Dec. 7, 1926. 1,610,053

R. D. HOLMES

COTTON AND AIR SEPARATOR

Filed May 15, 1926 2 Sheets-Sheet 1

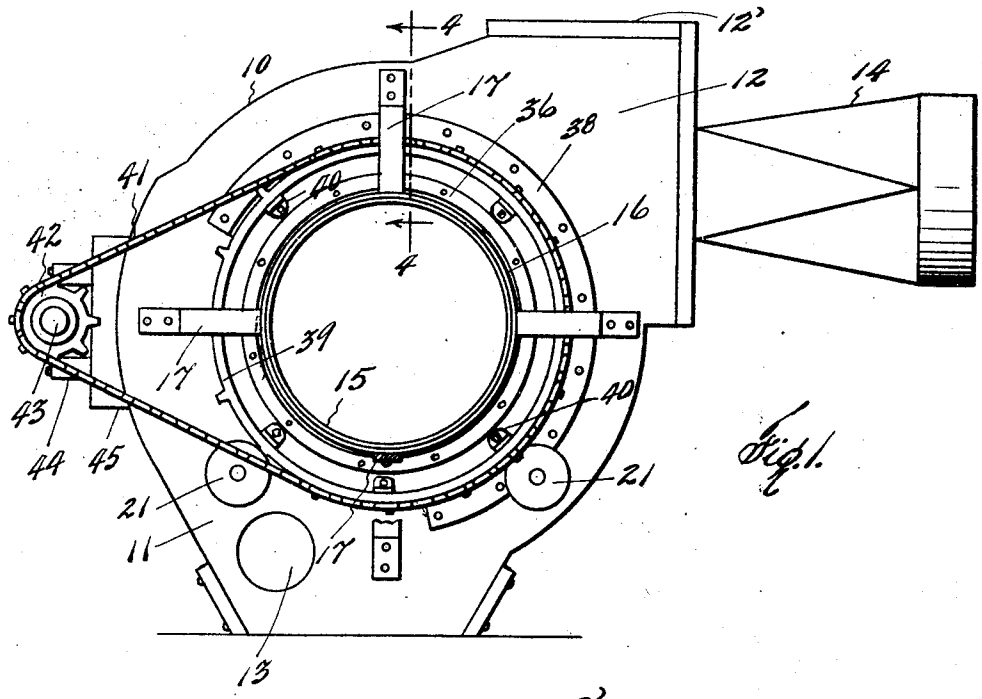


Fig. 1.

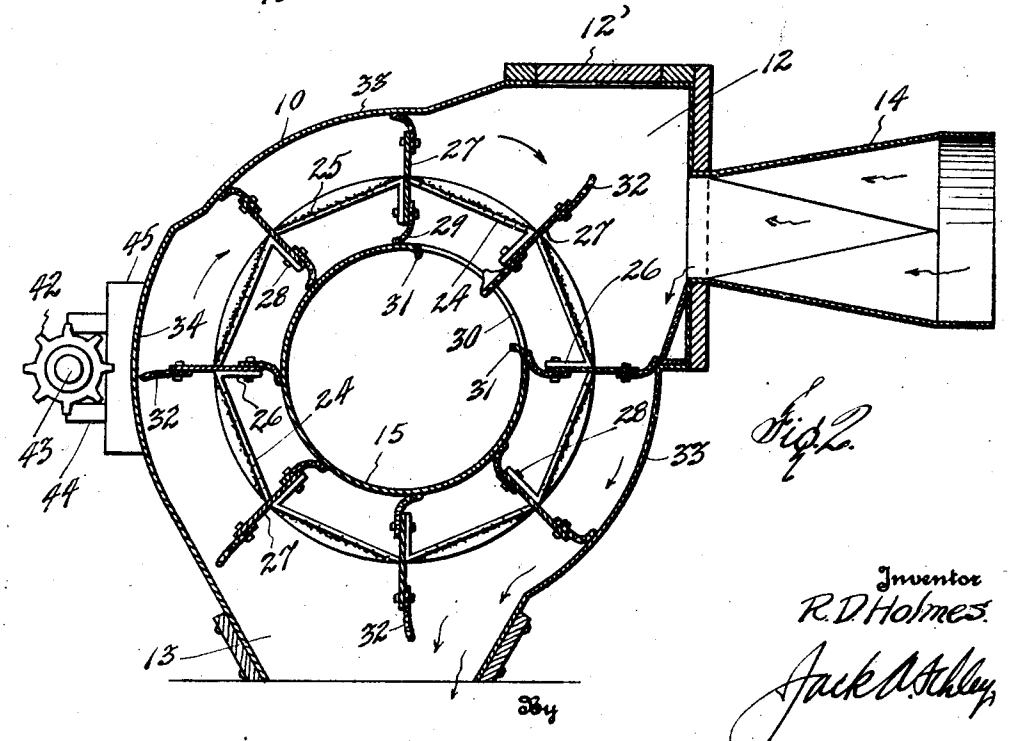


Fig. 2.

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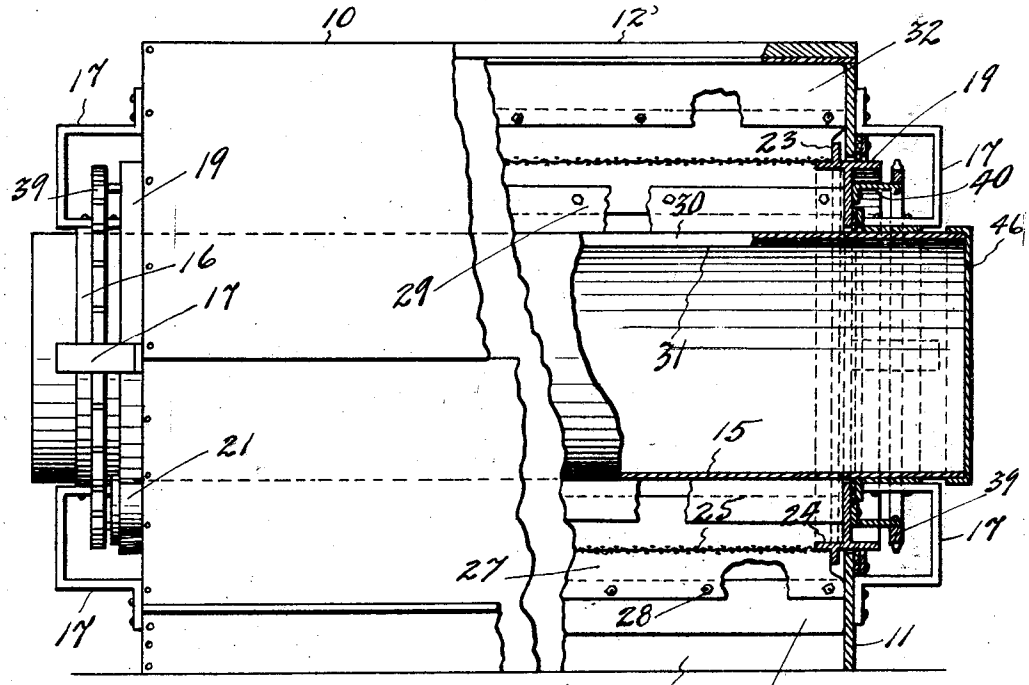


Fig. 3.

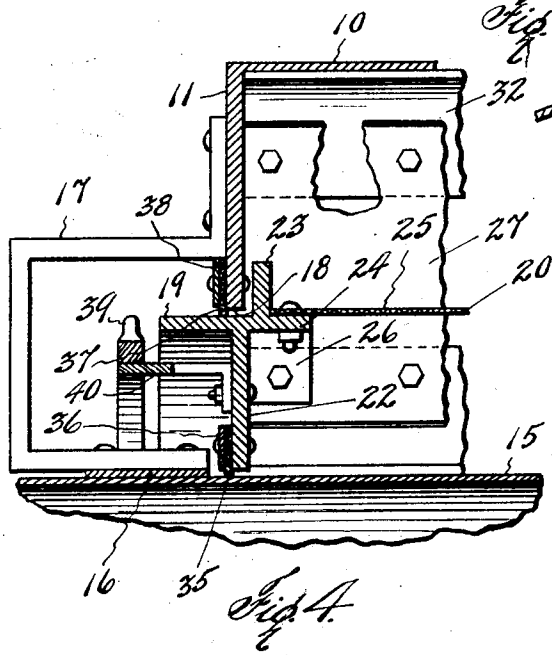


Fig. 4.

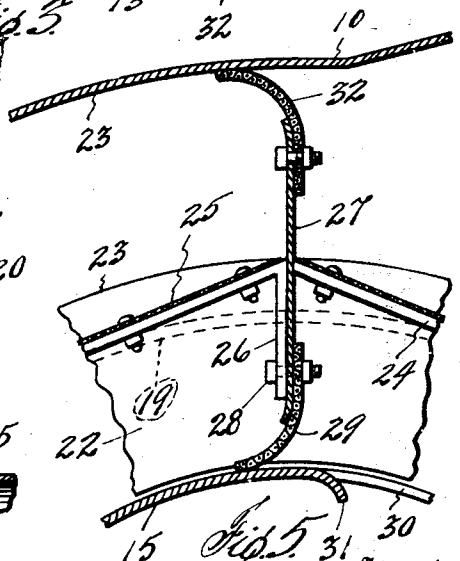


Fig. 5.

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Patented Dec. 7, 1926. 1,610,053

UNITED STATES PATENT OFFICE.

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COTTON AND AIR SEPARATOR.

Application filed May 15, 1926. Serial No. 109,215.

This invention relates to new and useful improvements in cotton and air separators.

The object of the invention is to provide a separator having a condenser cylinder constructed with an air outlet longitudinally of its central support and intermediate its ends; whereby the cotton is prevented from banking at the ends of the cylinder and an even distribution over the screened surface is had.

Another object is to provide a condenser cylinder having longitudinal peripheral pockets and radial air chambers, whereby the air is directed to a central outlet, and cotton is collected in the pockets; together with interior wipers which cut off the air outlet from all pockets, except those registering therewith.

A particular object of the invention is to obviate the use of a central revolving shaft or the like, and to provide in place thereof a stationary axial conductor around which the cylinder revolves.

A still further object of the invention is to provide an axial conductor around which the cylinder revolves, and which is of such diameter as to make the spaces between the screens and the conductor comparatively shallow, whereby the bottoms of said spaces are wide instead of V-shaped and from which the air will readily escape. The advantage of such an arrangement lies in the result that the cotton is not blanketed across the screens; the cylinder may be revolved toward the cotton inlet instead of away from it and said cylinder may be revolved at a slower rate of speed.

Another object of the invention is to provide a novel cylinder construction, whereby the parts may be readily and substantially assembled and whereby the screens are secured in a simple and efficient manner.

A further object of the invention is to provide an improved form of bearing support and driving means for the cylinder.

A construction designed to carry out the invention will be hereinafter described together with other features of the invention.

The invention will be more readily understood from a reading of the following specification and by reference to the accompanying drawings, in which an example of the invention is shown and wherein:

Fig. 1 is a side elevation of a separator constructed in accordance with my invention,

Fig. 2 is a transverse vertical sectional view,

Fig. 3 is a view partially in front elevation and partially in section,

Fig. 4 is an enlarged sectional view taken on the line 4—4 of Fig. 1, and

Fig. 5 is an enlarged detail of one of the flights and component parts.

In the drawings, the numeral 10 designates a housing having end walls 11, a substantially tangential receiving box 12 at its upper end and a discharge spout 13 at its bottom. A flared nozzle 14 enters the side of the box and the latter has a lid 12′ in its top. A horizontal central or axial flue 15 extends through the housing and its end walls. This flue has its ends projecting beyond the end walls and is immovably fastened in collars 16 rigidly supported by angular brackets 17 secured to the end walls, as is best shown in Figs. 1, 3 and 4.

The end walls 11 have openings 18 concentrically surrounding the flue and sufficiently large to receive the annular end members 19 of a revolving cylinder 20. The members 19 extend through the openings and are supported on flanged rollers 21 secured to the end walls below said openings and on each side of the vertical center of said cylinder. The end members, each have an inwardly directed annular web 22 surrounding the flue and an outwardly directed flange 23, relatively offset from the web (Fig. 4) and overlapping the inner side of the end wall 11. Flat lips 24 extend laterally from the inner side of the flange 23. These flanges are disposed substantially on the chords of arcs forming the circular edge of said flange.

Each of said lips forms a support for a screen section 25 which is bolted thereto at its ends. Between the ends of the lips, flat bracket 26, formed integral with said lips and the web 22 extend inwardly and radially of each end member 19. Transverse division plates 27 extend longitudinally of the cylinder 20. Each plate is notched to receive one of the lips at each end and is secured to the brackets 26 by bolts 28. These plates are disposed radially of the cylinder with their inner edges terminating adjacent the flue 15. Each plate extends outwardly

with relation to the end members 19 and has its outer edge terminating short of the housing 10.

On the inner ends of the plates rubber or flexible flights 29 are bolted. These flights have sufficient width to drag on the surface of the flue 15 as the cylinder revolves around said flue. It will be seen that the plates and flights divide the annular space between the flue and the screen sections into compartments or chambers and the said flights prevent the passage of air from one chamber to the other. The flue 15 has a longitudinal opening or entrance 30, terminating at each end, a short distance from the webs 22. This entrance (Fig. 2) has a cross-sectional area greater than that of one of the chambers and is located opposite receiving box 12. The entrance is constantly open to two of said chambers and it has inwardly rolled lips 31 along its longitudinal edges over which the filghts pass.

Outer flights 32 of rubber or flexible material are secured to the outer ends of the plates 27. The housing has curved wall portions 33 extending from the top and bottom of the receiving box 12 and these wall portions are concentric to the cylinder 20. The outer flights are wide enough to drag on the inner surfaces of the portions 33. The lower portion 33 extends to the hopper 13, but the rear portion 34 of the curved housing wall is offset from the upper portion 33 and is free from contact with the flights. The outer flights 32 thus only contact with the portions 33 and consequently throughout approximately three-fourths of the revolution of the cylinder, said flights are saved from wear.

The plates 27 extending beyond the screen sections 25 form troughs longitudinally of the cylinder which receive cotton and air from the box 12, as the cylinder revolves toward said box. It will be seen that air cannot pass the flights 32 which are in contact with the wall portions 33 and the flights 29 which are in contact with the flue 15 on each side of the entrance 30, the rear and lower portion of the housing is shut off from the air entering the box 12 and flue 15.

In order to prevent air leaking between the flue and the web 23, I provide arcuate packing strips 35 (Fig. 4) bearing on the flue and secured to the web by metal strips 36. A second packing strip 37 bolted to the end walls 11 and held by strips 38 rides on the end members 19. These strips may be made of felt or other suitable material. The ends of the flights co-acting with the end walls and said packing strips, prevent air leaks while the outer flights 32 are in contact with the portions 33.

It is pointed out that the machine does not have a shaft for supporting or driving its cylinder 20, as is common in the art, but has the stationary flue 15 at its center around which the cylinder freely revolves on supports independent of the flue. The flue being comparatively large in diameter and having the elongated entrance 30, provides an amplified means for exhausting the air from the box 12 and the cylinder. The entrance also causes an even distribution of the cotton over the screen sections and prevents banking at the ends. Further the cylinder is revolved in a clockwise direction and toward the box 12 which causes the cotton to more evenly spread over the screen sections, permits a slower revolution and effects a more ready releasing of the cotton from the troughs.

For revolving the cylinder 20, large sprocket rings 39 disposed outwardly of the end members 19 are fastened to brackets 40 secured to the webs 22. These rings surround the flue 15 within the brackets 17 and are driven by sprocket chains 41. Small sprocket wheels 42 drive the chains. These wheels are fastened on a revolving shaft 43 mounted in boxes 44 carried by a transverse support 45 secured across the rear of the housing wall 34. The shaft is suitably driven (not shown).

Usually one end of the flue is closed by a cap 46 and the other end is connected with a suitable conductor, but both ends of the flue could be connected with the air suction line.

In operating the separator an air suction is suitably set up so that the air currents will be induced through the nozzle 14 into the box 12 and thence through the cylinder 20, flue entrance 30 and out through one end of the flue 15. The cotton is carried into the box 12 by the air currents and spread so as to be easily drawn into the troughs between the plates 27 and distributed evenly over the screen sections 25 while the cylinder is revolving. The cotton is arrested by the screen sections and the air passes out through flue 15.

The cylinder revolves in a clockwise direction (Fig. 2) and the outer edges of the outer flights 32 engage and drag along the concentric wall portions 33 of the housing 10. Thus all troughs are cut off from the inflowing cotton except those exposed to the box 12. It will be noted that each flight 32 engages the lower wall portion 33 at the same time that the inner flight 29 correlated therewith, rides over the lower lip 31, so that no air can be trapped in the troughs below the box. The flights effectively seal the housing on each side of the box as well as on each side of the entrance 30. As the revolution of the cylinder is continued the cotton is dumped from the troughs into the hopper 13 at the bottom of the housing.

Various changes in the size and shape of

the different parts, as well as modifications and alterations, may be made within the scope of the appended claims.

What I claim, is:

1. In a cotton and air separator, a casing having an inlet nozzle and a cotton discharge opening, a revolving condenser cylinder having radial pockets, a cylindrical air discharge flue around which the cylinder revolves located axially of said cylinder, said flue having an air inlet and means for cutting off the pockets of the cylinder from the flue inlet as the cylinder revolves, the entire flue being open to said inlet.

2. In a cotton and air separator, a casing having an inlet nozzle and a cotton discharge opening, a revolving condenser cylinder having radial pockets provided with screen bottoms, a cylindrical air discharge flue around which the cylinder revolves located axially of said cylinder, said flue having an air inlet, and means for cutting off the pockets of the cylinder from the inlet as the cylinder revolves, the entire flue being open to said inlet.

3. In a cotton and air separator, a casing having an inlet nozzle and a cotton discharge opening, a stationary air flue having an entrance in one side, a cylinder revolving around said flue having inner flights engaging said flue, the casing having portions of its walls on opposite sides of the nozzle concentric to said cylinder and engaged by the flights and the intermediate portions of its walls between its cotton inlet and outlet out of the path of said outer flights.

4. In a cotton and air separator, a casing having an inlet and a cotton discharge outlet, a cylinder comprising end members and radial plates having their ends secured to said members, screen sections mounted between said plates, a stationary flue around which said cylinder revolves, said flue having a longitudinal entrance terminating short of the ends of the cylinder, inner flights on the plates engaging the flue, and outer flights on the plates engaging the casing.

5. In a cotton and air separator, a casing having an inlet and a cotton discharge, a stationary axial flue extending through the casing, the ends of the casing being spaced circumferentially from the flue, brackets secured to said flue and the casing spanning said spaces, a condensing cylinder having end members revolving in said spaces around said flue, rollers for supporting said cylinder members, and means for driving said cylinder.

6. In a cotton and air separator, a casing having an inlet and a cotton discharge, a stationary axial flue extending through the casing, the ends of the casing being spaced circumferentially from the flue, brackets secured to said flue and the casing spanning said spaces, a condensing cylinder having end members revolving in said spaces around said flue, rollers for supporting said cylinder members, means for driving said cylinder, and packing means between said flue and said cylinder and between said cylinder and said end walls of the casing.

7. In a cotton and air separator, a casing having an inlet and a cotton discharge, a stationary axial flue extending through the casing, the ends of the casing being spaced circumferentially from the flue, brackets secured to said flue and the casing spanning said spaces, and a condenser cylinder comprising end members revolving in said spaces and each comprising an annular element, a circular web, radial flange lips and radial lugs between the lips, radial plates secured to the lugs, and screen sections mounted on the lips between the plates.

In testimony whereof I affix my signature.

ROBERT D. HOLMES.