Oct. 17, 1933. S. GREEN 1,930,952

COTTON TREATMENT METHOD AND APPARATUS

Filed March 9, 1931

Fig. 1.

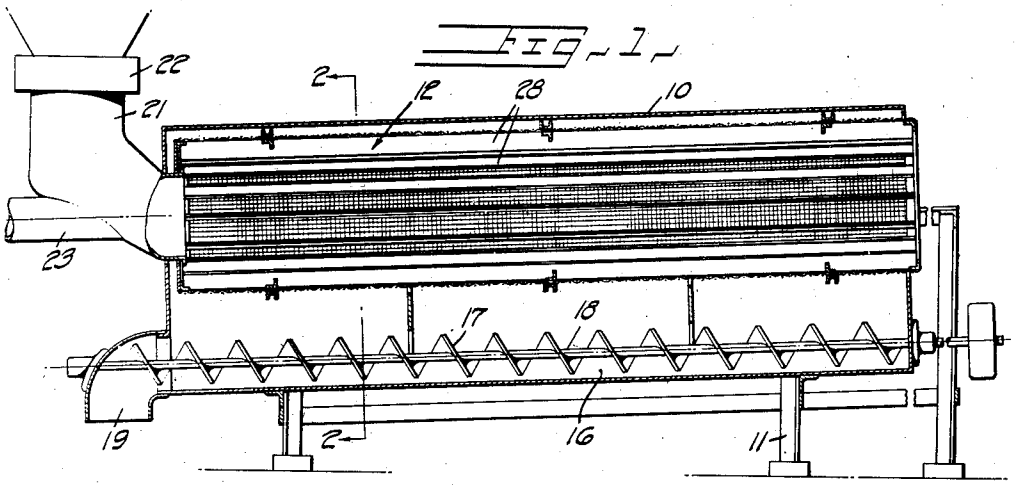


Fig. 3.

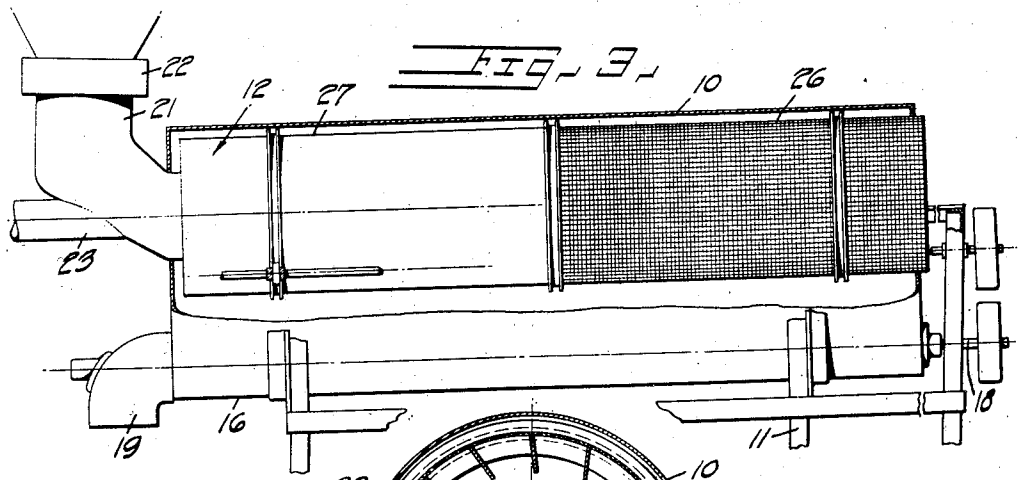
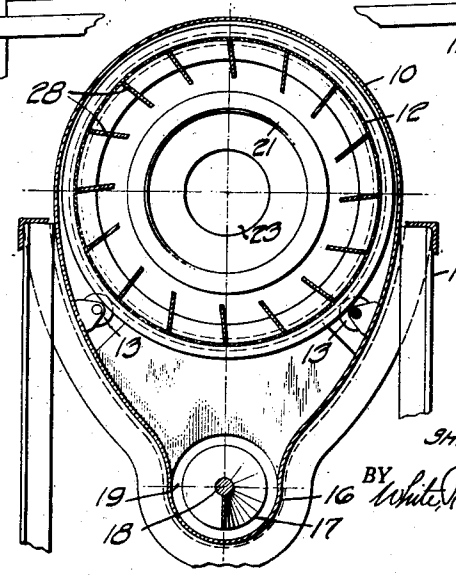


Fig. 2.



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COTTON TREATMENT METHOD AND APPARATUS

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3 Claims. (Cl. 19—72)

This invention relates generally to methods and apparatuses for placing cotton fiber in proper condition for subsequent ginning or other milling operations. It is concerned particularly with the removal of moisture content, and the removal of certain foreign material such as sand, stones or pebbles, leaves, and the like.

It is an object of the invention to devise a method and apparatus of the above character which will carry out its various functions automatically and with a minimum of time, and which will be well adapted for commercial operation.

It is a further object of the invention to devise a method and apparatus of the above character which will secure relatively high uniformity in the resulting treated product, irrespective of lack of uniformity in the fiber being treated.

Further objects of the invention will appear from the following description in which the preferred forms of the invention have been set forth in detail in conjunction with the accompanying drawing. It is to be understood that the appended claims are to be accorded a range of equivalents consistent with the state of the prior art.

Referring to the drawing:

Figure 1 is a side elevational view partly in cross section, illustrating an apparatus incorporating the present invention.

Fig. 2 is a cross sectional detail taken along the line 2—2 of Fig. 1.

Fig. 3 is a view similar to Fig 1 but illustrating a modified form of apparatus.

In the cotton industry it has been common to treat the raw cotton fiber to reduce its moisture content, and to remove certain foreign material such as sand, stones or pebbles, leaves, and the like, prior to ginning or subsequent milling operations. These operations have been carried out separately in different apparatuses, with the result that the fiber has been subjected to an undue amount of handling. Undue breakage of the cotton fiber and roping are common results of such methods. The present invention is characterized by the fact that drying of the fiber and removal of foreign material is accomplished as a single operation, thus effecting an economy with respect to the apparatus required, and reducing handling to a minimum.

The method of the invention can best be understood after a description of the apparatus. Referring to Figs. 1 and 2, the apparatus consists of an outer housing 10, which can be made of suitable material such as sheet metal. A conventional support is provided by framework 11. Preferably the housing is elongated as shown and is normally supported in an inclined position. Positioned within housing 10 and likewise inclined with respect to the horizontal, there is a rotatable drum 12. As convenient means for supporting this drum within the housing, it is shown carried by rollers 13 which appear in Fig. 2, and certain of these rollers can be driven by a suitable source of power. The upper and side portions of housing 10 are curved and are in close proximity with the upper side portions of drums 12, while the lower portion of the housing is formed to provide a trough 16 extending substantially the length of the housing. Suitable means such as a conveyor screw 17 is arranged within the trough 16 to carry away foreign material deposited within the same. This conveyor screw 17 is illustrated as being suitably journaled and can be continuously driven by drive shaft 18. Trough 16 at its lower end communicates with the discharge chute or conduit 19.

The cotton fiber to be treated is preferably introduced into the lower end of drum 12. As representative of suitable means for this purpose there is shown a chute or conduit 21 communicating with the lower end of drum 12. Suitable valve means indicated at 22 can be employed for feeding the fiber to conduit 21. A pneumatic conduit 23 communicates with conduit 22, and as will be presently explained, when the apparatus is in operation a stream of drying gas is continuously introduced thru conduit 23, to cause a continual stream of drying gas to flow thru drum 12 towards its upper end.

Drum 12 is preferably perforate, that is it is formed of wire mesh or of perforated sheet metal. The perforations are sufficiently large to permit sand, stones or pebbles, broken leaves and the like, to pass therethrough to the exclusion of the fiber. In that form of the invention shown in Fig. 1, the drum is perforated for its entire length. In that modification shown in Fig. 3 only the upper section 26 of the drum is perforate while the lower section 27 is substantially imperforate. The advantage of the latter construction will be subsequently explained.

To secure more adequate agitation of the cotton fiber within the drum and to secure adequate contact with the drying gas, a plurality of circumferentially spaced vanes 28 are mounted upon the inner walls of the drum. These vanes preferably extend substantially parallel to the axis of the drum and are also preferably set at different angles as shown in Fig. 2, to secure more adequate distribution of the fiber.

In operating my apparatus the cotton to be treated is continually introduced into the lower end of drum 12 thru conduit 21. The drum is continuously rotated and a stream of drying gas is continuously introduced thru conduit 23. As the drum rotates the cotton fiber is repeatedly carried upwardly and then dropped down thru the stream of drying gas flowing thru the drum. The drying gas flows with sufficient velocity to gradually progress the fiber to the upper end of the drum, where it is discharged. As the progression of the fiber is opposite to the force of gravity, relatively wet masses of fiber introduced into the drum are retained within the drum and treated for a longer period than masses introduced in relatively dry condition. Thus the method is automatically selective or classifying in its action, so that the treated discharged fiber is substantially uniform as to dryness irrespective of lack of uniformity in moisture content of the fiber being treated. While the cotton is being continually agitated within the drum, sand, stones or pebbles, broken leaves, and the like find their way thru the perforations of the drum and are collected in trough 16. Conveying screw 17 continually removes such foreign material thru conduit 19.

If the cotton being treated is relatively high in moisture content, its treatment within drum 12 may tend to cause roping of the fiber. Under such conditions the apparatus shown in Fig. 3 is desirable. In this apparatus a certain amount of the moisture of the cotton is first removed while the cotton is in the imperforate section 27 of the drum. When the cotton finally reaches the perforate section 26, it has been dried to such an extent that roping will not result from repeated contact with the perforated walls of the drum.

It is evident that certain adjustments can be made to secure optimum results under particular operating conditions. For example the inclination of the housing can be varied and the velocity of gas flow can be adjusted. The drying gas as introduced into the housing is at an elevated temperature, although the temperature should not be sufficiently high to cause injury to the fiber.

I claim:

1. In an apparatus for treating cotton fiber with gas and simultaneously removing foreign material therefrom, a housing, a drum rotatably disposed within the housing, said drum being inclined relative to the horizontal, means for delivering cotton fiber to be treated into the lower end of the drum, and means for maintaining a draft of gas thru the drum in the direction of the upper end of the drum, a portion of the drum near its upper end being perforate while a portion near its lower end is imperforate.

2. In cotton drying and cleaning apparatus, an elongated drum having an inlet for cotton at one end thereof and an outlet at the other end thereof, the longitudinal axis of said drum being inclined with respect to the horizontal and with the outlet end elevated with respect to the inlet end, means for rotating said drum about its longitudinal axis, whereby the cotton is carried to a point near the upper portion of the drum and dropped transversely across the inside of the drum, means for maintaining a stream of drying gas longitudinally through the drum in a direction towards the outlet end of the drum, said stream having a velocity which is sufficient to move the cotton forwardly toward the discharge end of the drum to a greater extent than the cotton is carried backwardly due to the movement of the drum, whereby the cotton is gradually driven toward the discharge end of the drum by the drying gas and whereby damp cotton remains in the drum for a longer period than the cotton which is less damp, said drum having a perforate portion and an imperforate portion, said imperforate portion extending for a substantial distance from the inlet end of the drum and said perforate portion extending for a substantial distance from the outlet end of said drum, whereby the cotton remains in the imperforate portion until it is sufficiently dry to reduce its tendency toward roping whereupon it is carried into the perforate portion for cleaning and further drying.

3. In cotton drying and cleaning apparatus, an elongated drum having an inlet for cotton at one end thereof and an outlet for the cotton at the other end thereof; said drum being imperforate adjacent the inlet and perforate adjacent the outlet, means for delivering cotton fiber to be treated to the inlet of the drum, means for rotating said drum about its longitudinal axis whereby the cotton is carried to a point near the upper portion of the drum and dropped transversely across the inside of the drum, and means for maintaining a draft of gas through the drum whereby the fiber is caused to progress toward the outlet of the drum and be discharged.

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