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COTTON GIN CLEANER

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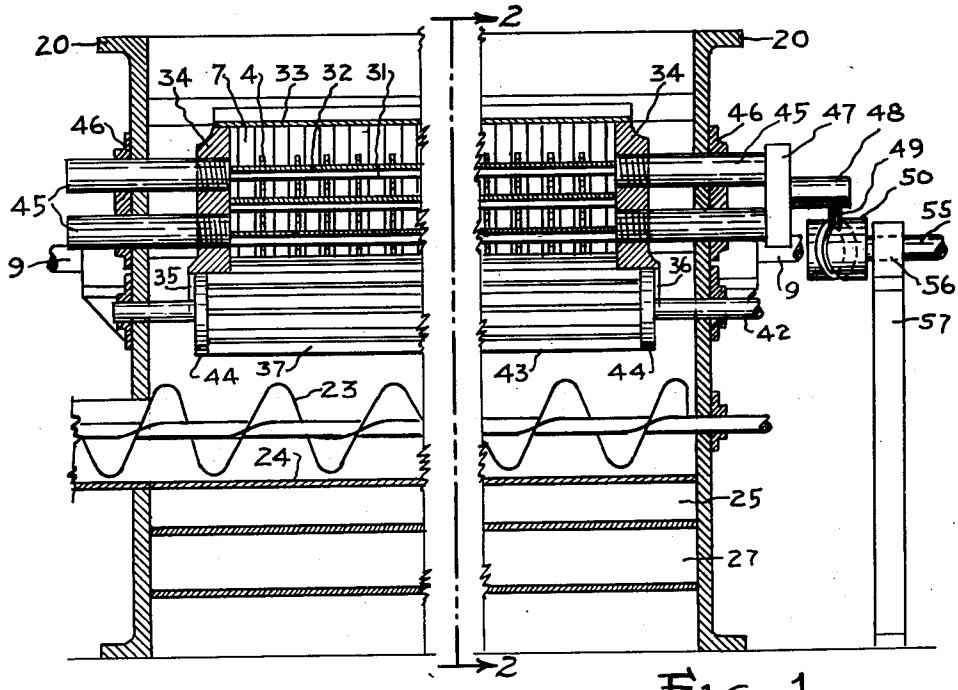


FIG. 1.

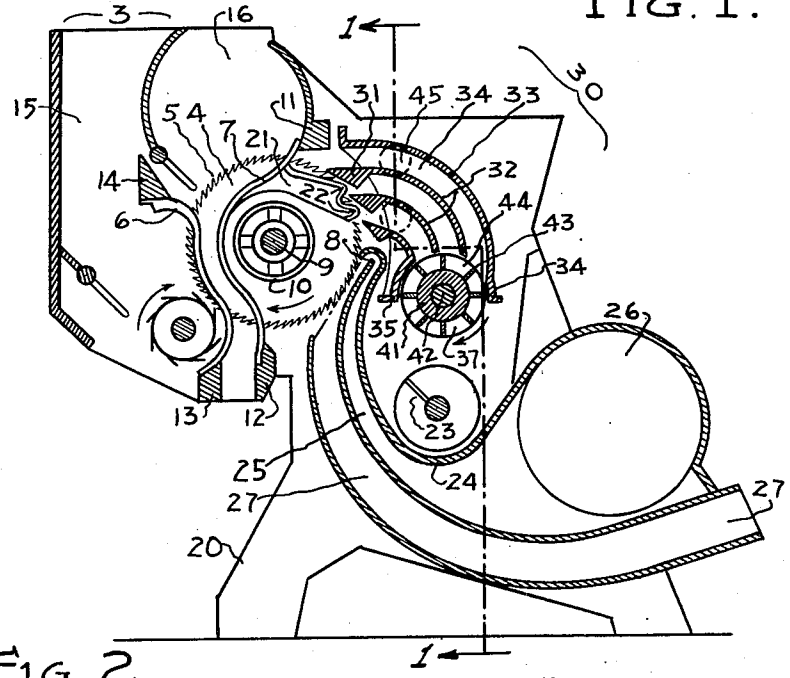


FIG. 2.

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COTTON GIN CLEANER

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2 Claims. (Cl. 19—59)

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The invention herein described may be manufactured and used by or for the Government of the United States of America for governmental purposes throughout the world, without the payment to us of any royalty thereon.

This invention relates to apparatus for cleaning cotton fiber, and has among its objects improvement in the cleaning functions of such apparatus, provision of a simple structure which may be included in existing lint cleaners and air-blast gin stands with little alterations and such other objects as will be apparent from the following description and claims.

The invention is utilized in connection with conventional cotton processing apparatus having a rotatable, toothed, horizontal cylinder for carrying cotton fiber and means for feeding cotton fiber to the cylinder. In general, according to the invention, a horizontal grid bar is located beyond the point of feeding and positioned in close proximity to the teeth tips of the cylinder for cleaning the fiber, as by scrubbing, combing and beating it. Means is provided for reciprocating the grid-bar longitudinally of the cylinder while the cylinder rotates, thus to aid in removal of fiber from the grid-bar, whereby the fiber-cleaning function is maintained more effectively and efficiently.

For a detailed description of the invention, reference is made to the accompanying drawing, in which

Figure 1 is a section on line 1—1 of Figure 2 looking from rear to front of a gin stand unit incorporating the invention, and

Figure 2 is a section on the line 2—2 of Figure 1.

In the drawing, 3 represents a gin stand unit providing a conventional rotatable cylinder having a plurality of longitudinally spaced, circular plates 4 provided with saw-shaped peripheral teeth 5, ribs 6 and 7, air blast nozzle 8 and other numbered elements hereinafter described. The present invention is incorporated in the assembly 30 that embraces a plurality of elements numbered 31 to 60, respectively, which are generally positioned behind the plates 4 and air-blast nozzle 8, except for the crossheads and motivating items protruding at the ends of the gin stand as hereinafter described.

In a conventional airblast gin stand 3 the horizontal cylinder assembly comprises from 60 to 80 trained 12-inch plates 4, having from 264 to 290 peripheral teeth 5 per plate, all plates being rigidly locked at approximately ¾ inch spacings more or less on shaft 9 between separating spacers 10, whereby the plates may rotate

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without wobble between the huller ribs 6 and ginning ribs 7.

Said gin ribs 7 are customarily spaced approximately ⅛ inch, more or less, apart and are attached at their ends to rib rails 11, 12 by means not shown. Said huller ribs 6 are provided with upper wide throats, not shown, near upper rib rail 14 so that entire cotton locks with seeds may freely feed through said ribs 6 from the huller front space 15 into the seed roll space 16 where the ginning actually occurs.

Our invention, depicted as assembly 30, comprises one or more horizontal keen-angle grid-bars 31, so positioned beyond the point of feeding and in close proximity to the tips of the teeth 5, as to allow relatively small clearances ranging from .01" to .125" as may be required. Said assembly 20 reciprocates longitudinally of the cylinder through approximately 1-inch stroke, on crosshead pistons 45 that are to be seen in Figure 1, attached to heads 34.

At the rear tips of said grid-bars 31, are duct surfaces or hoods 32, which in conjunction with upper duct surface hood 33 and heads 34 comprise a group of downwardly discharging ducts that terminate in a half-housing frame 35 and 36, over a revolving cylinder of cupped buckets 37.

As shown in these drawings, the duct hoods 32, are connected by means not shown, to the keen-angle grid-bars 31 so that they may move in unison with said grid-bars. Said buckets 37 rotate on a horizontal cylinder 41 having shaft 42. Said buckets are formed by blades 43 and heads 44 in conventional manner familiar to the cotton industry. It will be seen by reference to Figs. 1 and 2 that our oscillating grid-bar assembly 30 is positioned and trunnioned by crosshead elements 45 and guides 46 on end frames 20 of the gin stand apparatus 3. In the drawings shown, it will be understood that items 31, 32, 33, 34, 35, 36 and 45 are built together as one unit and further provided with a yoke driving head 47, spindle stem 48, and cam pin 49. Said cam pin 49 is positioned into cam 50 of cam shaft 55 whereby a rotary movement (by power means not shown) of said cam shaft 55 as it rides in bearings 56 and supports 57, may produce a reciprocating movement of entire assembly 30.

In the application of our invention within cotton gin stands, we employ a unique beating element as a projecting part of the back of the gin ribs, shown herein as 21. Said element 21 is a fin with undulating edge broadened to gin rib width providing nodes 22 near the grid bar, interposed between the teeth so that a side scrub-

bing and cleaning contact may be made at right angles to the contacts of the fibers and ribs. The number of nodes, 22, on said rib fins 21 depend upon the number of grid-bars.

Referring now to the operation of our invention, it will be seen that in the case of the cotton gin stand 3, herein depicted, the conventional processes of cotton ginning are first performed so that seed cotton will be conveyed by the teeth 5 thru the huller ribs 6, from the huller front 15 to the seed roll 16, and after ginning, the teeth 5 then convey the freshly ginned cotton fibers to a point of doffing or removal. In the illustration here offered, these freshly ginned fibers are carried by the said teeth 5 through the slots between the gin ribs 7 at a peripheral speed usually ranging between 1900 and 2500 feet per minute, subjecting the said fiber to centrifugal force whereby a certain amount of free foreign matter is cast out of the fibers into the space occupied by the throat of the upper duct which is formed between hoods 32 and 33. As these fibers are carried past the keen-angle grid-bars 31, they are subjected to a scrubbing and combing upon the fin nodes 22 and by said reciprocating grid-bars 31, which very effectively remove motes, immature small seeds, leaf-stems, leaf particles and certain finely divided foreign matter that is commonly known as "pin and pepper trash."

The aforesaid foreign matter that is carried with the cotton fiber to the cylinders is thus separated from the fibers by a combination of centrifugal action, scrubbing and combing and beating against the keen-angle grid-bars, 31, and rib nodes, 22, and said trash then descends through the several passages formed by the duct hoods 32 and 33 into the buckets 37 of the rotary cylinder 41. These buckets 37 empty into a conventional conveyor 23 housed in the trough 24.

Both in cotton gin stands and cotton gin lint cleaners, the air-blast nozzle 8 is utilized to remove or doff the cleaned fiber from the toothed cylinder. Said nozzle 8 is supplied by air under pressure from chamber 26 by means of air trunk 25.

This volume of doffing air comprises about 1500 cubic feet per minute in conventional gins and lint cleaners, the jet velocity preferably being less than 12,000 linear feet per minute. From this doffing point the cleaned fiber travels through a gin flue 27 to the place of condensing into a cotton batt or for other disposal.

We do not claim the invention of toothed cylinders nor stationary grid-bars, nor do we claim the invention of cotton cleaning processes as such, but we do claim:

1. A cotton cleaning apparatus comprising a horizontal cylinder having a plurality of longitudinally spaced circular plates with saw-shaped peripheral teeth for carrying cotton fiber, a horizontal grid-bar in close proximity to the teeth tips of said plates for cleaning said fiber, ribs between said plates, projecting fins on the backs of said ribs, said fins being provided with nodes near said grid-bar to operate in conjunction therewith, means for rotating said cylinder and means for reciprocating said grid-bar longitudinally of the cylinder.

2. A cotton cleaning apparatus comprising a toothed, rotatable horizontal cylinder for carrying cotton fiber, means for feeding cotton fiber to said cylinder, a horizontal grid-bar located beyond the point of feeding and in close proximity to the teeth tips of said cylinder for cleaning the fiber on the cylinder, means for rotating the cylinder, and means for reciprocating said grid-bar longitudinally of the cylinder.

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