March 5, 1940. M. F. AYCOCK 2,192,823

COTTON DRIER

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Fig. 1.

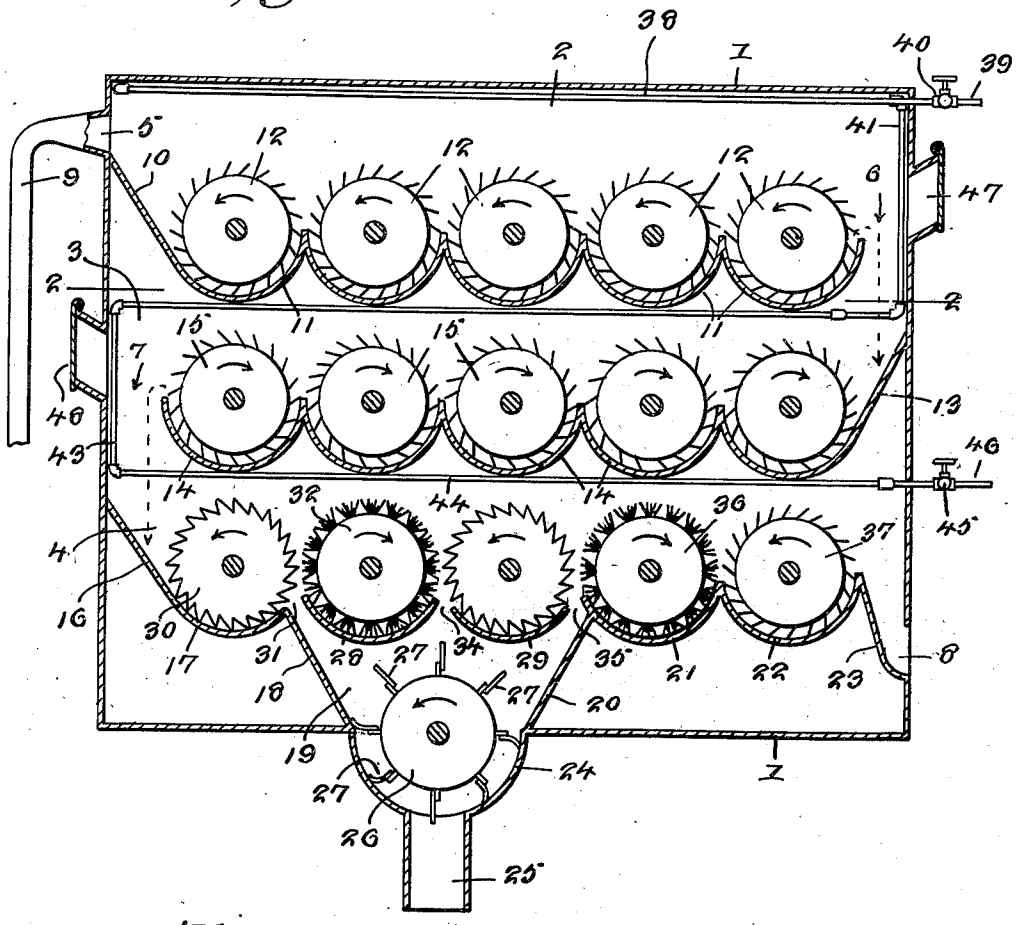
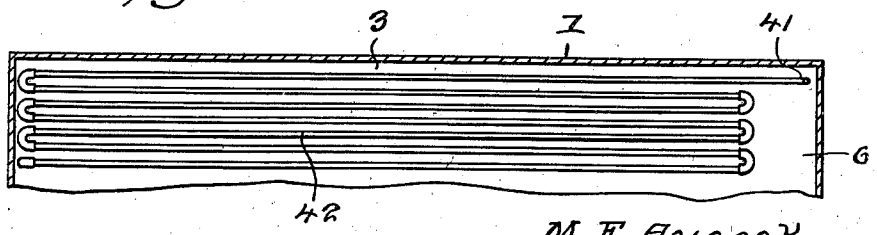


Fig. 2.



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COTTON DRIER

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3 Claims. (Cl. 19—93)

This invention relates to cotton driers and more particularly to an apparatus or machine conditioning the cotton prior to ginning.

While cotton is usually dry and naturally in condition for ginning at the time it is picked it often happens that the ginning is delayed and in the meantime the cotton becomes wet from the rain or otherwise dampened by absorption of moisture due to the atmospheric conditions and necessitates drying treatment thereof before ginning. Furthermore, it is found that foreign material such as leaves and other forms of trash adhere to cotton which is in a moist condition, thereby necessitating cleaning as well as drying before the ginning operation.

A prime object of the present invention is to produce a simple, practical and efficient apparatus or machine for simultaneously drying and cleaning the cotton whereby to ideally condition it for the ginning operation.

Other objects and advantages to be attained will hereinafter more fully appear in the following description.

The invention consists in the novel general structure and in the particular parts and combinations and arrangement of parts as hereinafter described and set forth in the appended claims, reference being had to the accompanying drawing illustrating a practical adaptation of the invention, and in which—

Figure 1 is a vertical longitudinal section through the apparatus; and

Figure 2 is a fragmentary horizontal section taken on or about the line 2—2 of Figure 1.

Referring now to the drawing, the numeral 1 designates a generally rectangular hollow shell or casing which is divided into a plurality of superposed horizontal chambers, of which there may be any desirable number, but, as shown, there being three, including an upper chamber 2, an intermediate chamber 3, and a lower chamber 4. The cotton to be dried is carried in an air stream tortuously through the chambers of the casing, that is to say, the cotton is taken into the upper chamber 2 through an inlet 5 at one end thereof, thence to the opposite end of the chamber where it is discharged through an opening 6 into the intermediate chamber 3 through which it is carried to the opposite end of the chamber and discharged through an opening 7 into the lower chamber 4, whence it is carried to the opposite end of said chamber 4 and discharged through an outlet opening 8. In this connection, it is noted that the air stream may be created and maintained in the chambers 2, 3 and 4, either by an air blast through the cotton supply pipe 9 leading from a wagon or other source from which the cotton is taken into the chamber 2 through the inlet 5, or by suction created in the intake of the gin, which, in practice, has a suitable pipe connection (not shown) with the outlet 8 of the lower chamber 4 of the drying apparatus. In some cases the air stream may be maintained by both the blast at the intake 5 and suction at the outlet 8.

The horizontal partition constituting the bottom of the upper chamber 2 inclines downwardly, as at 10, from the region of the inlet opening 5 and is then formed into a series of the adjoining transverse troughs 11 which are semi-cylindrical in form, each trough having a peripherally spiked roller 12 located therein and rotating with its upper portion in opposed relation to the air stream through the chamber. These rollers 12 constitute pickers which engage and carry the heavier hull and trash laden pieces of cotton through the troughs 11 crosswise thereof but forwardly of the chamber 2 with a substantial beating effect, the lighter pieces or wads floating in the air stream above the rollers and all of the material passing through the opening 6 to the intermediate chamber 3.

At the receiving end of the intermediate chamber 3 the bottom partition inclines downwardly, as at 13, and it is then formed in a series of troughs 14 extending connectedly to the opening 7 at the opposite end of the chamber. Working in the troughs 14 are peripherally spiked rollers 15 similar to the rollers 12 in the upper chamber 2 but rotating in the opposite direction, in other words, with their upper portions in opposed relation to the air stream in said intermediate chamber 3.

Beneath the opening 7 through which the material is discharged into the lower chamber 4, the bottom of said chamber 4 inclines downwardly, as at 16, and is then formed into a transverse arcuate trough 17 which merges with the adjacent inclined wall 18 of a hopper 19. The opposite inclined wall 20 of said hopper 19 is joined at its upper end with an arcuate trough 21 which adjoins a similar trough 22, said troughs 21 and 22 constituting a further part of the bottom of the chamber 4, the remainder of which inclines downwardly, as at 23 to the outlet opening 8 in the adjacent end wall of the casing 1. The lower ends of the inclined walls 18 and 20 of the hopper 19 merge respectively with the opposite sides of a semi-cylindrical bottom 24 of the hopper, said bottom portion 24 having a central discharge

outlet 25, said outlet 25 being constantly air-sealed by a rotating controller and dropper element 26 located in the lower portion of the hopper and provided with a plurality of radial blades 27 of resilient material which engage the semi-cylindrical bottom portion 24 of the hopper during rotation of the element 26, said blades 27 being in sufficient number and relative arrangement whereby, at all times, there are at least two blades in contact with the cylindrical portion 24 of the hopper bottom and one on either side of the outlet 25. These blades 27 in addition to affording a practical air seal for the outlet 25 function as a feeder to discharge the hulls and foreign material or trash extracted from the cotton passing through the apparatus.

Above the hopper 19 and in line with the troughs 17, 21 and 22, are a pair of spaced transverse arcuate troughs 28 and 29, all of these troughs, collectively, constituting the bottom proper of the lower chamber 4.

Working in the trough 17 is a re-claiming saw 30 which effects a further separation of the hulls and trash from the cotton fibres, the heavier parts thus separated being discharged into the hopper 19 through the opening 31 between the troughs 17 and 28, while the fibres caught on the saw teeth are taken therefrom by a brush element 32 rotating reversely in the trough 28 with its lower portion sweeping rearwardly across the trough 28, the fibres thus freed from the saw being carried into the air stream thereabove. Working in the next adjacent trough 29 is a second re-claiming saw 33 which acts upon any hulls or trash which has passed beyond the trough 28, thereby causing separated heavier material to enter the hopper 19 through a central opening 34 between said troughs 28 and 29 and also through an opening 35 between the troughs 29 and 21, there being a second brush 36 rotating in the trough 21 in cooperative relation to the saw 33, the same as the brush 32 cooperates with the saw 30 and serving to sweep the fibres from said saw 33 and carry the fibres into the air stream thereabove. In the last trough 22 a final peripherally spiked roller 37 is provided which beats and throws into the air stream adjacent the outlet opening 8 any heavy material which has passed the second brush 36.

All the time the hereinabove described physical action is occurring in the treatment of the cotton, the several chambers are heated to a temperature sufficient to effectively evaporate the moist content of the cotton without injuring the fibres, this drying effect being an essential feature of the invention and equally important as the cleaning of the cotton in the conditioning thereof prior to ginning. To this end, heating elements comprising coils of steam pipes are provided in the respective chambers. As shown, these coils are coupled in series, the first coil 38, located in the top portion of the upper chamber 2, is a continuation of a pipe 39 from a source of steam supply (not shown) and provided with a cutoff valve 40. From the end of the coil 38 a connecting pipe 41 leads to a coil 42 located in the top portion of the intermediate chamber 3, said coil 42 being looped back and forth between the end wall of the casing 1 in which the inlet opening 5 of the upper chamber 2 is located and a point below the end transverse trough 11 next adjacent the opening 6 through which material is passed from the chamber 2 into said intermediate chamber 3, so as not to appreciably obstruct the movement of the cotton. From the end of the coil 42 a connecting pipe 43 leads to a similiar coil 44 located in the top portion of the lower chamber 4, said coil 44 terminating at one end short of the opening 7 through which the material passes from the intermediate chamber 3 into said lower chamber 4, the end of said coil 44 having a cut-off valve connection 45 with a pipe 46 which may be a return pipe to the source of steam supply or to any other desirable place for discharge.

Preferably, relief doors 47 and 48 are respectively provided at the opposite ends of the upper and intermediate chambers, as shown, or at any other suitable location for convenient access to the interior of the respective chambers.

In the operation of the apparatus several peripherally spiked rollers, saw elements and brushes may be rotated by any suitable driving means (not shown), and the cotton is effectively dried in passing through the respective chambers with the air stream which is heated by the heating coils provided as herein described and located so as not to obstruct the free passage of the cotton while at the same time the cotton is freed of hulls and trash so that it leaves the apparatus in a sufficiently dry and cleaned condition for ginning.

Obviously, the apparatus admits of considerable modification within the spirit and scope of the invention as defined by the appended claims.

The invention, therefore, is not limited to the specific construction and arrangement shown in the accompanying drawing.

What is claimed is:—

1. A cotton drier comprising, a casing divided into superposed elongated chambers, the uppermost chamber having an inlet at one end and an outlet opening at its opposite end communicating with the corresponding end portion of the chamber next below, the respective underlying chambers each communicating with the chamber next below alternately at opposite ends of the casing, the bottoms of the several chambers being formed with transverse arcuate troughs, a portion of the bottom of the lowermost chamber being broken in continuity to provide an outlet opening, a hopper located below said opening, the upper wall portions of the hopper merging with adjacent portions of the chamber bottom proper and a trough or troughs of said chamber bottom being located above said hopper in spaced relation but substantially in alignment with the other troughs of the bottom proper, peripherally spiked roller elements working cooperatively in respective troughs of the upper chambers, cooperative peripherally saw-toothed roller and brush elements working in the troughs of the lowermost chamber next adjacent and above said hopper, a rotatable dropper element in said hopper having yieldable blades disposed radially on the circumference thereof whereby to feed the contents of the hopper to the discharge outlet of the hopper and coacting with the bottom of the hopper to maintain an air seal for the outlet.

2. A cotton drier comprising a generally rectangular hollow casing, a plurality of transverse imperforate troughs arranged in said casing in separate upper and lower horizontal series dividing the casing into superposed chambers, the uppermost chamber having a cotton inlet and the lowermost chamber having a cotton outlet, the adjoining chambers having communicating end passage-ways whereby the passage of the cotton through the casing is tortuous from end to end of the casing and downwardly from cham-

ber to chamber, means for heating the chambers, peripherally formed picker and beater roller elements rotating in the troughs of the upper chamber or chambers in opposed relation to an air stream passing through the respective chambers, associated saw and brush roller elements located alternately and rotating in the troughs constituting the bottom of the lowermost chamber and certain of the troughs being spaced apart, a hopper located below said spaced troughs in receiving relation to the openings therebetween, the upper wall portions of the hopper merging with the marginal portions of the troughs next adjacent said spaced troughs, and a rotatable dropper element in said hopper for feeding the contents of the hopper to an outlet opening in the hopper and providing an air seal for said outlet opening.

3. A cotton drier comprising, a superposed series of elongated chambers communicable with each other at their adjacent ends whereby to provide a tortuous passage through the chambers, the uppermost chamber having a cotton inlet at one end and the lowermost chamber having a cotton outlet at one end, the bottoms of the respective chambers being formed into transverse arcuate imperforate troughs, certain troughs constituting the bottom of the lowermost chamber being spaced apart so as to provide outlet openings therebetween, a hopper located beneath said spaced troughs in receiving relation to said outlet openings, the upper wall portions of the hopper merging with the marginal portions of the troughs next adjacent said spaced troughs, said hopper having a discharge opening, a rotatable dropper element in said hopper for feeding the contents of the hopper to the outlet opening providing an air seal for said opening, peripherally formed picker and beater roller elements working in the troughs of the respective upper chambers in opposed relation to the air stream in the chambers, associated saw and brush roller elements located alternately and rotating in the troughs constituting the bottom of the lowermost chamber, and means for heating the chambers comprising pipe coils located in the upper portions of the chambers and spaced above the roller elements working in said troughs.

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