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BOLL BREAKER AND COTTON CLEANER.
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To all whom it may concern:

Be it known that I, SOLOMON E. GILLESPIE, a citizen of the United States, residing at Dallas, in the county of Dallas and State of Texas, have invented certain new and useful Improvements in Boll-Breakers and Cotton-Cleaners, of which the following is a specification.

My invention has relation to a boll-breaker and cleaner and in such connection it relates more particularly to the construction and arrangement of the parts constituting such an apparatus or such instrumentalities as enter into such an apparatus.

Hereinafter when a boll breaker was combined with a cleaning mechanism the usual practice has been to inclose the two instrumentalities in a common casing and to exhaust the air from both boll breaker and cleaner to thereby not only conduct the cotton under suction to and through the boll breaker and cleaner but to exhaust the dirt from the cotton as it passes through the cleaner. As a variation of this usual practice, the cotton has been forced by air under pressure through both boll breaker and cleaner and the current of air under pressure has been utilized in the cleaner to also blow the dirt out of the cotton as the cotton travels through the cleaner.

Again as boll breakers have been ordinarily constructed the bolly cotton has been broken or combed by pins projecting from a picker roll and coacting with similar pins projecting from a breast or concave.

My present invention differs functionally from the constructions and arrangements of the prior art in that,—

First. The cotton is either drawn into the boll breaker by suction or blown in by air under pressure but before the cotton passes through and is discharged into the connecting cleaner, the cotton is relieved from air pressure or suction and the cotton is conveyed mechanically by the boll breaking mechanism into a cleaning chamber which is filled with technically "dead" air in that in said cleaning chamber air can not travel either under suction or under pressure, and

Second. The bolly cotton is crushed or rolled between a stationary breast and a revolving body, the operative faces of both of which are formed of a series of rods preferably made of steel.

In the carrying out of my invention the bolly cotton is introduced either by suction or under air pressure to a chamber inclosing the periphery of the boll breaking roll or revolving member of the boll breaker and it is caught and fed by the boll breaking roll over a stationary concave or breast and through the boll breaker to the cleaning chamber. The boll breaking roll has its active or breaking surface formed of a continuous series of rods spaced from each other and extending longitudinally of the roll and the concave or breast has an active or breaking surface formed of a series of rods ranged parallel with the rods of the breaker roll. To facilitate not only the crushing of the bolls but also the feeding of the bolly cotton longitudinally and spirally of the boll breaker, the roll is also provided with ribs wound spirally on the periphery of the roll and coacting with straight ribs wound in arc shape upon the concave or breast. The spaced rods of the boll breaking roll also act as an air separator so that the cotton after it enters the boll breaker is relieved from either pressure or suction of air and then conveyed mechanically by the revolving spiral ribs through the boll breaking chamber and discharged practically free of bolls into a cleaning chamber wherein the air is dead. The cotton is conveyed through the cleaner chamber by paddles projecting from the periphery of a revolving body and the cotton is pressed by said paddles upon and over a screen wall inclosing the revolving body and paddles. The dirt from the cotton is thus removed partly by gravity and partly by centrifugal action of the blades through said screen wall as the cotton is propelled by said paddles through the cleaner chamber.

The nature and scope of my invention will be more fully understood from the following description taken in connection with the accompanying drawings forming part hereof, in which—

Figure 1, is a top or plan view partly broken away of a boll breaker and cleaner embodying the main features of my present invention.

Fig. 2, is a front end elevational view of the same.

Fig. 3, is a rear end elevational view.

Fig. 4, is a longitudinal sectional view taken on the line 4—4 of Fig. 1.

Fig. 5, is a cross sectional view taken on the line 5—5 of Fig. 1.
Fig. 6, is a horizontal sectional view of the boll breaker and of a portion of the cleaning mechanisms.

Fig. 7, is a cross sectional view of the boll breaker taken on the line 7—7 of Fig. 6.

Fig. 8, is an enlarged detail view in section of the boll breaking mechanism, and

Fig. 9, is a cross sectional view taken on the line 9—9 of Fig. 8.

Referring to the drawings: 1 represents a casing made of sheet metal, wood or other imperforate material and enclosing the boll breaking and cotton cleaning mechanisms. Either end of the casing (which is of general cylindric form) is closed by a plate or frame 2 and 3. A shaft 4 traverses the approximate center of the casing 1 and has its bearings by preference in the plates or frames 2 and 3. Suitable means for revolving the shaft may be provided, such for instance as that shown in the drawings in which power is conveyed from a suitable source to the pulley 5 on the rear end of the shaft 4 beyond the plate 3.

The boll breaking roll 6 is preferably formed of two spiders 7—7 each keyed to the shaft 4 and connected at their peripheries by a series of rods 8 formed preferably of steel and preferably round in cross section.

In the preferred construction of roll 6 these rods 8 are rigidly held in the spiders and have neither rotary nor other movement in said spiders. In the preferred construction of the breaker roll, the roll is frusto-conical with the larger diameter at the delivery end of the boll breaker. It is of course to be understood that the roll may, if desired, be of generally cylindric shape.

Adjacent to the periphery of the roll 6 and coacting with the rods 8 which form a ribbed surface for the roll, is arranged a breast or concave 9 consisting essentially of two substantially quarter-circle frames 10—10 connected rigidly to each other by a series of longitudinally arranged rods 11. The concave or breast 9 is relatively stationary in that it does not rotate or revolve but it is adjustably and yieldingly supported in a rigid frame 12.

The interior face of the concave 9 and the exterior face of the roll 6 coact in the breaking of the cotton boll and each of these coacting faces is by preference provided with ribs 13 and 14 coacting to crush the boll and one set of ribs 14 on the roll acting to propel the cotton through the boll breaking chamber. The ribs 13 of the concave 9 are arcuate and straight but the ribs 14 of the roll 6 are spirally wound around the exterior face of said roll.

The inlet 15 for cotton discharges through a distributor wheel 16 directly upon the periphery of the roll 6, and said roll carries the cotton around over the breast 9 and through an annular chamber 17 formed between the exterior of the roll 6 and a screen wall 18 arranged within the casing 1. The plate or spider 7 forming the front end of the roll 6 is open or skeleton in shape and revolves in close proximity to the plate 2 forming the closure for the front end of casing 1. This plate 2 has an opening from which projects the pipe 19 connected in the preferred form of apparatus with a suction device. Inasmuch as the rods forming the periphery of roll 6 are spaced apart it is obvious that when suction is applied through pipe 19 to the interior of roll 6 that the air discharged with the cotton into the boll breaker is sucked through these rods and hence the roll 6 not only performs the function of a boll breaker but also that of an air separator to relieve the cotton of air pressure prior to its discharge from the boll breaker.

If desired the cotton may be discharged from the inlet 15 under air pressure or the suction within the boll breaker roll 6 may be sufficient to draw the cotton through inlet 15 to the distributor wheel 16. This wheel 16 when rotated serves to propel the cotton properly spread out and in regulated quantities directly upon the receptacles of the roll 6. The wheel 16 may be revolved by a belt 20 connecting the shaft of said wheel with the central shaft 4 (see Fig. 2) or in any other suitable manner.

The cotton introduced to roll 6 is properly crushed and broken by the coaction of the ribbed surface of said roll 6 with the ribbed face of the concave 8, the rods forming said surfaces having a drawing out as well as a flattening effect upon the cotton bolls. The bolls are separated from the cotton and the sections of the pod are disrupted by the coaction of the spirally wound ribs 14 of the roll 6 with the arcuate ribs 13 of the concave, and the cotton is mechanically advanced by the ribs 14 of the roll through the chamber 17 and over the screen 18 to the discharge 19 end of the boll breaker.

In order that the boll breaker roll 6 may properly act as an air separator, it is essential that the discharge from the boll breaker shall be into a closed chamber or in other words the discharge should be into what is technically known as "dead" air.

I have also discovered that in the cleaning of cotton the best results are obtained by advancing the cotton mechanically through the cleaning chamber over a screen surface or wall and in maintaining the cleaning chamber under dead air pressure of slight rarefaction. As a result of this discovery the closed chamber constituting the discharge 19 from the boll breaker in my present application is extended to form the cleaning chamber of the apparatus.

To accomplish this the imperforate casing 1 is extended and within said casing is a...
ranged a cylindrical screen wall 21 constituting the outer wall of the cleaning chamber. The shaft 4 traversing the approximate center of the casing 1 carries within said
5 screen wall 21 a revolving body 22 of preferably cylindrical outline. This body 22 for greater ease of rotation is preferably hollow or tubular and has closed ends 22a and 22b. The diameter of body 22 is less than
10 that of screen wall 21 and the space 23 between the exterior of body 22 and the wall 21 constitutes the cleaning chamber. The annular outlet or discharge from the boll breaker communicates with this chamber 23
15 and the cotton after it leaves the boll breaker is discharged into the chamber 23 and upon the revolving body 22. The inner end of the boll breaker being of a diameter larger than the adjacent end 22b of the cleaner body 22
20 an annular peripheral flange 22c is provided for this inner end and said flange 22c is so connected with the adjacent end 22a of body 22 as to form with said end 22a an airtight closure between the interior of the boll breaker and the adjacent end of the cleaning chamber.

Projecting from the periphery of the body 22 are a series of paddles 24 arranged around the body in a spiral direction and inclined sufficiently to force the cotton longitudinally through the cleaning chamber 23.

The cotton in the cleaning chamber 23 is not only pushed mechanically through said chamber 23 but is also forced by centrifugal action assisted by the paddles, against the screen wall 21 and dirt is forced or knocked from the cotton through said screen 21 while the cotton is in transit through the cleaning chamber.

40 The casing 1 is extended at the bottom below screen walls 18 and 21 to form a trough 25 in which operates a trash conveyor 25a of the usual screw type.

The discharge from dead air cleaning chamber 23 is through centrifugal force from the body 22 into a tangentially arranged flue 26. The flue 26 opens into a vertically arranged outlet chamber 27 having its bottom normally closed by a revolving wheel 28 constituting a vacuum pocket between the chamber 27 and the distributor pipe 29 leading to the means for conveying the cleaned cotton to the gin stand. The pocket 29 prevents in large measure the entrance of outside or live air to the cleaning chamber 23 through the chamber 27 and flue 26.

It is to be understood that for cotton which does not have bolls to be broken, the boll breaker roll will be used solely as an air separator by means of which the cotton may be introduced to the closed cleaner chamber relieved from pressure or suction of air. In such instance the roll 6 and the chamber in which it revolves may be and is to be regarded as part and parcel of the cleaner.

Having thus described the nature and objects of my invention, what I claim as new and desire to secure by Letters Patent, is—
1. In an apparatus of the character described, a hollow boll breaking roll having a longitudinally ribbed periphery formed of spaced rods and a concave having a ribbed surface formed of spaced rods and coacting with the ribbed periphery of the roll.
2. In an apparatus of the character described, a boll breaking roll having a longitudinally ribbed periphery formed of spaced rods, a concave having a ribbed surface formed of rods and coacting with the ribbed periphery of the roll, and a spirally wound rib formed on the exterior surface of the roll.
3. In an apparatus of the character described, a hollow boll breaking roll having a longitudinally ribbed and open spaced breaking surface, a rib formed spirally upon said surface and constituting a means for feeding the cotton through the boll-breaker and a concave having a longitudinally ribbed surface coacting with the ribbed breaking surface of the roll.
4. In an apparatus of the character described, a boll breaking roll having a longitudinally ribbed breaking surface, a rib formed spirally upon said surface and primarily constituting a means for feeding the cotton through the boll breaker, a concave having a longitudinally ribbed surface coacting with the ribbed breaking surface of the roll, and a series of arcuate ribs arranged on said concave and coacting with the spiral rib of said roll in the crushing of the boll.
5. In a boll breaker, a concave having a ribbed breaking surface, a roll having its periphery formed of spaced rods coacting with the ribbed surface of the concave, a means for discharging air and cotton upon the periphery of the roll and a means for drawing the air from the cotton through said rods and to and from the interior of the roll.
6. In a boll breaker and cleaner, a boll breaking mechanism to the exterior of which cotton under air pressure is delivered, a means for drawing the air from the cotton into the interior of the mechanism, a cotton cleaning chamber forming a continuation of the exterior of the boll breaking mechanism, said chamber having no direct communication with the external air, and a closure arranged between the interior of the boll-breaking mechanism and the adjacent end of the cotton cleaning chamber.
7. The improvement in the art of boll breaking and cotton cleaning which consists in introducing cotton under air pressure to the exterior of the boll breaker and exhausting the air into the interior of the boll breaker prior to the boll breaking operation, then propelling the cotton relieved of air pressure through said boll breaker and discharging the same into a cotton clean-
The improvement in the art of cotton cleaning which consists in introducing the cotton relieved from air pressure, to one end of the cleaner, then discharging the cotton into the cleaner, said cleaner having no direct communication with the exterior air and propelling the cotton mechanically through the cleaner.

In testimony whereof I have signed my name to this specification.

SOLOMON E. GILLESPIE.