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APPARATUS FOR THE RESTORATION OF MOISTURE
TO THE FIBERS OF SEEDCOTTON
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Fig. 2.

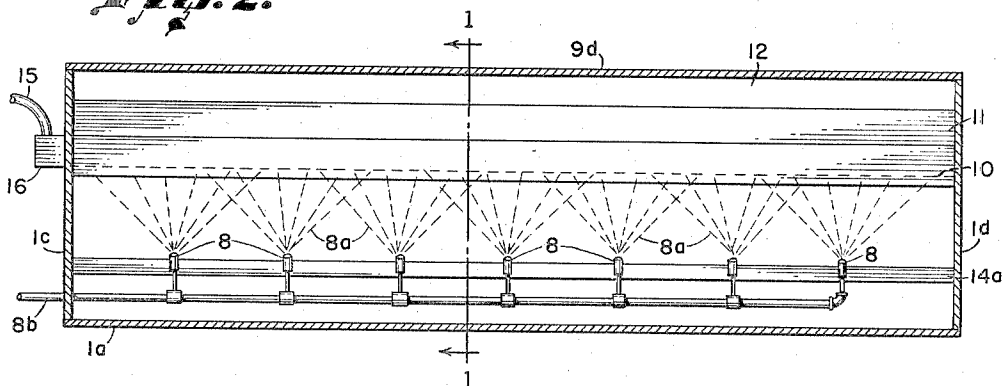
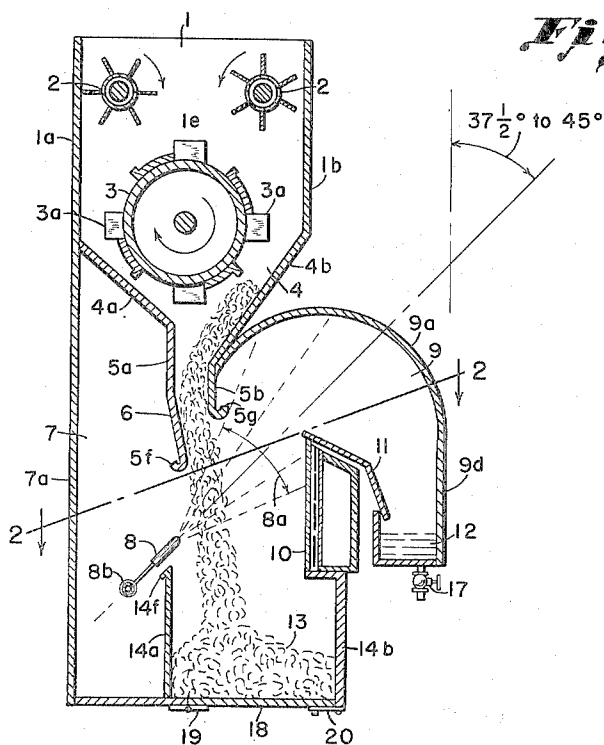


Fig. 1.



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APPARATUS FOR THE RESTORATION OF MOISTURE TO THE FIBERS OF SEEDCOTTON

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3 Claims. (Cl. 68—205)

(Granted under Title 35, U. S. Code (1952), sec. 266)

A non-exclusive, irrevocable, royalty-free license in the invention hereindescribed, for all governmental purposes, throughout the world, with the power to grant sublicenses for such purposes, is hereby granted to the Government of the United States of America.

This invention relates to apparatus for restoring moisture to the fibers of seedcotton which has become excessively dry through natural or artificial causes. Specific amounts of moisture content in the fiber of seedcotton are necessary in attaining the best results from the process that is known as cotton ginning.

One of the primary objectives of the apparatus is to provide means for moisture restoration by easily controlled pressure nozzle sprays that may employ chemical wetting agent solutions or fog mists of water or other fluids. Another object of the invention is to provide a device for restoring moisture to the fiber of seedcotton without the objectionable drip of surplus moisture into the already treated seedcotton. A third object is to construct an apparatus that is free from objectionable surfaces upon which seedcotton adheres and builds up in lumps and bulky wads. Still another object is to provide means for introducing predetermined quantities of heat into the apparatus so that surplus moisture might be evaporated or converted into a vapor within the confines of the seedcotton fiber, so as to become a useful moistening medium.

In order that the invention may be more readily understood, reference is made to the following description and the accompanying drawing in which Figure 1 depicts a vertical cross section of the apparatus taken on line 1—1 of Figure 2; and Figure 2 depicts a plan section taken on line 2—2 of Figure 1. In these drawings like numerals refer to like parts throughout.

At the top of the apparatus is a suitable inlet 1 for receiving seedcotton. Said inlet is confined within side walls 1a and 1b and end walls 1c and 1d. Regulated feeding rollers 2, mounted on conventional external bearings not shown and powered by conventional means, are positioned horizontally within the inlet 1 and deliver seedcotton to a cylinder 3 having directing vanes 3a, which are positioned horizontally beneath the rollers 2 and in the space that we have designated as the throat 1e of said inlet. This roll is also conventionally mounted and driven. Below the cylinder 3 is funnel 4 having sloping sides 4a and 4b, while its ends are vertical and are a continuation of the inlet ends 1c and 1d. This funnel 4, which restricts the seedcotton flow downward to the zig-zag passage or chute 6, is attached by conventional means not shown to deflector plates 5a and 5b, which guide the flow of seedcotton so that it does not impinge upon the tips of nozzles 8, nor upon the upper edge of vertical heater 10. It will be noted that the lower edges of deflector plates 5a and 5b, are bent into a curved lip, 5f and 5g, respectively, as these have been found to provide a more drip-free and smoother flow of seedcotton. On one side of the seedcotton chute 6 is positioned

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tion of inlet wall 1a, and whose ends are continuations of inlet hopper ends 1c and 1d. A vertical wall 14a, common to nozzle compartment 7 and bin 13 at the bottom of the apparatus, is provided with a return lip at the upper edge, as indicated by 14f. Opposite the partition 14a is vertical wall 14b. This wall, together with partition 14a and end walls 1c and 1d, forms base bin 13 which receives the seedcotton after the latter has passed downward through chute 6 and traversed the spray zone 8a. End walls 1c and 1d are merely continuations of the sides of the inlet. Said zone of action 8a of the nozzles 8 is indicated by dotted lines as an expanding taper from the tips of the nozzles to the collector hood 9 and heater 10. It is this zone of action 8a that the downward flowing seed cotton in chute 6 traverses. It will be noted that the collector hood 9 has an arcuate top 9a, flat end walls which are continuations of inlet end walls 1c and 1d, and that the lower end of said collector hood is bounded by heater shield 11, and the vertical side wall 9d at the outside of the apparatus. These elements provide a moisture sump 12, wherein all surplus moisture from the spraying action may be readily collected and disposed of by means of valve 17.

Heater element 10 is preferably an electrical heating element vertically disposed, as indicated partially below the zone of action 8a of nozzles 8, and is provided with current through conduit 15 and thermostat 16, respectively, whereby the unit may operate at any predetermined temperature and radiate quantities of heat commensurate with the needs of moisture restoration. Although it is preferred to use a flat electrical element for this heater panel 10, it should be understood that other kinds of heating panels may be used in this position without departing from the spirit of the invention.

Referring now to the specific operation of the apparatus, it will be seen that seedcotton which is passed at a predetermined rate downwardly through the rollers 2 of inlet 1, directed by the cylinder 3 into funnel 4, then guided by deflector plates 5a and 5b into chute 6, where it ultimately descends to base bin 13. As the seedcotton passes the curved edges 5f and 5g of deflector plates 5a and 5b it passes through the zone of action 8a of nozzles 8, which are supplied with moistening media under pressure by means of pipe 8b. An extensive experiment has shown that the angle of inclination of the axes of spray of these nozzles must be substantially within the limits of from 10° to 60° with the horizontal or from 30° to 80° with the vertical, and that the form of spray delivered from said nozzles 8 in said zone of action 8a may be flat or "fish tail" sprays on the one hand, or conventional 45° conical sprays on the other, so long as the cone of action of the nozzle is bounded by the aforesaid limits of the zone of action 8a. Surplus spray and drift of foggy mist that does not combine with the descending fibers of the seedcotton is carried into the collector hood 9 or evaporated by heater panel 10. Any drip present finds its way to the drain sump 12. Any tendency of moisture and foggy mist to splatter against the vertical heater panel 10 produces vaporization. The resulting vapor either merges with the downflowing seedcotton or is carried into the collector hood 9. The treated seedcotton in its downward passage along chute 6 may be collected in bulk in the base bin 13, or it may thence be conducted by suitable and conventional means not shown to such elements of ginning apparatus as distributors and feeders. The floor of bin 13 may be provided with trap door 18 supported by hinge 19 and kept in place by latch 20. Because of peculiarities that are encountered in the usual handling of seedcotton in flat streams at cotton gins, it is preferred that the width of chute 6, between deflector plates 5a and 5b, should be greater than 4½ inches; that the radius of the collector hood 9 should preferably be

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9 inches or greater; that the width of the base bin between walls 14a and 14b should be approximately 12 inches; and that the over-all height of the apparatus should thus be between 4 and 5 feet with widths ranging from 48 to 72 inches depending upon the widths of the apparatus from which and into which the device may receive and discharge. It may be further said that for ordinary single-feeder and gin stand, it is preferred to employ from 5 to 7 spray nozzles having a general delivery cone of not more than 45°, and the total having ports in the tips of the nozzles whereby approximately 1.33 pounds of wetting agent solution per minute may be sprayed to the descending seedcotton under working pressures of approximately 70 pounds p. s. i. The vertical heater panel employed is an electrical strip heater of 4 kw. capacity.

The described apparatus operates satisfactorily with seedcotton poundages that are normally concurrently handled by cotton gin stands and their feeders.

I claim:

1. An apparatus for restoring moisture to the fiber of seedcotton comprising: a vertical chute for passage of a predetermined quantity of seedcotton; means inside said chute for controlling said rate of passage; inclined moisture spraying nozzles at one side of the lower end of said seedcotton chute adapted to eject moisture misting sprays directed upwardly across said lower end of the chute at nozzle axis angles ranging between 80° and 30° to the vertical; means for supplying moisture media to said nozzles; a collector hood for excess spray opposite said nozzles at the terminus of the spraying locus; means for collecting surplus moisture media from said apparatus; a vertical heater panel disposed on the same side of said lower end of the chute as said collector hood and slightly below the latter for radiating heat and evaporating moisture; and a collecting bin at the base of the apparatus for receiving moistened seedcotton.

2. An apparatus for restoring moisture to the fiber of

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seed cotton comprising: a seedcotton inlet hopper; regulated feeding rollers at the intake to said hopper adapted to feed seedcotton at a predetermined rate; a directional feeding cylinder below said rollers at the throat of said hopper; a discharge funnel from the bottom of said hopper; a zig-zag vertical passage below said funnel; deflector plates on the side of said funnel; a base bin at the bottom of said vertical passage; a spray nozzle compartment to one side of said passage; a wall common to said compartment and said vertical passage; a row of spray misting nozzles within the said compartment having discharge axes inclined at an angle of from 30° to 80° to the vertical, the nozzle tips of said nozzles being adjacent the wall common to said compartment and said passage, said nozzles being adapted to produce a zone of mist exterior of said nozzle compartment and traversing said vertical passage; a vertical heating panel disposed below the inclined zone of mist of said nozzles and opposite said nozzles to form part of said passage; an arcuate collector hood as a terminal for the said zone of mist at the side of said passage opposite to said nozzles, said hood beginning at one of said deflector plates, and said heat panel, said hood terminating in a moisture drainage sump; means for draining moisture from the sump of said collector hood; means for bringing said heating panel to predetermined temperature and radiation effectiveness; means for supplying moisture restoration solutions under pressure to said spray misting nozzles; and means for removal of treated seedcotton from said base bin.

3. The apparatus of claim 2 in which the lower edges of the zig-zag vertical passage are formed to present round surfaces to the passage of materials thereacross.

References Cited in the file of this patent

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