

Oct. 13, 1942.

L. M. KINARD

2,299,022

AIR SEPARATOR

Filed Feb. 6, 1941

2 Sheets-Sheet 1

Fig. 1.

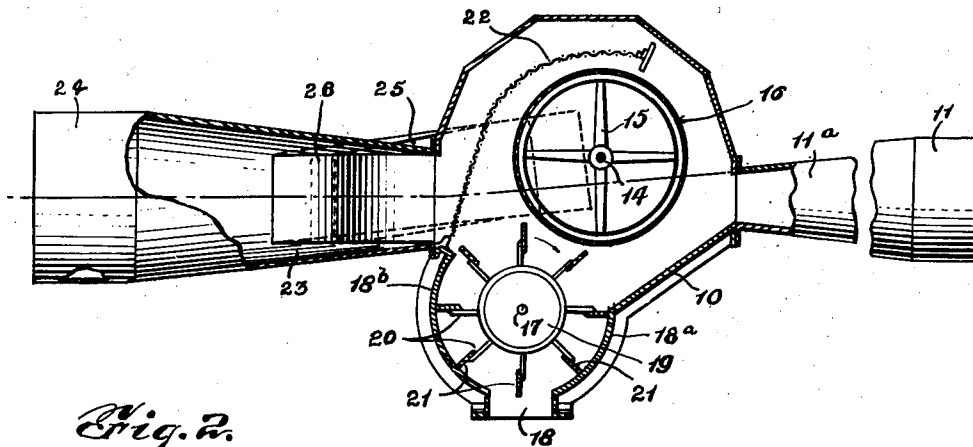
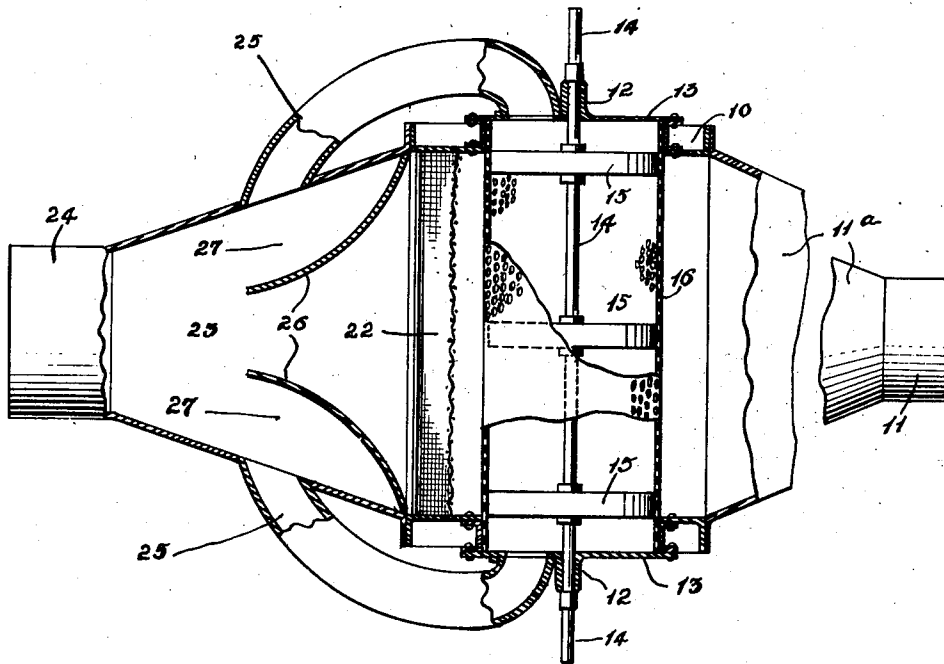


Fig. 2.



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Fig. 3.

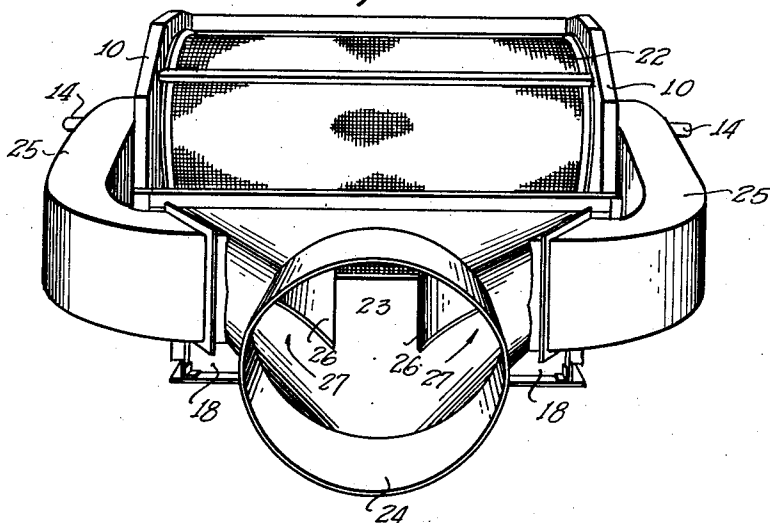


Fig. 4.

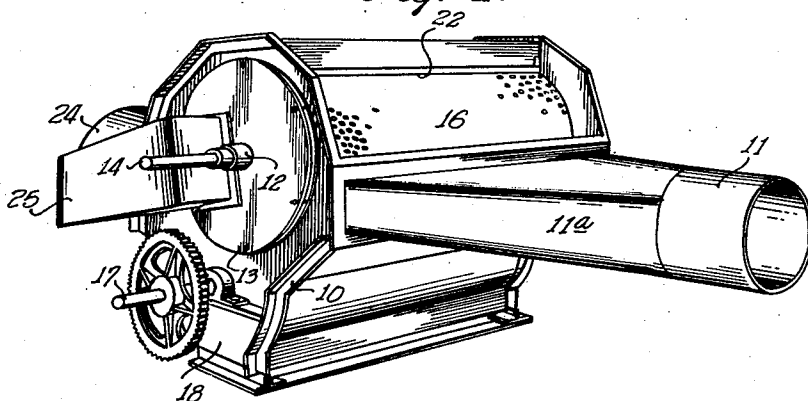


Fig. 5.

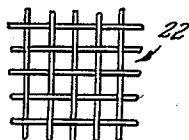
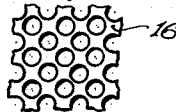


Fig. 6.



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2,299,022

AIR SEPARATOR

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Application February 6, 1941, Serial No. 377,621

8 Claims. (Cl. 19-75)

This invention relates to cotton machinery and has particular relation to those machines known as air separators.

Cotton is normally conveyed from one point to another during processing, by means of pneumatic conduits. Upon arrival at the proper point, it is necessary to separate the air from the cotton in order to permit the cotton to be processed without the large amount of conducting air interfering.

Various hand controlled devices have been provided as have been some automatic machines. Hand controlled devices are objectionable as the human element causes non-constant action and necessitates constant tending. Some of the automatic machines have not been free of clogging, which causes undesirable shut-down periods during which time the machines are cleared of the obstructing lint. In order to be entirely successful, a structure for this purpose must not only require constant attention by hand operation but must operate automatically without clogging or stopping over long periods of time.

A primary object of this invention is the provision of an improved air separator.

Another object of the invention is the provision of an improved air separator which will separate the air from the air-carried cotton without leaving portions of the cotton in the machine to interfere with its proper functioning.

Still another object of the invention is the provision of an air separator provided with an improved rotary separator having an equalized air connection from its interior to the outlet passage.

Another and still further object of the invention is the provision of an air separator provided with a deflecting cylinder so constructed as to separate the cotton while still permitting the air current to pass in a substantially direct line to the discharge conduit.

Another and still further object of the invention is the provision of an air separator provided with a deflecting cylinder, and a foraminous wall between the cylinder and the air discharge.

Another and still further object of the invention is the provision of an air separator provided with a deflecting cylinder and air discharge connections between the cylinder interior and the discharge.

Another and still further object of the invention is the provision of an air separator provided with a deflecting cylinder and air discharge connections from the interior of the cylinder to the air discharge conduit comprising two passages

having a cross-section equal to half the cross-section of the air discharge at their junction.

Another and still further object of the invention is the provision of an air separator provided with a foraminous wall having an air discharge between two plates equal to half the main discharge conduit and equal to the air discharge conduit, comprising two passages from each end of the deflecting cylinder.

Other and further objects of the invention will be apparent from a reading of the complete specification and claims.

Referring to the drawings wherein I have illustrated an embodiment of my invention:

Fig. 1 is side elevation of my invention, parts being broken away for the sake of clearness of illustration.

Fig. 2 is a plan view, parts being in section.

Fig. 3 is a rear perspective view.

Fig. 4 is a side-front perspective view.

Figs. 5 and 6 are details of the screen construction as used in the preferred form of the invention.

Similar reference characters refer to the same or similar parts throughout the specification and drawings.

A main housing portion 10 is provided with an inlet conduit 11 through which enters the cotton-laden air. Adjacent the main housing, the conduit 11 expands in width as at 11a to deliver the cotton to the length of the deflecting cylinder to be described.

Centered in the main housing and mounted in bearings 12, carried by large separable cap portions 13 is a shaft 14. This shaft 14 carries spiders 15 which in turn support the deflecting cylinder 16. This deflecting cylinder 16 is of foraminous material constructed preferably of sheet metal with one-fourth inch punchings far enough apart to furnish sufficient material to give stability to the cylinder as a whole, as shown in Fig. 6.

This cylinder 16 is power-connected to be driven in a clockwise direction as seen in Fig. 1. In other words, the surface presented to the oncoming current of air is moving downwards to deflect the cotton from the air current. It will be noted that the position of the conduit 11, 11a relative to the deflecting cylinder is such that the air current with its cotton, will encounter the deflecting cylinder below its center sufficiently only to insure that the cotton will be assisted by the slope of the outer wall of the cylinder 16 as it is separated from the air current.

Below and slightly to the rear of the shaft is

another shaft 17 which carries a bladed means for discharging the cotton delivery conduit 18. This bladed means comprises a core or cylindrical portion 19 having blades 20 arranged in radial planes and extending the length of the cylinder. On the outer edges of the blades 20 are mounted flexible strips 21. These flexible strips 21 which may be of rubber sheeting rub on cylindrical walls of the cotton discharge conduit 18 as at 18a and 18b provide an air lock, passing the cotton yet holding back the blast of the air current.

This cotton discharge unit revolves clockwise as shown in Fig. 1, as does its coacting deflecting cylinder 16.

Immediately to the rear of the deflecting cylinder 16 is a foraminous wall 22 which may be constructed of any foraminous material with one quarter inch or slightly larger mesh. This wall 22 is spaced from the upper housing wall and extends from a line slightly forward of the vertical plane of the shaft 14, over the cylinder 16 and is attached to the housing at the rear of the discharge unit. This wall 22 follows the curvature of the deflecting cylinder and the rear portion thereof preferably inclines slightly forward which permits the lint to drop onto the discharge unit.

Air being drawn from the conduit 11, passes over, under or through the deflecting cylinder 16. That portion which passes over or under the deflecting cylinder 16, passes through the foraminous wall 22 and out through opening 23 and a part of that which passes through the discharge openings at the ends of the deflecting cylinder, will enter a discharge passage 27 on its way to the discharge conduit 24.

Connected at each side of the housing to the respective cap portions 13 are discharge connections 25. As the cap portions 13 conform to shape of the ends of the deflecting cylinder, these discharge connections connect directly to the ends of the chamber within the deflecting cylinder. The rear ends of these discharge connections enter the sides of the discharge conduit. The walls of the discharge conduit 24 and the plates 26 form passages 27 which empty into the main portion of the discharge conduit 24. The stationary plates 26 are so positioned that the discharge passage between the stationary plates 26 will, during operation, discharge substantially the same amount of air as the combined discharges of the passage 27 and passages 25.

I will now describe the operation of the separator as a whole.

The separator may be placed above a cleaner-gin unit to supply cotton thereto. An exhaust fan is connected to the air discharge conduit 24. A conduit extends from the conduit end 11 to a storage house or to a telescoping tube to pick up cotton from a truck or wagon. Atmospheric pressure at the intake end carries the cotton up along the conduit to the enlarged portion 11a. The cotton laden air enters the enlarged portion 11a and has a tendency to spread due to the shape and to slacken its speed because of the enlarged cross section.

As the air and cotton enter the main housing 10, the cotton encounters the lower portion of the deflecting cylinder. A portion of the air continues on through the openings of the cylinder, and the other portion of air goes over and under the deflecting cylinder through the foraminous wall 22, on through the discharge opening be-

tween the stationary plates 26 into main discharge conduit 24. The revolving action of the deflecting cylinder forces the cotton downwardly to the cotton discharging mechanism on the shaft 17. The cotton is received by and between the blades 20 and passed downwardly through the cotton discharge conduit 18 to the cleaner-gin below.

The flow of air entering with cotton from conduits 11 and 11a is equally divided into the deflecting cylinder 16 and foraminous wall 22 because the cross-section area of the openings in the foraminous wall 22 and deflecting cylinder 16 being equal, and the two discharge passages 25 and the discharge passage between the stationary plates 26 being equal, relieves the resistance so that the cotton cannot stick. The deflecting cylinder revolves in such manner that it controls the cotton and the air so that if any cotton tends to stick to either the deflecting cylinder or foraminous wall, the air will automatically keep the foraminous wall and deflecting cylinder clean.

It will thus be seen that I have produced a structure which will efficiently and effectively remove the air from the cotton and deliver the latter to the cleaner-gin unit.

While I have described and illustrated an embodiment of my invention in detail, I desire to have it understood that the disclosure is merely illustrated and that modifications and changes may be made without the scope of the invention and without departing from its spirit as claimed.

What is claimed is:

1. An air separator for cotton comprising a housing, a rotary deflecting cylinder on a horizontal axis, having openings in its surface for deflecting the cotton, a conduit for delivering cotton-laden air to the cylinder, a discharge conduit at the rear of the cylinder for receiving the air from the delivering conduit in an unobstructed flow through the cylinder in a substantially direct line, a foraminous wall intermediate said cylinder and discharge conduit and auxiliary discharge conduits for transferring air from the interior of the cylinder to either side of the main discharge conduit.

2. An air separator for cotton, comprising a housing, a rotary deflecting cylinder having openings in its surface for deflecting the cotton, a conduit for delivering cotton-laden air to the cylinder, a discharge conduit at the rear of the cylinder for receiving the air from the delivering conduit in an unobstructed flow through the cylinder, a stationary foraminous wall between the cylinder and the discharge conduit and auxiliary discharge conduits from the interior of the cylinder to the main discharge conduit.

3. An air separator for cotton, comprising a housing, a rotary deflecting cylinder having openings in its surface for deflecting the cotton, a conduit for delivering cotton-laden air to the cylinder, a discharge conduit in axial alignment with said delivering conduit and disposed at the rear of the cylinder for receiving the air from the delivering conduit in an unobstructed flow through the cylinder a foraminous wall interposed between said cylinder and discharge conduit and a pair of auxiliary discharge connections from the interior of the cylinder to either side of the main discharge conduit being of a combined transverse cross-section equal to substantially half of the transverse cross-section of the discharge at their junction.

4. An air separator for cotton comprising a

housing a rotary deflecting cylinder, having openings in its surface for deflecting the cotton, a conduit for delivering cotton-laden air to the cylinder, a discharge conduit at the rear of the cylinder for receiving the air from the delivering conduit in an unobstructed flow through the cylinder in a substantially direct line, a stationary screen disposed between said cylinder and discharge conduit for collecting cotton escaping said cylinder, an auxiliary discharge from the interior of the cylinder to the main discharge conduit, comprising two passages having respective connections to the cylinder ends, and a rotary, radially bladed means operating adjacent said deflecting cylinder and providing an airlock between the housing interior and the cotton outlet of said housing.

5. An air separator for cotton comprising a housing, a rotary deflecting cylinder, having openings in its surface for deflecting the cotton, a conduit for delivering cotton-laden air to the cylinder, a discharge conduit at the rear of the cylinder for receiving the air from the delivering conduit in an unobstructed flow through the cylinder in a substantially direct line, an auxiliary discharge from the interior of the cylinder to the main discharge conduit, comprising two passages having respective connections to the cylinder ends, the combined transverse cross-sectional area of the two passages being equal to substantially half of the transverse cross-section of the discharge conduit at their junction, means at the delivery end of each of said passages to direct air into the stream flowing through said discharge conduit, and a rotary airlock below said cylinder.

6. An air separator for cotton, comprising a housing, a rotary deflecting cylinder having

openings in its surface for deflecting the cotton, a conduit for delivering cotton-laden air to the cylinder, a discharge conduit at the rear of the cylinder for receiving the air from the delivering conduit in an unobstructed flow through the cylinder, a stationary foraminous wall between the cylinder and the discharge conduit, and auxiliary discharge connections between the interior of the cylinder and the main discharge conduit, the auxiliary discharge connections comprising two passages connected to the respective ends of the interior of the cylinder and leading to the main discharge conduit.

7. An air separator for cotton, comprising a housing, a rotary deflecting cylinder having openings in its surface for deflecting the cotton, a conduit for delivering cotton-laden air to the cylinder, a discharge conduit at the rear of the cylinder for receiving the air from the delivering conduit in an unobstructed flow through the cylinder, an auxiliary discharge conduit being provided at the delivery end with deflecting means to direct the air in the direction of the main discharge.

8. An air separator for cotton, comprising a housing, a rotary deflecting cylinder having openings in its surface for deflecting for cotton, a conduit for delivering cotton-laden air to the cylinder, a discharge conduit at the rear of the cylinder for receiving the air from the delivering conduit in an unobstructed flow through the cylinder, an auxiliary discharge from the interior of the cylinder to the main discharge conduit comprising two passages having deflecting means at their delivery ends to direct the air in the direction of the discharge.

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