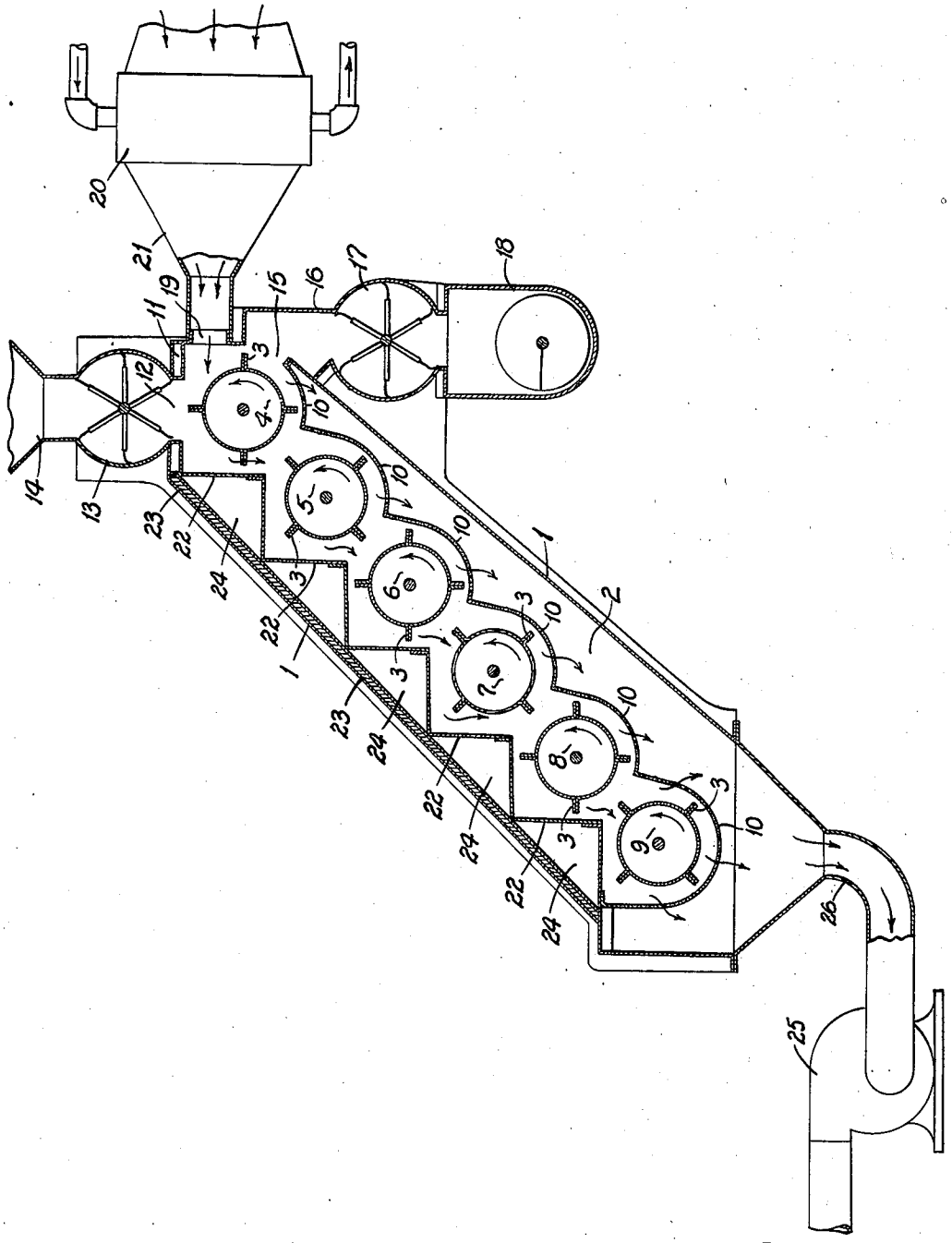
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COMBINED COTTON CLEANING AND DRYING MACHINE

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INVENTOR;
JOHN E. MITCHELL
BY Bruce A. Elliott
ATTORNEY

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COMBINED COTTON CLEANING AND DRYING MACHINE

John E. Mitchell, Dallas, Tex.

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This invention has for its general object to provide a novel combination cotton drying and cleaning machine which will permit of the continuous passage of the cotton from a source of supply through cleaning machinery to a distributor, and during its passage through the cleaning machinery enable a continuous stream of heated air to be passed through the casing of the cleaning machinery, preferably by a single suction fan, to dry the cotton.

In the accomplishment of this general object I provide a combination cotton drying and cleaning machine which involves the use of a plurality of beating cylinders operating within an enclosed chamber and provided with two sealing members, one for sealing the inlet for the cotton as it is unloaded from wagons, or other source of supply, and the other sealing the outlet for the cotton and discharging the same to a distributor, a single fan being used for either drawing or forcing heated air into the drying and cleaning chamber and withdrawing the moist air and trash from the chamber. The sealing members are preferably in the form of conventional air seal droppers.

To facilitate the rapid drying of the cotton in its passage through the casing of the cleaning mechanism, I employ a series of baffles projecting, respectively, into the spaces between adjacent beating cylinders, which operate not only to intermittently arrest the progress of the cotton through the cleaning machinery, and thereby facilitate the drying operation, but themselves being heated by the current of hot air continuously passing through the casing enclosing the cleaning machinery, constitute additional means for heating the cotton and driving off moisture therefrom.

A feature of the invention consists of the provision of an elongated, inclined casing housing a series of beating cylinders, having cooperating screens, said casing being provided with an inlet for the cotton to be cleaned and dried and an outlet for the cleaned and dried cotton, at its upper end, and sealed by means of air seal droppers, an inlet for heated air intermediate these droppers, and an outlet for moist air at the lower end of the casing, so that a single fan may be employed for drawing or forcing the heated air through the casing and out of its lower end, causing it to be brought into intimate contact with the cotton and cleaning machinery in its passage through the casing and insuring the current of heated air moving in a uniform body, i. e., without stratification, from the upper to the lower portion of the machine.

The invention is illustrated in the accompanying drawing in which the view is a vertical section embodying a preferred construction and arrangement of parts.

Referring now to the drawing, the numeral 1 indicates the casing of my improved cleaning machine, said casing being elongated, that is, of extended length as respects its height and width, and being positioned at a considerable incline to the horizontal. Mounted in suitable bearings in the side walls, 2, of this casing are a series of beating cylinders, that is to say, cylinders provided with a number of blades, 3, around their peripheries, said cylinders being numbered in order, beginning at the upper end of the casing, from 4 to 9, inclusive. While I have shown six of these beating cylinders, a greater or less number may be employed, as may be found desirable. They may be made any length over which it is found practicable to spread the cotton. Surrounding the under side of each of these beating cylinders is a curved screen, 10, these screens being connected to form a continuous screening surface extending from end to end of the machine. The upper end of casing 1 is provided with a horizontal portion, 11, in which is formed an opening, 12, constituting an inlet for the cotton to be cleaned and dried. Mounted on the horizontal portion 11 is a conventional air seal dropper, 13, which, as is well known, operates to drop cotton into the machine while at the same time sealing the inlet against the passage of air. The air seal dropper, in operation is supplied with the cotton to be cleaned and dried from a suction pipe, 14, which draws the cotton from the wagons, or other source of supply. The upper end of the lower wall of the casing 1 is provided with an opening, 15, constituting an outlet for the cleaned and dried cotton, and this outlet communicates with an upwardly extending portion, 16, of the casing of an air seal dropper, 17, which is mounted on one end of a distributor, 18, and into which it discharges the cleaned and dried cotton without breaking the seal of the outlet 15. Between the inlet 12 and outlet 15 I provide in a vertical portion of the casing 1 a third opening, 19, which constitutes an inlet for heated air. Heated air is supplied by drawing air through a steam heated radiator, 20, the casing, 21, of which is extended to communicate with the hot air inlet 19. I have shown in outline a well known form of heater of high heating capacity; but any other desired means of heating the air could be employed.

To facilitate the heating and drying of the cot-

ton in its passage through the cleaning machine, I mount on the under side of the upper wall of casing 1, to extend from side to side of said casing, a series of baffles, 22, which consists of metal plates extending at right angles to each other, one series of apices projecting into the spaces between the respective beating cylinders, and the other series extending to the upper insulated wall, 23, of the casing, thereby providing a series of triangular dead air chambers, 24, which arrangement serves to adequately prevent interchange of heat from the casing with the outer air through the upper wall of the casing.

Hot air from the heater 20 is drawn into and through the casing 1, and moist air leaving the cotton withdrawn from said casing, by means of a single suction fan, 25, having its suction side communicating with the interior of casing 1 at its lower end by means of a pipe, 26. The use of a single suction fan is rendered possible by my novel arrangement of air seal droppers at the cotton inlet and outlet located at the upper end of the machine and by providing for the entrance of heated air between these sealed openings. Thus the casing being sealed against the advent of outer air, suction of sufficient degree to draw the hot air into, through, and out of the cleaning machine at the proper rates can be readily induced in the casing with the minimum expenditure of power.

I wish it understood, however, that the hot air could be blown through the casing 1 instead of being drawn through by suction, or that, instead of a single suction fan, two fans could be employed one for blowing the hot air into the casing and the other for withdrawing the moist air from the lower end of the casing. Such alternative arrangements are not illustrated as the same are within the knowledge and skill of operators in this art, and the invention is not otherwise concerned therewith; the essential fact being that hot air is, in operation, continuously caused to pass through the casing from the upper to the lower end thereof, and moisture-ladened air to pass out of the latter, without regard to the manner of accomplishing such passage of the hot air, so far as the broad idea of the invention is concerned. However, I regard it as a feature of novelty to employ a single suction or blowing fan in the novel combination of parts featured in my invention.

In the machine of my prior Patent No. 1,942,868, I show a sealing member, 26, for receiving the cotton as it is unloaded from the wagons, but it discharged the cotton direct into a distributor which, in that case, was utilized for exposing the cotton to the heated air. I also show an additional sealing member, 11, through which the cotton was discharged from the cleaning cylinders into the gin stands; but this was not claimed in connection with the other sealing member as part of the invention.

Insofar, therefore, as the use of two sealing members, or air seal droppers, governing the inlet to and outlet from a cleaning machine is concerned, the present application is to be considered the same as my patent aforesaid. This applies only to the broad idea above referred to, as otherwise the present arrangement differs materially from that of the patent aforesaid.

The present invention is intended either to supplement my drying method applied to machinery mounted on the gin stands, in case of extreme conditions of moisture, or to be used alone as a comparatively inexpensive method for conditioning green cotton as it is unloaded from the wagons, where the cotton does not contain too much excess moisture, but does contain an excess amount of trash and other extraneous matter.

The essential factors in successfully conditioning green or damp cotton for ginning purposes are, first, fluffing the locks of cotton to insure intimate contact of the cotton fibers with the heated air; second, providing sufficient volume of air for the amount of cotton being treated and raising the temperature of the air to a point where it will rapidly absorb moisture given up by the cotton fibers; third, having a rapid relative motion between the cotton and the heated air; and, fourth, while the cotton is in rapid motion keeping it exposed to the heated air long enough for it to give up sufficient moisture to bring about a good ginning condition of the cotton. In a machine or method which meets all of the other requirements, the last mentioned factor, or that of time of exposure, can be very short in duration.

My improved machine meets all the requirements for successfully conditioning green or damp cotton for ginning purposes, as will clearly appear from the following description of the operation.

The cotton, as it is unloaded or elevated from the wagons, falls from the usual separator into the air seal dropper 13, which delivers it to the upper one of the series of beating cylinders 4—9. These cylinders, which rotate rapidly in the direction shown by the arrows, and which are adapted to transfer the cotton from one to the other in both the downward and upward direction, deliver the spread out stream of cotton from the upper portion of one cylinder to the upper portion of the next succeeding cylinder, the stream of cotton being interrupted between each pair of cylinders by the baffles 22. When the cotton reaches the last beating cylinder 9, it is then engaged by the lower portion of each cylinder in succession and forced over the screen surfaces 10 back to the outlet 15 beneath the first cylinder where, by means of the latter, it is discharged into the second rotating sealing member, or air seal dropper 17, and then into the distributor 18.

An induced current of heated air for delivering the cotton is drawn, or forced, into the hot air inlet 19 at the top of the machine between the inlet and outlet sealing members, the air being heated by passing through the radiator 20. The heated air fills all of the interior portions of the machine and heats the drum of the beating cylinders as well as the metal baffles 22, the latter being insulated against the outside loss of heat by the insulated wall 23. The current of hot air finds its way out of the machine through the screens beneath the cylinders and is withdrawn with the trash from the machine, in the preferred form of the invention, by the exhaust fan 25, which discharges the moist air and trash out of doors.

While the beating cylinders 4—9 can be mounted in the same relation to each other in a horizontal plane, it is preferable to mount them on an inclined plane, as shown, not only because this arrangement permits the use of the hot metal baffle plates 22, which serve to pre-heat the cotton in its downward passage through the machine, but the drying or conditioning efficiency of the machine is also improved, because, with a horizontal arrangement of cylinders, the air tends to stratify as it changes in temperature; that is, the hottest portion of the air tends to flow

through the machine at the highest point; whereas, with the inclined arrangement of cylinders, stratification is avoided, and the heated current of air moves in a uniform body from the upper to the lower portion of the machine, but, of course, gradually becomes lower in temperature, in a uniformly moving current, as the heat is absorbed by the cotton.

It will be obvious that if the hot air be blown through the machine from the upper to the lower end, the pipe **26**, shown connected to the suction side of fan **25**, would simply lead to the outer air.

I claim:

1. Combined cotton cleaning and drying mechanism comprising a casing enclosing the cotton cleaning mechanism and having a cotton inlet and a cotton outlet, an air seal dropper for delivering cotton to be cleaned through said inlet, an air seal dropper for delivering cleaned cotton discharged through said outlet, a source of heated air exterior of said casing, and means for causing a continuous passage of the heated air through and out of said casing.

2. Combined cotton cleaning and drying mechanism comprising a casing enclosing the cotton cleaning mechanism and having a cotton inlet, a cotton outlet and a hot air inlet, an air seal dropper for delivering cotton to be cleaned through said cotton inlet, an air seal dropper for delivering cleaned cotton discharged through said outlet, a source of heated air exterior of said casing, communicating with said hot air inlet, and suction means communicating with said casing at a point remote from said hot air inlet for drawing the heated air into, through and out of said casing.

3. Combined cotton cleaning and drying mechanism comprising a casing enclosing the cotton cleaning mechanism and having a cotton inlet and a cotton outlet, an air seal dropper for delivering cotton to be cleaned through said inlet, an air seal dropper for delivering cleaned cotton discharged through said outlet, a source of heated air communicating with said casing between said droppers, and suction means communicating with said casing at a point remote from the point of entrance of the heated air for drawing the latter into, through and out of said casing.

4. Apparatus for simultaneously cleaning and drying cotton comprising an elongated casing having at one end an inlet for cotton to be cleaned, an outlet for cleaned cotton, and an intermediate inlet for heated air, a source of heated air communicating with said intermediate inlet, a series of rotatable cleaning cylinders, having cooperating screens, mounted in transfer relation in said casing from end to end thereof, an air seal dropper for delivering cotton to be cleaned through said inlet, an air seal dropper for delivering cleaned cotton discharged through said outlet, and means for causing a continuous passage of heated air into said intermediate inlet, through said casing, and out of the latter at the other end thereof.

5. Apparatus for simultaneously cleaning and drying cotton comprising an elongated, inclined casing having a cotton inlet, a cotton outlet and an intermediate inlet for heated air at its upper end, and an outlet for moist air at its lower end, a series of aligning cotton cleaning cylinders extending from said inlet to said outlet and, having cooperating screens, mounted in transfer relation in said casing to extend from end to end thereof, and adapted, in operation, to transfer cotton from said inlet to the remote end of said casing in one direction, and then, in the opposite direction, over the series of screens to said outlet, a source of heated air communicating with said intermediate inlet, an air seal dropper for delivering cotton to be cleaned through said inlet, an air seal dropper for delivering cleaned cotton discharged through said outlet, and means for causing the continuous passage of the heated air into said intermediate inlet, through said casing and out through the outlet for moist air in the lower end thereof.

6. Apparatus for simultaneously cleaning and drying cotton comprising an inclined, elongated casing having a cotton inlet, a cotton outlet and an intermediate inlet for heated air at its upper end, and an outlet for moist air at its lower end, a source of heated air communicating with said intermediate inlet, a series of cotton cleaning cylinders, having cooperating screens on their under sides, mounted in transfer relation in said casing to extend in alignment from end to end thereof, a series of triangular, hollow, baffles extending along the upper side of said casing and projecting, respectively, into the spaces between adjacent cylinders, each of said baffles inclosing with the upper wall of said casing a dead air space, an air seal dropper for continuously delivering cotton to be cleaned through said inlet, whereby the cotton will be passed by said cylinders from the upper to the lower end of said casing and caused to successively engage said baffles, and then from said lower end over the successive screens to said outlet, means for inducing a continuous passage of the heated air into said intermediate inlet and through said casing in contact with said cylinders and baffles to heat the same and to remove moisture from the cotton, means for withdrawing moisture laden air and refuse from the lower end of said casing, and an air seal dropper for delivering the dried and cleaned cotton discharged through said outlet.

7. Apparatus for simultaneously cleaning and drying cotton comprising an inclined, elongated casing having a cotton inlet, a cotton outlet and an intermediate inlet for heated air at its upper end, a series of bladed cylinders, having cooperating screens, mounted in transfer relation to extend in alignment from end to end of said casing, the uppermost cylinder cooperating with both said cotton inlet and cotton outlet in a manner to remove cotton from said inlet and discharge cotton through said outlet, an air seal dropper for delivering cotton to be cleaned through said inlet, a series of metal baffles projecting into the spaces between said cylinders from the upper side of said casing, and serving to interrupt the passage of cotton between each pair of cylinders, a source of heated air, means for inducing the passage of the heated air into said intermediate inlet, through said casing in contact with said baffles and cylinders to heat the same while removing moisture from the cotton, and the passage of moisture laden air and refuse from said casing at the lower end thereof, and an air seal dropper for delivering the dried and cleaned cotton discharged through said outlet, the combinations of parts causing a downward passage of the cotton from said inlet into successive contact with the heated baffles, an upward passage thereof over said screens, and its discharge through said outlet by the uppermost cylinder.

8. Apparatus for simultaneously cleaning and drying cotton in a continuous operation during its passage from a source of supply to cotton extracting machinery comprising, in combination

with a distributor for delivering the cotton to such machinery, an elongated, inclined casing having a cotton inlet, a cotton outlet and an intermediate inlet for heated air at its upper end, and an outlet for moist air at its lower end, a series of cotton cleaning cylinders, having cooperating screens, mounted in transfer relation in said casing to extend in alignment from end to end thereof, and adapted, in operation, to transfer cotton from said inlet to the remote end of said casing in one direction and then, in the opposite direction, over the series of screens to said outlet, a source of heated air communicating with said intermediate inlet, an air seal dropper for delivering cotton to be cleaned through said inlet, an air seal dropper for delivering cleaned cotton discharged through said outlet to said distributor, and means for causing the continuous passage of the heated air into said inlet, through said casing and out through the outlet in the lower end thereof.

9. Combined cotton cleaning and drying mechanism comprising a casing and means for causing a current of heated air to be continuously passed through the same from one end to the other thereof, a plurality of beating cylinders, having screens cooperating with their under sides, mounted in transfer relation in said casing, an inlet for cotton, a sealing member controlling the same and adapted to deliver cotton to be cleaned at one end of said series of beating cylinders, a series of baffles, adapted to be heated by said current of air, cooperating with the upper sides of said beating cylinders, and serving to interrupt the normal movement of cotton effected by said beating cylinders, whereby the cotton will be fluffed by said cylinders and preheated by said baffles in its movement over the upper portion of said cylinders and the lower portion of the cylinders will act to force the partially dried cotton over said screens, an outlet for the dried cotton beyond said screens, a sealing member for delivering the dried cotton from the machine, and means for delivering moist air from said casing at a point remote from said inlet.

10. Apparatus for cleaning and simultaneously drying cotton comprising an inclined casing having a cotton inlet, a cotton outlet and an intermediate inlet for heated air at its upper end, a sealing member controlling said inlet for delivering cotton to be cleaned to the machine, a sealing member controlling said outlet for delivering cotton from the machine, means for causing a current of heated air to pass into said intermediate inlet and through said casing, a series of bladed beating cylinders, having cooperating screens, arranged in transfer relation in said casing to extend in alignment from the upper to the lower end thereof, and adapted to cause cotton delivered through said inlet to be moved first in a downward direction over the upper portions of the cylinders and then in an upward direction over said screens to the outlet, means for preheating the cotton in its downward passage over the cylinders, and means for withdrawing moist air from the lower end of said casing.

11. Combined cotton cleaning and drying mechanism comprising a casing enclosing the cotton cleaning mechanism and having a cotton inlet and a cotton outlet, an air seal dropper for delivering cotton to be cleaned through said inlet, an air seal dropper for delivering cleaned cotton discharged through said outlet, a source of heated air exterior of said casing and communicating therewith at one extremity of the casing, and means communicating with said casing at a remote extremity thereof for causing a continuous passage of heated air through and out of said casing.

12. Combined cotton cleaning and drying mechanism comprising an elongated casing enclosing the cotton cleaning mechanism and having a cotton inlet and a cotton outlet, an air seal dropper for delivering cotton to be cleaned through said inlet, an air seal dropper for delivering cleaned cotton discharged through said outlet, a source of heated air exterior of said casing and communicating therewith at one end of the casing, and means communicating with the opposite end of said casing for causing a continuous passage of the heated air through and out of said casing.

13. Combined cotton cleaning and drying mechanism comprising an elongated casing enclosing the cotton cleaning mechanism and having a cotton inlet, a cotton outlet and an intermediate hot air inlet at one end, an air seal dropper for delivering cotton to be cleaned through said cotton inlet, an air seal dropper for delivering cleaned cotton discharged through said outlet, a source of heated air exterior of said casing communicating with said hot air inlet, and suction means communicating with said casing at the end thereof remote from said hot air inlet for drawing the heated air into, through and out of said casing.

JOHN E. MITCHELL.