

Sept. 7, 1965

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3,204,296

DUST REMOVING SYSTEM FOR CARDING MACHINES

Filed March 12, 1962

4 Sheets-Sheet 1

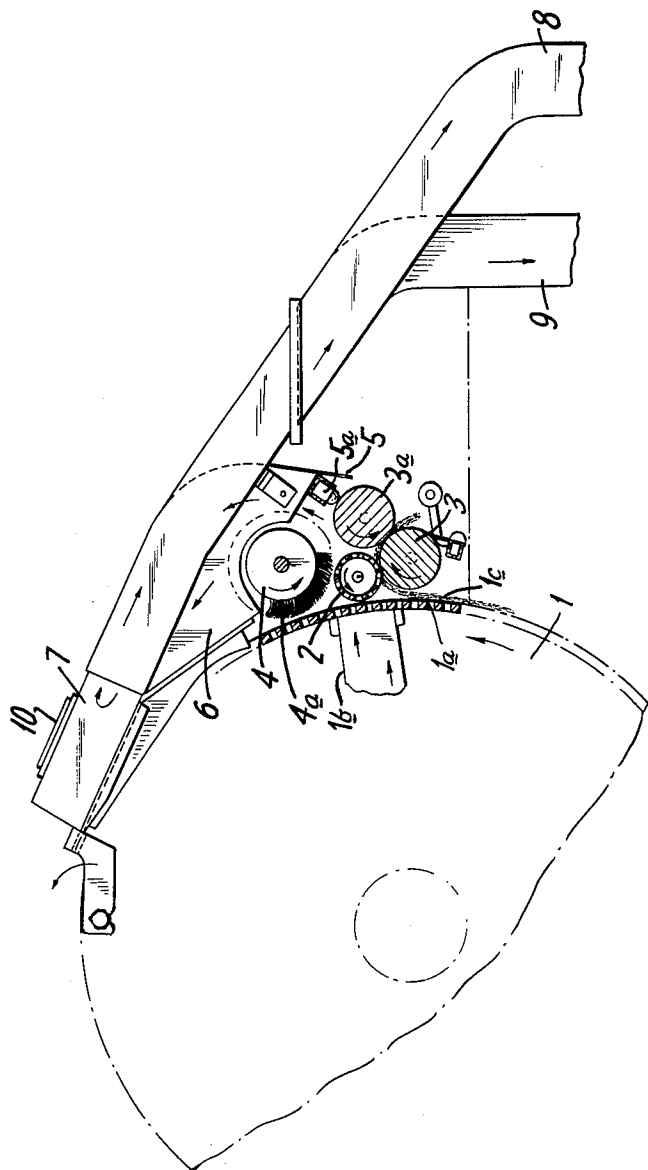


FIG. 1.

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4 Sheets-Sheet 2

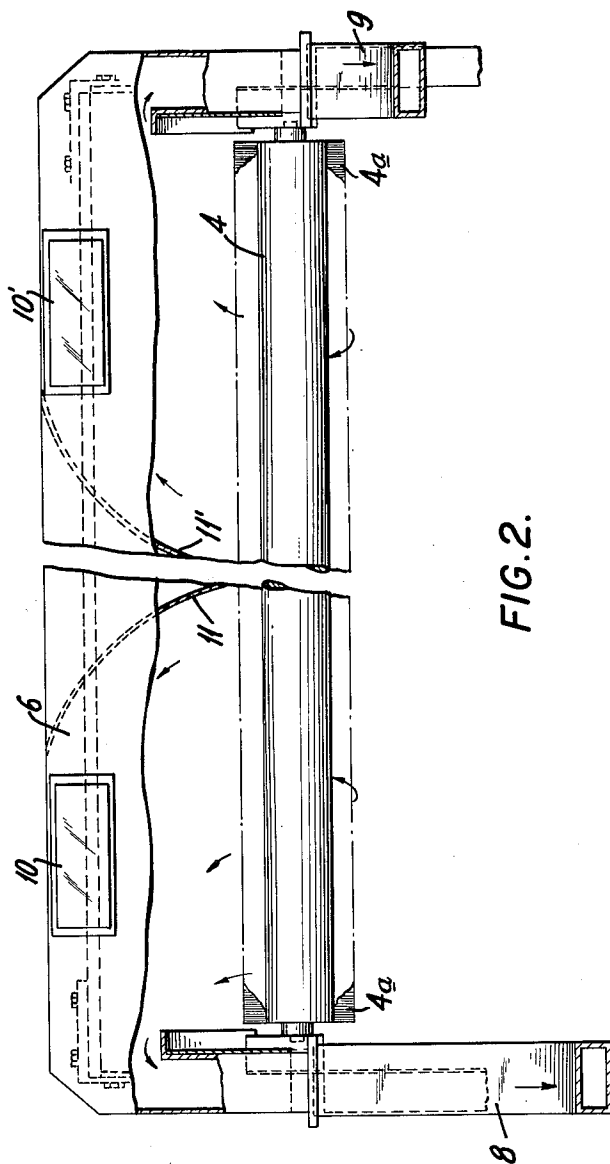


FIG. 2.

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4 Sheets-Sheet 3

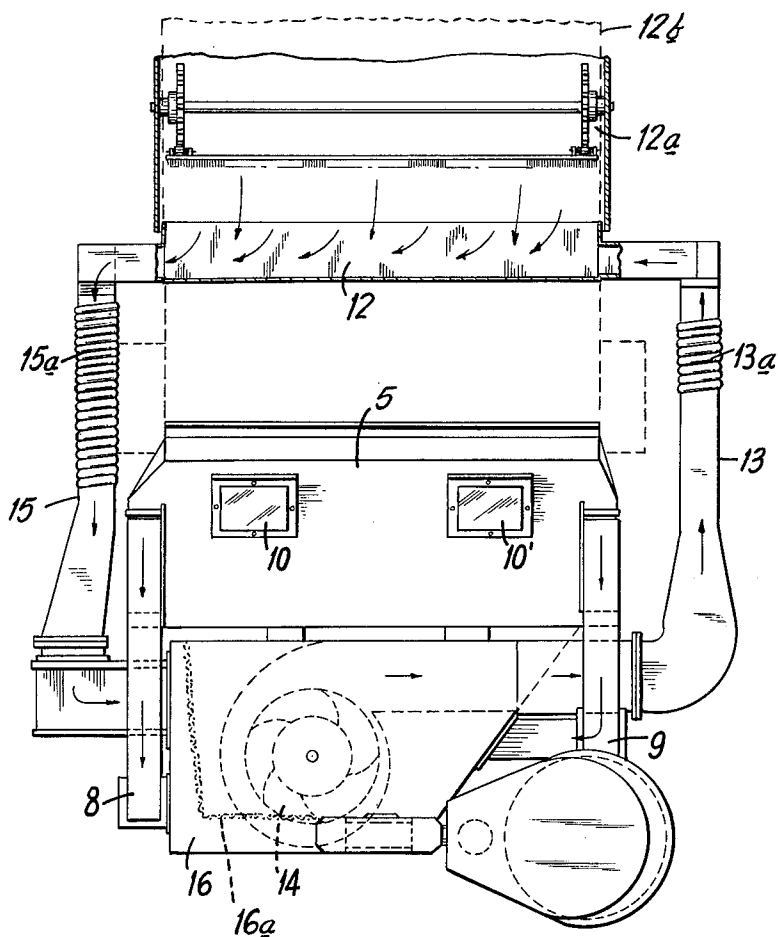


FIG. 3.

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4 Sheets-Sheet 4

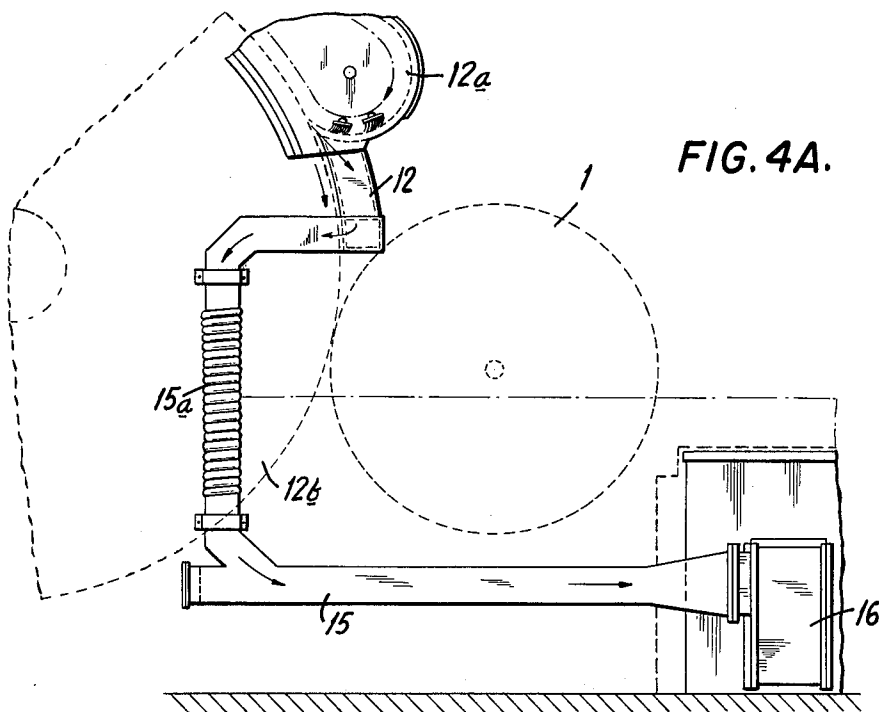


FIG. 4A.

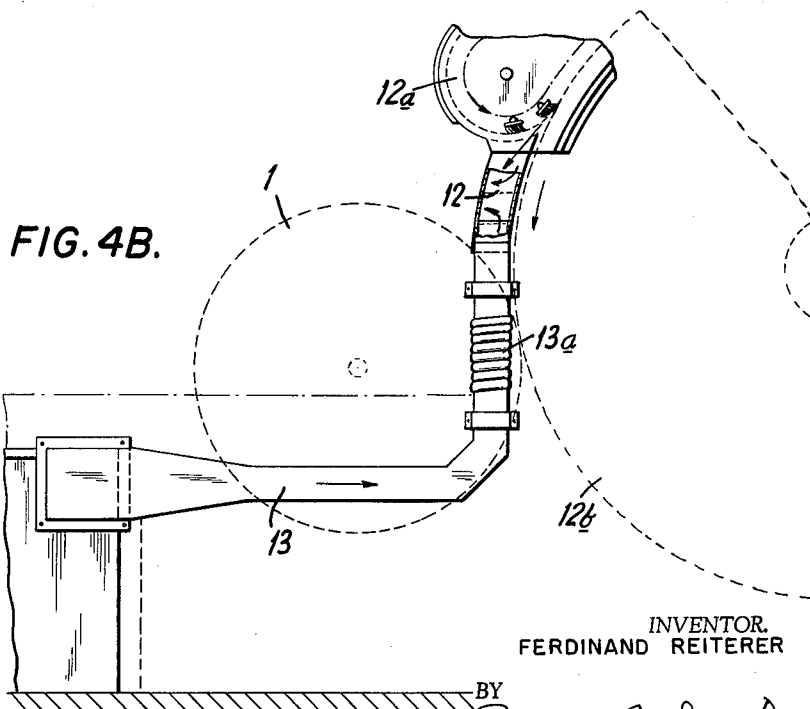


FIG. 4B.

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DUST REMOVING SYSTEM FOR CARDING MACHINES

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Filed Mar. 12, 1962, Ser. No. 179,118

Claims priority, application France, May 25, 1961, 862,817

9 Claims. (Cl. 19—106)

This application is a continuation-in-part of my copending application Serial No. 858,463, filed December 9, 1959, now abandoned, for "Carding Machine."

This invention relates to dust removing systems for carding machines and, more particularly, to a new and improved dust removing system arranged to remove dust effectively but without disrupting the fibers in the web produced by the machine.

During the combing and cleaning of a web of fibers in a carding machine a considerable quantity of dust, including impurities, very short fibers, and the like, is generated and, although some of this dust is released from the web during the combing process, a substantial proportion is retained in the web until it is removed from the doffer cylinder by a detaching device. At this point, the dust tends to accumulate and form piles which if carried on by the web can obstruct subsequent processing equipment. Moreover, any dust released into the atmosphere during the carding and detaching operations is injurious to personnel in the vicinity of the machine.

Heretofore, attempts have been made to remove dust generated in this manner by directing a blast of air toward the web at the regions of dust generation so as to blow the dust away from the web toward collecting devices. This arrangement, however, tends to destroy the homogeneity of the web by disturbing and disorienting the fibers. In some cases, suction has been applied to the web to remove dust but this frequently withdraws the fibers away from the web, as well as the dust. Moreover, the current of air created by the suction results in the same effect as blowing devices, causing disruption of the fibers in the web.

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

Another object of the invention is to provide a dust removing system of the above character which effectively removes dust from a web without disturbing the fibers in the web.

A further object of the invention is to provide a system for removing dust in the vicinity of the flat card chain of a carding machine as well as at the web detaching device.

These and other objects of the invention are attained by providing a hood adjacent to a dust generating region of a carding machine so as to receive dust therefrom and directing a stream of air into the hood so as to carry the dust away without disturbing the fibers of the web. In one embodiment of the invention, a rotatable cylinder is provided adjacent to the hood in a dust generating region having a surface adapted to collect dust and air is directed past the cylinder on the side away from the fiber web to remove dust from the cylinder surface and drive it into the hood. Preferably, the surface of the dust collecting cylinder is covered with a large number of fine, closely spaced needles slanted in the direction opposite to the direction of cylinder rotation so that the dust particles are readily released into the hood not only by the flow of air but also by centrifugal force resulting from the cylinder rotation. The invention is also adapted

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for use with a pneumatic web detaching device wherein air is directed outwardly from within the doffer at the detaching location, and this stream of air may be used to carry dust into the hood. In addition, the dust removing system may include another hood at a different dust generating location, such as at the end of the card flats, along with means for directing air within the hood from one side to the other to carry away dust from the region.

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

FIG. 1 is a side elevation view of a portion of a carding machine illustrating one form of dust removing system according to the invention;

FIG. 2 is an end view, partly broken away, illustrating the embodiment shown in FIG. 1;

FIG. 3 is a modification of the arrangement shown in FIG. 1, adapted to remove dust from the end of the flat card chain as well as from the region of web detachment;

FIG. 4A is a side view illustrating one side of the system shown in FIG. 3; and

FIG. 4B is a side view showing the other side of the system shown in FIG. 3.

In the representative embodiment of the invention illustrated in FIGS. 1 and 2, a rotatable doffer cylinder 1 having a perforated peripheral wall 1a and an internal air supply duct 1b positioned to direct air outwardly through the perforated wall at the detaching region, carries a web 1c on its outer surface from a swift (not shown in FIG. 1) to a detaching device which may be similar to the device described in my copending United States application, Serial No. 141,132, filed September 27, 1961, now U.S. Patent No. 3,145,428, for "Pneumatic Web Removal in Carding Machines." As described in that application and illustrated in FIG. 1, one form of pneumatic detaching device comprises a primary detaching cylinder 2 having a perforated peripheral wall disposed in the path of air blown by the duct 1b and an imperforate secondary detaching cylinder 3 arranged to carry the web from the surface of the doffer past that of the primary detaching cylinder. In addition, another secondary detaching cylinder 3a may be provided to direct the web away from the cylinder 2. It will be understood, however, that the dust removing system of the present invention is also suitable for use with carding machines having other types of web detaching devices, such as vibrating combs, for example.

In accordance with the present invention, a rotatable cylinder 4 having a surface adapted to collect dust is positioned closely adjacent to the web detaching device and to the outer surface 1a of the doffer, and to a hood 5 having a section 6 surrounding the side of the cylinder 4 opposite to the web detaching device and extending to the secondary cylinder 3a. It will be noted from an examination of FIG. 1 that air from the duct 1b passes generally parallel to the web 1c at its closest approach, so that it does not disturb the fibers thereof, while at the same time it carries a considerable quantity of dust into the hood 5. In order to collect any remaining dust from the region of the detaching device and release it into the hood, the surface of the cylinder 4 is preferably covered with a layer 4a of fine, closely spaced needles slanted in the direction opposite to the direction of rotation of the cylinder. With this arrangement, the surface of the cylinder generates relatively little air current during rotation, but is highly effective to carry dust into the hood and release it by centrifugal force.

If desired, a resilient scraper 5a may be mounted on the hood 5 in position to engage and scrape the surface of the adjacent cylinder 3a to remove dust and fibers therefrom. The chamber portion 7 of the hood 5 con-

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nects the hood to the suction ducts 8 and 9 and, as best seen in FIG. 2, two viewing windows 10 and 10' are provided in the portion 7 to permit observation of the interior of the chamber and two deflecting vanes 11 and 11' are disposed within the chamber to deflect air toward the suction ducts. Also, as illustrated in the drawings, the chamber portion 7 is preferably hinged to the frame of the machine so that the entire hood and upper parts of the ducts 8 and 9, along with the dust collecting cylinder 4, can be pivoted away from the detaching device.

In operation, with the doffer 1 and the detaching cylinders turning in the directions indicated by the arrows, the web 1c of fibers is urged by air from the duct 1b against the adjacent detaching cylinder 3. The web is then carried by this cylinder past the cylinders 2 and 3a while the stream of air is directed through the perforated cylinder 2 and into the hood 5, carrying with it much of the dust released by detachment of the web. Some of the dust, however, escapes this stream of air and would be scattered into the atmosphere in the absence of the dust collecting cylinder 4, which collects the dust on its surface on the side adjacent to the detaching device and carries it into the interior of the hood 5 where it is removed by centrifugal force and also by the air flowing past it into the hood. Accordingly, both the web 1c and the atmosphere surrounding the detaching region are kept free of dust.

In the embodiment of the invention shown in FIGS. 3, 4A and 4B, the dust removing system is adapted to carry away dust from the region at the end of the flat card chain of a carding machine as well as from that of the detaching device. To this end, another hood 12 forming a chamber across the end of a flat card chain 12a which is mounted above a main card cylinder 12b is connected on one side of the machine to an air supply duct 13 leading from the outlet of a fan 14 and at the other side of the machine to a suction duct 15 connected to the air intake of the fan housing 16. Within the fan housing, a filter screen 16a is mounted between the air intake and the fan 14. If desired, flexible portions 13a and 15a may be provided in the ducts 13 and 15 to enable the hood 12 to be moved away from the end of the flat chain easily.

In operation, the fan 14, in addition to applying air to the interior of the doffer and suction to the hood 5, directs air through the duct 13, across the interior of the hood 12, and back through the duct 15 to the air intake of the housing 16. As indicated by the arrows in the drawings, dust generated at the end of the flat chain is directed into the hood 12 where it is carried away by the duct 15 without any pollution of the surrounding atmosphere. Moreover, since the air in the hood 12 flows generally parallel to the surface of the swift and is spaced from the fiber web by the hood, it is impossible for the flow of air to disrupt the fibers in the web.

It will be apparent from the foregoing that the present invention provides a dust removing system for carding machines which effectively prevents dust from polluting the atmosphere or collecting on the fiber web at the dust generating regions 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. In combination with a fiber processing machine wherein dust is generated at selected regions by processing a web of fibers, a dust removing system comprising hood means substantially enclosing a dust generating region so as to receive dust directly therefrom, and means for guiding a current of air along a path extending in closely adjacent spaced relation to a web of fibers being processed by the machine in a direction generally parallel

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to an adjacent surface of the web and the hood means without passing through the web so as to carry away the dust received thereby without disrupting the fibers of the web.

2. In combination with a fiber processing machine wherein dust is generated at selected regions by processing of a web of fibers, a dust removing system comprising hood means substantially enclosing a dust generating region and having an opening extending transversely to the direction of motion of the web and generally parallel to the surface of the web, and means for guiding a current of air along a path extending in closely adjacent spaced relation to a web of fibers being processed by the machine in a direction generally parallel to an adjacent surface of the web and through the hood means without passing through the web so as to carry away the dust received thereby without disrupting the fibers of the web.

3. The combination according to claim 2 wherein the means for directing air through the hood means is arranged to direct air within the hood means in a direction parallel to the extent of the hood opening.

4. In combination with a fiber processing machine wherein dust is generated at selected regions by processing of a web of fibers, a dust removing system comprising hood means mounted in a dust generating region, dust collecting cylinder means mounted for rotation at the mouth of the hood means having a surface adapted to collect dust from the dust collecting region and carry it into the hood means, and means for guiding a current of air along a path extending in closely adjacent spaced relation to a web of fibers being processed by the machine in a direction generally parallel to the surface of the web of fibers and then past the surface of the dust collecting cylinder means and into the hood means without passing through the web so as to collect dust and carry it into the hood means.

5. In combination with a fiber processing machine including a doffer having a perforated peripheral wall and a device for detaching a web of fibers from the doffer and wherein dust is generated at selected regions by processing of a web of fibers, a dust removing system comprising hood means mounted in a dust generating region, dust collecting cylinder means mounted for rotation at the mouth of the hood means having a surface adapted to collect dust from the dust collecting region and carry it into the hood means and means for guiding a current of air along a path extending in closely adjacent spaced relation to a web of fibers being processed by the machine in a direction generally parallel to the surface of the web of fibers and then past the surface of the dust collecting cylinder means and into the hood means without passing through the web so as to collect dust and carry it into the hood means, wherein the hood means is mounted adjacent to the doffer and to the detaching device and including duct means for directing air outwardly through the perforated wall toward the detaching device and wherein the detaching device includes a detaching cylinder having a perforated peripheral wall interposed between the duct means and the hood means.

6. A dust removing system for a fiber processing machine including a main card cylinder, a revolving flat card chain for processing a web of fibers carried by the main card cylinder, a doffer cylinder for removing the web from the main card cylinder, and a detaching device for removing the web from the doffer cylinder, said dust removing system comprising first hood means mounted adjacent to and substantially enclosing the detaching device so as to receive directly dust generated during the detachment of the web, means for guiding a current of air along a path extending in closely adjacent spaced relation to a web of fibers being processed by the machine in a direction generally parallel to an adjacent surface of the web without passing through the web and through the first hood means so as to carry away the

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dust received thereby without disrupting the fibers in the web, second hood means mounted adjacent to an end of the flat card chain so as to receive dust generated thereby, and means for directing air through the second hood means so as to carry away the dust received thereby without disrupting the fiber web.

7. A dust removing system for a fiber processing machine including a main card cylinder, a revolving flat card chain for processing a web of fibers carried by the main card cylinder, a doffer cylinder for removing the web from the main card cylinder, and a detaching device for removing the web from the doffer cylinder, said dust removing system comprising first hood means mounted adjacent to and substantially enclosing the detaching device so as to receive directly dust generated during the detachment of the web, means for guiding a current of air along a path extending in closely adjacent spaced relation to a web of fibers being processed by the machine in a direction generally parallel to an adjacent surface of web without passing through the web and through the first hood means so as to carry away the dust received thereby without disrupting the fibers in the web, second hood means mounted adjacent to an end of the flat card chain so as to receive dust generated thereby, and means for directing air through the second hood means so as to carry away the dust received thereby without disrupting the fiber web, wherein the doffer cylinder is provided with a perforated peripheral wall and the means for guiding a current of air includes duct means for directing air outwardly from within the doffer cylinder through the perforated wall and toward the hood means in a direction generally parallel to the surface of the web at the detaching device.

8. A dust removing system according to claim 6 in-

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cluding a dust-collecting cylinder mounted for rotation at the mouth of the first hood means having a surface adapted to collect dust in the dust generating region and carry it into the path of the current of air so that it is removed from the surface of the dust-collecting cylinder inside the first hood means.

9. A dust collecting system according to claim 8 wherein the dust-collecting cylinder has a surface covered with a plurality of fine, closely spaced needles extending at an angle to the surface so as to be directed away from the direction of rotation of the dust-collecting cylinder.

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