to align the fibers of the material carried by the swift. A doffer 5 removes the fibrous material from the swift and delivers it in lap form to a pair of calendar rollers 5a at the front end of the carding machine. Inasmuch as the structure and operation of all of the above-mentioned components of the carding machine are well known in the art and form no part of the present invention they need not be described in further detail.

In accordance with the present invention, the carding machine is provided at the front end with a main filter box 6 having mounted therein a filter screen 7 dividing the box into two compartments, an intake compartment 7a and a blower compartment 7b. An electric motor 8 drives a centrifugal fan 9 mounted in the blower compartment so as to draw air from the intake compartment through the screen 7 and drive it out through a pressure duct 10 into the enclosure formed by the housing 10a of the carding machine.

Inside the housing 10a the pressure duct 10 leads to a nozzle 11 having an adjustable deflector vane 12 adapted to direct the air rearwardly from the nozzle across a smooth horizontal plate 13. This plate is located beneath the fiber-carrying carding machine components such as the doffer 5 and the swift 3 so that dust particles which drop from these components will fall on the plate and into the path of the air from the nozzle 11. As is clearly evident from FIG. 1, the air stream from the nozzle may also be directed by adjustment of the deflector vane 12 against the screen below the enclosed swift portion, wherefrom it is deflected against the surface of the lower portion of the swift 3 which protrudes into the housing 10a so as to remove dust particles adhering to the surface and the needles thereof and carry these particles rearwardly in the enclosure.

At the rear of the enclosure, beyond the lowest portion of the swift, is a dust collecting device adapted to provide an outlet for air and, in the illustrated embodiment, a secondary filter box 14 provided with two filter screens 15 and 16, located directly below the lickering 2 so as to receive the waste droppings therefrom, serves this purpose. Preferably, the first screen 15 of the filter box is made relatively coarse so as to catch fibers while the second screen 16 is of relatively fine size to trap small particles of dust such as sand or the like.

Normally, suction is applied to the filter box 14 in the manner described below to draw air through the screens and return it to the fan 9, but, in addition, air

3

from the nozzle 11 can also escape from the enclosure through an evacuation box 17 attached to the rear end of the enclosure 16a. This box includes a filter door 18 which is hinged at 19 to provide an outlet for air to the atmosphere while retaining the dust particles inside the box. Consequently, the evacuation box 17 also constitutes a dust collecting device.

In order to provide suction at the filter box 14, and as best seen in FIG. 2, two suction ducts 20 and 21 lead from the box through the front of the housing 10a and into the intake compartment 7a of the main filter box 7 where any remaining dust particles are removed from the air by the filter 7 before it is again driven by the fan 9 into the pressure duct 10. A damper or shut-off valve 22 mounted in each of the suction ducts 20 and 21 permits the suction at the secondary filter box 14 to be shut off so that all the air from the nozzle 11 passes through the evacuation box 17. In this way, waste and dust which have accumulated on the upper filter screen 15 can be driven into the evacuation box. It will be noted that the smaller dust particles of sand or the like which have passed through the screen 15 to be trapped by the lower screen 16 are not blown into the box 17 by this process since the lower screen is not exposed to the stream of air. Consequently, the dust collected in the box comprises primarily fibrous material which can be reprocessed if desired, the unwanted sand or mineral dust having been removed by the screen 15. When the valves 22 are closed air is drawn into the main filter box through a valve 23 which is normally held closed by a weight or the like, a door 24 permitting access to this box for removal of dust. Furthermore, two suction nozzles 25 are provided adjacent to the calender rolls 5a at the front end of the machine to draw in dust generated in that area and these are connected to the suction ducts 20 and 21 between the secondary filter box 14 and the valves 22.

In the operation of this embodiment of the invention, the motor 8 is energized to drive the fan 9, the valves 22 being opened so that air flows through the outlet nozzle 11, across the plate 13, through the filter box 14, back through the suction ducts 20 and 21, into the main filter box 6, and through the filter screen 7 into the fan. In addition, some air is drawn into the suction ducts through the nozzle 25 whereas some air from the outlet nozzle 11 passes across the screen 15 into the evacuation box 17 and through the filter door 18 to the atmosphere.

Fibrous material supplied to the lickerin 2 by the feed roller 1 is carried to the swift 3, meanwhile being cleaned by appropriate conventional devices such as mote knives or the like (not shown). Waste material from this cleaning process falls directly on the screens 15 and 16 of the secondary filter box 14 and dust from this material is immediately drawn against the screens and held there by the suction while any dust passing through the screens is carried by the suction ducts to the main filter box 6. Dust from the front end of the machine is also carried to the main filter box 6 by the nozzles 25. Furthermore, any dust particles adhering to the surface and the needles of the swift 3 as it passes into the enclosure formed by the housing 10a are blown off by the air from the nozzle 11. Periodically, the accumulated fiber dust and waste material may be removed from the screen 15 by closing the valves 22 so that all the air from the nozzle 11 passes through the evacuation box. This drives the accumulated material into the box from which it can be removed by opening the door 18.

In the embodiment of the invention shown in FIG. 3 the dust collecting system of FIG. 1 is modified by the addition of a curved perforated plate 28a mounted below the lower portion of the swift 3 so as to form a partial enclosure, and an air inlet 28 for directing air from the pressure duct into this enclosure, an adjustable distributing valve 27 being provided at the junction of the inlet 28 with the pressure duct. In this way air is directed more forcefully at the swift surface and the

4

needles mounted thereon than in the embodiment shown in FIG. 1 and the quantity of air passing close to the swift may be controlled, the dust removed from the surface being carried through the perforations in the plate 28a to the collecting box 14.

Another modification shown in FIG. 3 is the provision of a blowing nozzle 29 connected to the pressure duct and located within the flat chain 4 for directing air through the flats to drive dust therefrom toward the front end of the machine. A distributing valve 26 permits control of the quantity of air delivered to this nozzle. Operating in conjunction with the blowing nozzle 29 is a suction nozzle 30 mounted at the front end of the machine which is oriented to collect the dust blown from the flats and any other dust generated at the front end. This nozzle is connected through a duct 31 to the intake compartment 7a of the main filter box 6.

Finally, the machine shown in FIG. 3 also includes a suction device 32 covering the area above the lickerin 2 and the feed roller 1 connected through a suction duct 33 to the intake compartment 7a of the main filter box 6. This device is in the form of a hood provided with a perforated plate mounted closely adjacent to the lickerin surface.

The operation of the embodiment shown in FIG. 3 is the same as that of the embodiment shown in FIGS. 1 and 2 except that, in addition, dust is blown off the flats in the direction toward the suction nozzle 30 by the nozzle 29 so that it is not distributed throughout the atmosphere and dust from the feed roll and lickerin is sucked into the main filter box by the suction device 32.

From the foregoing it will be readily apparent that the present invention provides a self-contained dust removing system which effectively removes dust from both the exterior and interior areas of a carding machine.

Although the invention has been described herein with reference to specific embodiments, many modifications and variations therein will readily occur to those skilled in the art. Accordingly, all such variations and modifications are included within the intended scope of the invention as defined by the following claims.

I claim:

1. A dust collecting system for a fiber processing machine which includes a plurality of fiber-carrying components comprising a housing located beneath the fiber-carrying components and enclosing a portion of at least one of the fiber-carrying components, dust collecting means disposed in the housing on one side of the enclosed portion of the fiber-carrying component including an opening providing an outlet for air from the enclosure, air supply means disposed in the housing and spaced from the dust collecting means on the other side of the enclosed portion of the fiber-carrying component to direct a stream of air adjacent to the surface of the enclosed portion of the fiber-carrying component and toward the dust collecting means, and means for directing air toward the surface of the enclosed portion of the fiber-carrying component to facilitate removal of dust therefrom.

2. A dust collecting system according to claim 1 including a suction duct connected to the dust collecting means to draw air through the opening therein.

3. A dust collecting system according to claim 2 including a fan housing having an air intake compartment connected to the suction duct and an air outlet compartment, a fan mounted in the fan housing, and including pressure duct means connected between the outlet compartment and the air supply means to deliver air thereto.

4. A dust collecting system according to claim 3 including air filter means disposed in the fan housing between the intake compartment and the outlet compartment.

5. A dust collecting system according to claim 2 including air filter means disposed over the opening in the dust collecting means.

5

6. A dust collecting system according to claim 5 wherein the filter means comprises a first relatively coarse screen at the pressure side of the opening to trap dust fibers and a second relatively fine screen on the suction side of the opening to trap fine dust particles.

7. A dust collecting system for a fiber processing machine which includes a plurality of fiber-carrying components comprising a housing located beneath the fiber-carrying components and enclosing a portion of at least one of the fiber-carrying components, dust collecting means disposed in the housing on one side of the enclosed portion of the fiber-carrying component including an opening providing an outlet for air from the enclosure, air supply means disposed in the housing and spaced from the dust collecting means on the other side of the enclosed portion of the fiber-carrying component to direct a stream of air adjacent to the surface of the enclosed portion of the fiber-carrying component and toward the dust collecting means, a suction duct connected to the dust collecting means to draw air through the opening therein, air filter means disposed over the opening in the dust collecting means, and including a fan housing having an air intake compartment connected to the suction duct, an air outlet compartment, a fan mounted in the fan housing, pressure duct means connected between the outlet compartment and the air supply means to deliver air thereto, an evacuation enclosure located beyond the dust collecting means with respect to the air supply means having a filtered opening to the exterior of the machine, intake valve means in the fan housing, and shutoff valve means in the suction duct means, whereby with the shutoff valve means closed and the intake valve means opened, air is directed from the air supply means across the filter means of the dust collecting means and into the evacuation enclosure to carry dust accumulated on the filter means into the evacuation enclosure.

8. A dust collecting system according to claim 1 including means forming a flat surface disposed within the housing and beneath the enclosed portion of the fiber-carrying component extending substantially from the air supply means to the dust collecting means.

9. A dust collecting system for a fiber processing machine which includes a plurality of fiber-carrying components comprising a housing located beneath the fiber-carrying components and enclosing a portion of at least one of the fiber-carrying components, dust collecting means disposed in the housing on one side of the enclosed portion of the fiber-carrying component including an opening providing an outlet for air from the enclosure, air supply means disposed in the housing and spaced from the dust collecting means on the other side of the enclosed portion of the fiber-carrying component to direct a stream of air adjacent to the surface of the enclosed portion of the fiber-carrying component and toward the dust collecting means, and means on the air supply means for adjusting the direction of air flow therefrom to direct air toward the enclosed portion of the fiber-carrying component.

10. A dust collecting system for a fiber processing machine which includes a plurality of fiber-carrying components comprising a housing located beneath the fiber-carrying components and enclosing a portion of at least one of the fiber-carrying components, dust collecting means disposed in the housing on one side of the enclosed portion of the fiber-carrying component including an opening providing an outlet for air from the enclosure, air supply means disposed in the housing and spaced from the dust collecting means on the other side of the enclosed portion of the fiber-carrying component to direct a stream of air adjacent to the surface of the enclosed portion of the fiber-carrying component and toward the dust collecting means, and a perforated plate located adjacent to the surface of the enclosed portion of the fiber-carrying component and forming a partial enclosure therewith, and duct means connected to the air supply means

6

to direct a stream of air therefrom through the partial enclosure and along the surface of the fiber-carrying component to remove dust particles therefrom and carry them to the dust collecting means.

11. A dust collecting system for a carding machine which includes a lickerin, a swift, a flat chain and a doffer each having surfaces adapted to engage fibrous material being processed comprising a housing located generally beneath the lickerin, the swift and the doffer and enclosing a portion of the lickerin and the swift, means forming a flat surface in the housing located beneath the enclosed portion of the swift, dust collecting means including an opening located beneath the lickerin, filter means disposed in the opening and extending substantially parallel with the flat surface, suction duct means connected to the opening to draw air from the housing through the filter means, air supply means within the housing to direct air across the flat surface adjacent to the swift surface and toward the dust collecting means, means for directing a current of air toward the surface of the enclosed portion of the swift to facilitate removal of dust therefrom, pressure duct means for supplying air to the air supply means, a fan housing including an intake compartment connected to the suction duct means and an outlet compartment connected to the pressure duct means, and fan means within the fan housing to drive air from the intake compartment to the outlet compartment.

12. A dust collecting system for a carding machine which includes a lickerin, a swift, a flat chain and a doffer each having surfaces adapted to engage fibrous material being processed comprising a housing located generally beneath the lickerin, the swift and the doffer and enclosing a portion of the lickerin and the swift, means forming a flat surface in the housing located beneath the enclosed portion of the swift, dust collecting means including an opening located beneath the lickerin, filter means disposed in the opening and extending substantially parallel with the flat surface, suction duct means connected to the opening to draw air from the housing through the filter means, air supply means within the housing to direct air across the flat surface adjacent to the swift surface and toward the dust collecting means, pressure duct means for supplying air to the air supply means, a fan housing including an intake compartment connected to the suction duct means and an outlet compartment connected to the pressure duct means, fan means within the fan housing to drive air from the intake compartment to the outlet compartment, and a perforated curved plate mounted within the housing and adjacent to the surface of the enclosed portion of the swift to form a partial enclosure therewith, and duct means connecting the air supply means to the partial enclosure to direct air along the surface of the swift and carry dust therefrom toward the dust collecting means.

13. A dust collecting system for a carding machine which includes a lickerin, a swift, a flat chain and a doffer each having surfaces adapted to engage fibrous material being processed comprising a housing located generally beneath the lickerin, the swift and the doffer and enclosing a portion of the lickerin and the swift, means forming a flat surface in the housing located beneath the enclosed portion of the swift, dust collecting means including an opening located beneath the lickerin, filter means disposed in the opening and extending substantially parallel with the flat surface, suction duct means connected to the opening to draw air from the housing through the filter means, air supply means within the housing to direct air across the flat surface adjacent to the swift surface and toward the dust collecting means, pressure duct means for supplying air to the air supply means, a fan housing including an intake compartment connected to the suction duct means and an outlet compartment connected to the pressure duct means, fan means within the fan housing to drive air from the intake compartment to the outlet compartment, and a suction nozzle mounted adjacent to

7

the doffer, duct means connecting the suction nozzle to the intake compartment of the fan housing, a blowing nozzle mounted inside the flat chain to direct air through the flat chain and carry dust away from the flat chain and toward the suction nozzle, and duct means connecting the blowing nozzle to the pressure duct means.

14. A duct collecting system according to claim 11 including a suction device mounted closely adjacent to the lickerein and duct means connecting the suction device to the fan housing intake compartment.

5

10

2,242,278  
2,910,731  
2,964,804

562,740  
737,038  
740,391

8

References Cited in the file of this patent

UNITED STATES PATENTS

Yonkers ----- May 20, 1941  
Moore et al. ----- Nov. 3, 1959  
Schonenberger ----- Dec. 20, 1960

FOREIGN PATENTS

Great Britain ----- July 13, 1944  
Great Britain ----- Sept. 21, 1955  
Great Britain ----- Nov. 9, 1955