Jan. 21, 1958 A. L. SMITH 2,820,306

COTTON DRIER

Filed June 16, 1954

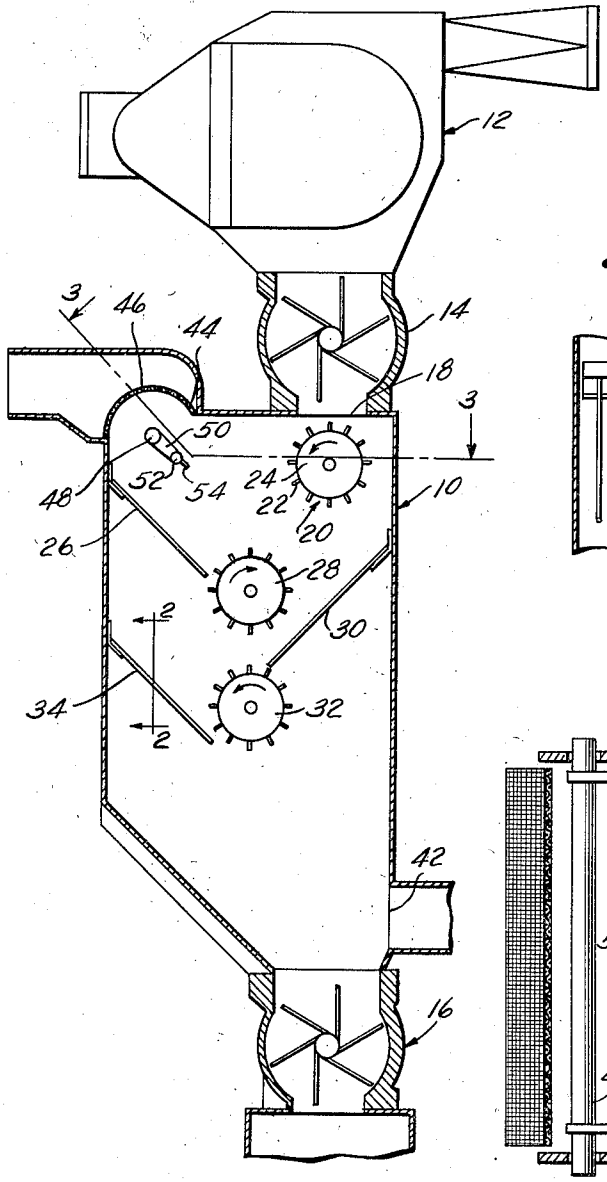

Fig. 1

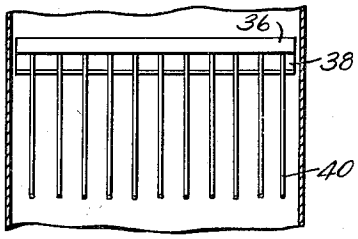

Fig. 2

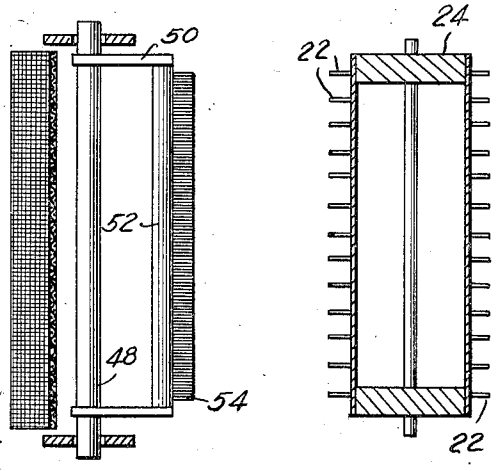

Fig. 3

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COTTON DRIER

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7 Claims. (Cl. 34—168)

This invention relates to equipment for drying cotton or similar material.

Cotton and many other materials must be dry prior to being passed through processing equipment such as cleaners, gins, etc. The reduction of moisture content is often accomplished by sending the cotton through a vertical or horizontal casing in which hot air is introduced with the cotton as it flows through the casing. The hot air normally follows along with the cotton, and in fact in many driers is the sole means for conveying the cotton. Naturally the ability of the air to remove moisture decreases as it proceeds with the cotton. These types of driers have proven more or less satisfactory in the past. Nonetheless, the need for improving driers has long been recognized. Particularly, the need for a drier which can handle large quantities of cotton efficiently, and with speed, and yet which is not of extremely large size, has long been apparent.

The advent of the mechanical picker has increased the necessity for a more satisfactory drier. Mechanical pickers take up a lot of trash and other debris; furthermore, there is considerable twisting of the cotton. Also many of the pickers introduce a considerable amount of moisture. With the cotton twisted around twigs, etc. and with moisture added the need for greater cleaning increases. The need for improved drying equipment also increases. Even if additional moisture is not added by the pickers improved drying will facilitate subsequent cleaning, etc.

An object of this invention is to provide a drier which will handle large amounts of cotton quickly and efficiently, and which, for a given size, has a greater drying effect than the presently known driers.

A further object of the invention is to devise a drier in which the hot air is passed in a direction opposite to the direction of flow of the cotton. Further, the objects include providing a drier in which the cotton is thoroughly opened up, in which the cotton is tumbled and agitated and in which all of the cotton is exposed to the action of hot air thus facilitating subsequent cleaning.

I have found that by using the above discussed principles the same drying effect can be achieved with approximately one-third the amount of air required in the known types of driers. Such marked increase in efficiency is achieved through opening and tumbling the cotton, through the passage of air in a direction opposite to the movement of the cotton through the machine, and through exposure of all the cotton to the air.

As stated above, in a drier constructed in accordance with the instant invention, the drying medium is passed through the cotton or other material in a direction opposite to the general path of movement of the cotton. The efficiency of the drier can be increased by increasing the the quantity of air use. In fact, the greater the quantity of air used the more tendency there is to fluff and lift the cotton. With the flow of air increased, the drier

can be made of a still smaller size for a given capacity, as compared to previous driers. However, as the flow of air is increased above a certain amount, there is a tendency of some of the material being dried to leave the drier with the air. Therefore, still another object of the invention is to provide a drier in which a relatively high velocity of air can be employed, yet in which the cotton will not escape with the exhausted air.

These and other objects and advantages will become apparent from the following descriptions and the accompanying drawings, in which:

Figure 1 is a sectional elevational view of a drier constructed in accordance with the invention.

Figure 2 is a view taken along line 2—2 of Figure 1.

Figure 3 is a view taken along line 3—3 of Figure 1.

Similar reference characters in the several figures indicate similar elements.

Referring now in particular to the drawings, the drier comprises a casing **10**. The casing may be formed of sheet metal as is common in the art, with suitable bracing and supports being used. Separator **12** is positioned on top of the drier with a vacuum dropper **14** being intermediate the separator and the drier. The vacuum dropper serves the purpose of dropping the cotton into the drier and preventing the passage of air either into or out of the drier. A second vacuum dropper **16** is positioned adjacent the bottom of the drier and serves as a means for feeding or dropping the cotton to other equipment. Immediately below the inlet opening **18** there is a roller **20**. The latter roller is a breaker roller or agitating roller which can be referred to as a picker roller. Roller **20** extends transversely of the drier and comprises a number of spike-like picking elements **22** attached to the drum **24**.

A baffle **26** is fastened to the side of the casing to one side of roller **20**. A second roller **28** is positioned below the baffle. A second baffle **30** is positioned on the opposite side of the casing, and a third roller **32** is positioned below baffle **30**. Yet a third baffle **34** is positioned adjacent roller **32**. Each of the rollers **20**, **28** and **32** are constructed in the same manner. The three baffles are also identical in construction.

Figure 2 shows that the baffles comprise a base flange **36** fastened to the casing, an offset flange **38** and a series of rod-like finger members **40**. The latter are spaced from each other and extend downwardly and inwardly toward the center of the drier.

The rollers are connected so as to rotate in the manner indicated by the arrows seen in Fig. 1. When so rotating roller **20** throws the cotton onto baffle **26**, and roller **28** receives the cotton from baffle **26** and throws it onto baffle **30**. In turn roller **32** receives the cotton from baffle **30** and throws it onto baffle **34**. The rod-like elements are close enough to cause most of the cotton to move downwardly by gravity towards the adjacent rollers. The cotton drops off the lower baffle onto the dropper **16**.

The picker rollers will open, agitate and tumble the cotton. The cotton will also tumble down the shelf-like supports or baffles.

Hot air inlet **42** is positioned adjacent the lower end of the casing. Hot air outlet **44** is positioned at the upper end of the casing spaced from the inlet opening **18**. The hot air is forced through the casing of the drier as the cotton is thrown and gravitates downwardly. The air can pass through the rod-like members **40**. By passing a large amount of air through the drier the drying action is increased. In order to prevent escape of the cotton through the outlet **44**, I provide a foraminous screen **46**. The screen extends laterally of the drier and completely bridges the outlet opening **44**. This screen

should have a mesh of about ⅜" to ½". The screen will effectively prevent the passage of the cotton outwardly of the moisture-laden air. However, soon the screen will become clogged with cotton unless some provisions are made to keep the screen clean. As illustrated in the drawing, I provide a shaft 48. The shaft has spaced arms 50 connected at their ends by the wiper base 52. Wiper 54 is affixed to the base. Screen 46 is made in the form of an arc of a circle, and shaft 48 is positioned concentrically with the arc. As a result, the shaft can be rotated to cause the wiper to wipe across the foraminous screen and dislodge the cotton. This prevents clogging of the screen.

The rollers open and fluff the cotton. Further, they throw the cotton from one side of the casing to the other transversely of the path of the hot air through the casing. This insures maximum travel for the cotton or other material being opened and dried. The rollers are spaced from the sides of the casing toward which their upper surfaces are moving and spaced from the baffles. As a result, there is substantially free movement of the cotton through the heated air.

While I have shown and described a preferred form of my invention, it will be understood that variations in details of form may be made without departure from the invention as defined in the appended claims.

I claim:

1. A tower drier comprising a casing, a separator mounted on said casing, a cotton inlet opening in said casing, a vacuum dropper mounted below said separator and being operable to receive cotton from said separator and drop the cotton into said casing through said inlet opening, a picker roller mounted in said casing directly below said dropper to receive cotton therefrom, said picker roller being rotatable to move its upper surface toward one side of said casing, a foraminous baffle supported adjacent said one side of said casing said baffle being positioned entirely to one side of said roller, said baffle projecting inwardly and downwardly in said casing and having an end terminating adjacent the center of said casing, said baffle being adapted to support cotton received from said dropper but being pervious to air, a second picker roller positioned adjacent said end of said baffle to receive cotton therefrom, said second picker roller being mounted centrally in said casing, said second picker roller being rotatable to move its upper surface toward an opposite side of said casing, a second foraminous baffle supported adjacent the side opposite said one side of said casing and projecting inwardly and downwardly in said casing, and having a lower end terminating adjacent the center of said casing, said second baffle being substantially entirely to one side of said second picker roller, said second baffle being adapted to support cotton but being pervious to air, said second baffle being positioned to receive cotton from said second roller a third picker roller positioned adjacent the lower end of said second baffle to receive cotton therefrom, said third picker roller being positioned centrally of said casing, said third picker roller being rotatable to move its upper surface toward an opposite side of said casing, means positioned at the bottom of said casing operable to drop cotton out of said casing, a hot-air inlet in said casing above the last named means and below the baffles, an air outlet above said baffles, a foraminous screen positioned across said air outlet and wiper means for wiping cotton off said screen, said air outlet being spaced from said cotton inlet opening.

2. A tower drier comprising a casing, a separator mounted on said casing, a cotton inlet opening in said casing, a vacuum dropper mounted below said separator and operable to receive cotton from said separator and drop the same into said casing through said inlet opening, means mounted in said casing for opening and fluffing cotton received from said dropper, a second vacuum dropper mounted at the bottom of said casing and adapted to drop cotton from said casing, hot-air inlet means positioned above said second vacuum dropper, air exhaust means comprising an outlet positioned at the upper end of said casing, a foraminous screen positioned in said exhaust means, and means for wiping the face of said screen to remove cotton therefrom, means within said casing for guiding said cotton downwardly through said casing and alternately from one side of said casing to the other and fluffing said cotton, said air outlet being spaced from said cotton inlet opening.

3. A tower drier comprising a casing, a vacuum dropper mounted above said casing, a separator mounted above said vacuum dropper, a cotton inlet in said casing below said dropper said vacuum dropper being operable to receive cotton from said separator and drop the cotton into said casing through said inlet, a picker roller mounted in said casing directly below said dropper to receive cotton therefrom, said picker roller being rotatable to continuously move its uppermost surface toward one side of said casing, a foraminous baffle supported adjacent said one side of said casing said baffle being spaced entirely to one side of said roller and projecting inwardly and downwardly in said casing and having a lower end terminating adjacent the center of said casing and positioned to receive cotton from said picker roller, said baffle being adapted to support cotton received from said picker roller but being pervious to air, a second picker roller positioned adjacent said lower end of said baffle and centrally of said casing, said picker roller being positioned to receive cotton gravitate downwardly from said baffle, said second picker roller being rotatable to move its upper surface toward an opposite side of said casing, a second foraminous baffle supported adjacent said opposite side of said casing substantially entirely to one side of said second roller and projecting inwardly and downwardly in said casing, and having a lower end terminating adjacent the center of said casing said second baffle being positioned to receive cotton from said second picker roller, said second baffle being adapted to support cotton but being pervious to air, a third picker roller positioned adjacent the lower end of said second baffle to receive cotton therefrom, said third roller being positioned centrally of said casing, said third roller being rotatable to move its upper surface toward said one side of said casing, means positioned at the bottom of said casing operable to remove dried cotton from said casing, a hot-air inlet in said casing above the last named means and below said baffles, and an air outlet above said baffles, said air outlet being spaced from said cotton inlet opening.

4. A tower drier comprising a casing, a vacuum dropper mounted above said casing, a separator mounted above said vacuum dropper, a cotton inlet in said casing below said dropper said vacuum dropper being operable to receive cotton from said separator and drop the cotton into said casing through said inlet, a picker roller positioned below said vacuum dropper and mounted in said casing, and extending laterally across the casing, said picker roller being rotatable to strike cotton received from said dropper and open and throw said cotton upwardly in said casing, a foraminous baffle positioned in said casing below said picker roller, said baffle being positioned substantially entirely to one side of said roller and adapted to receive cotton opened by said roller and support the same for movement downwardly in said casing, said baffle being slanted inwardly and downwardly in said casing and said cotton being movable downwardly of said baffle by gravitational force, means forming an outlet opening adjacent the lower end of said casing, and means for removing the cotton from said casing through said outlet opening, means providing an air inlet adjacent the bottom of said casing for introducing hot air into said casing, an air outlet opening positioned at the top of said casing, and means for introducing air under pressure through said air inlet opening for movement through the cotton in said casing above said air inlet, through said

foraminous baffle and through said air outlet to thoroughly dry the cotton, said air outlet being spaced from said cotton inlet opening.

5. A tower drier comprising a casing, a vacuum dropper mounted above said casing, a separator mounted above said vacuum dropper, a cotton inlet in said casing below said dropper said vacuum dropper being operable to receive cotton from said separator and drop the cotton into said casing through said inlet, a picker roller mounted in said casing below said dropper to receive cotton therefrom, said picker roller being rotatable to continuously move its uppermost surface toward one side of said casing, a foraminous baffle supported adjacent said one side of said casing and projecting inwardly and downwardly in said casing, said baffle having a lower end terminating adjacent the center of said casing and being positioned to receive cotton from said picker roller, said baffle being adapted to support cotton received from said picker roller, said baffle being positioned substantially to one side of said roller, and direct said cotton downwardly in said casing along the upper surface of said baffle but being pervious to air, a second picker roller positioned adjacent the lower end of said baffle and centrally of said casing, the uppermost portion of said second picker roller being above said lower end of said baffle and spaced inwardly of said casing with respect to said lower end of said baffle, said second picker roller being in the path of movement of the cotton downwardly over said baffle, said second picker roller being rotatable to move its uppermost surface toward an opposite side of said casing and to throw cotton received from said baffle upwardly and toward the side of the casing opposite the said one side of said casing, a second foraminous baffle supported in said casing adjacent said side opposite said one side of said casing, said second baffle being substantially to one side of said second roller the second baffle projecting downwardly and inwardly in said casing, said second baffle having a lower end terminating adjacent the center of said casing and adapted to receive cotton from said second picker roller and direct said cotton downwardly and inwardly of said casing, a third picker roller positioned adjacent the lower end of said second baffle and centrally of said casing, the uppermost portion of the last named roller lying in the path of movement of cotton downwardly over said second baffle and being rotatable to move its upper surface toward said one side of said casing and to throw cotton received from said second baffle upwardly and toward said one side of said casing, means positioned at the bottom of said casing operable to remove dried cotton from said casing, a hot air inlet in said casing above the last named means and below said baffles and an air outlet above said baffles, said air outlet being spaced from said cotton inlet opening.

6. A tower drier comprising a casing, a vacuum dropper mounted above said casing, a separator mounted above said vacuum dropper, a cotton inlet in said casing below said dropper said vacuum dropper being operable to receive cotton from said separator and drop the cotton into said casing through said inlet, a foraminous baffle positioned in said casing below said dropper adjacent one side of said casing and adapted to receive cotton from said dropper and support the same for movement downwardly and inwardly in said casing, said baffle being slanted inwardly and downwardly in said casing and said cotton being movable downwardly on said baffle by gravitational force, a picker roller positioned below said vacuum dropper in said casing and extending laterally across said casing, said picker roller being positioned centrally of said casing with said baffle being substantially entirely to one side of said roller, said picker roller being positioned adjacent the lower end of said baffle with the uppermost portion of said picker roller being above said lower end of said baffle and spaced inwardly of said casing with respect to said lower end of said baffle and being rotatable to move its uppermost surface toward one side of said casing to throw cotton received from said baffle upwardly and toward the side of said casing opposite said one side of said casing, means forming an outlet opening adjacent the lower end of said casing, and means for removing the cotton from said casing through said outlet opening, means providing an air inlet adjacent the bottom of said casing, for introducing hot air into said casing, an air outlet opening positioned at the top of said casing, and means for introducing air through said air inlet opening for movement through the cotton in said casing through said baffle and through said air outlet to thoroughly dry said cotton, said air outlet being spaced from said cotton inlet opening.

7. A tower drier comprising a casing, a vacuum dropper mounted above said casing, a separator mounted above said vacuum dropper, a cotton inlet in said casing below said dropper said vacuum dropper being operable to receive cotton from said separator and drop the cotton into said casing through said inlet, a picker roller positioned below said vacuum dropper and mounted in said casing, and extending laterally across said casing, said picker roller being rotatable to strike cotton received from said dropper and open and throw the cotton upwardly into said casing, said air outlet being spaced from the first mentioned inlet means forming an outlet opening adjacent the lower end of said casing, and means for removing the cotton from said casing through said outlet opening, means providing an air inlet adjacent the bottom of said casing, for introducing hot air into said casing, an air outlet opening positioned at the top of said casing, and means for introducing air under pressure through said air inlet opening for movement through the cotton in said casing above said air inlet and through said air outlet to thoroughly dry the cotton.

References Cited in the file of this patent

UNITED STATES PATENTS

1,327,609	Bartholomew	Jan. 13, 1920
2,025,701	Mitchell	Dec. 24, 1935
2,068,587	Aldrich, Jr.	Jan. 19, 1937
2,104,881	McLemore	Jan. 11, 1938
2,214,680	Sims	Sept. 10, 1940
2,430,686	Roeder	Nov. 11, 1947
2,671,248	Wallace	Mar. 9, 1954

UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 2,820,306 January 21, 1958

Algernon L. Smith

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

Column 4, line 30, for "gravitate" read -- gravitating --; column 6, line 32, after "dropper", first occurrence, insert a comma; lines 39 and 40, strike out "said air outlet being spaced from the first mentioned inlet"; line 46, after "casing," insert -- said air outlet being spaced from the first mentioned inlet, --.

Signed and sealed this 9th day of September 1958.

(SEAL)
Attest:

KARL H. AXLINE
Attesting Officer

ROBERT C. WATSON
Commissioner of Patents