Feb. 16, 1954 A. L. VANDERGRIFF 2,668,989

COTTON HULL EXTRACTOR AND CLEANER

Filed July 8, 1948 2 Sheets-Sheet 1

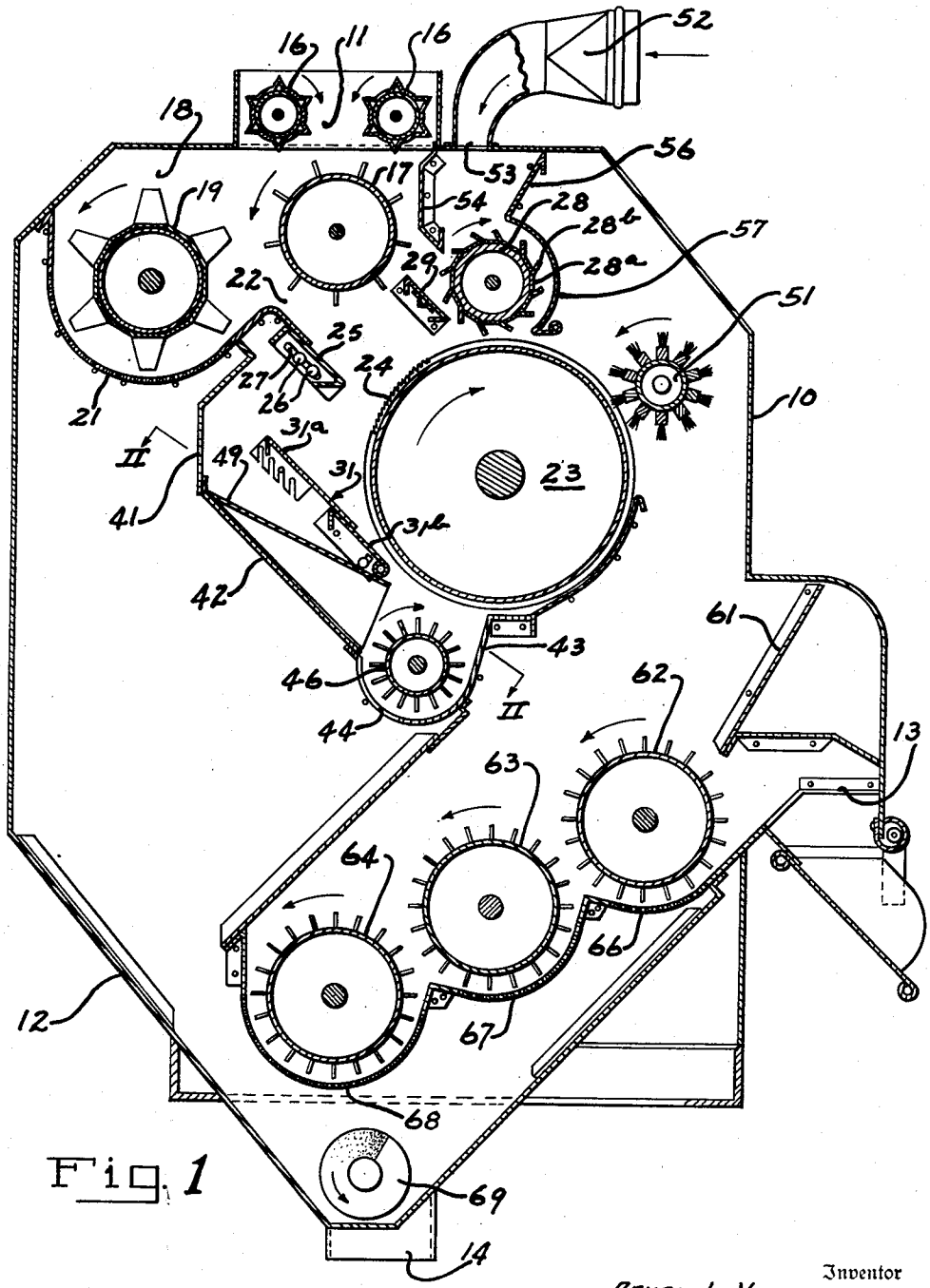


Fig. 1

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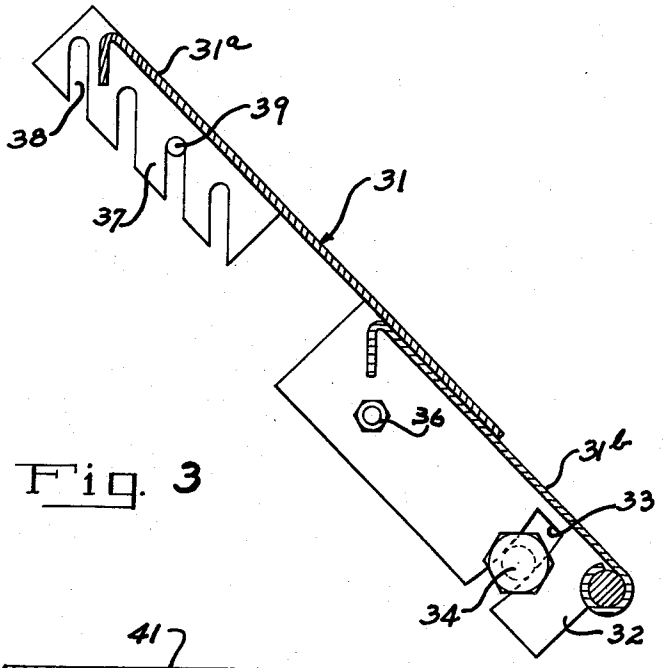


Fig. 3

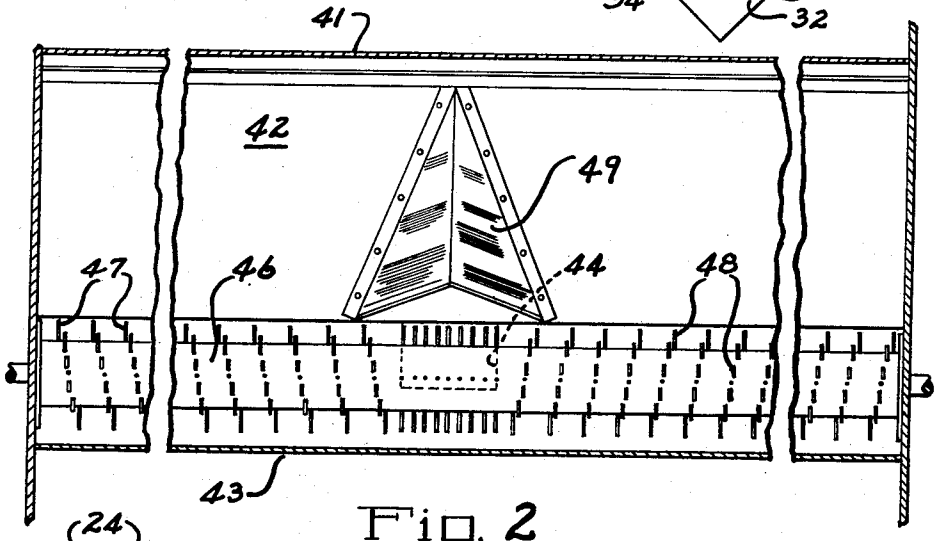


Fig. 2

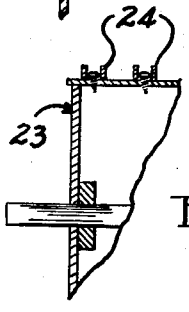


Fig. 4

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COTTON HULL EXTRACTOR AND CLEANER

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10 Claims. (Cl. 19—36)

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This invention relates to apparatus for extracting hulls and trash from seed cotton as it comes from the field and has for an object the provision of apparatus of the character designated which shall afford a maximum of hull extracting and cleaning operations with a minimum of moving parts.

A further object of my invention is to provide a hull extractor including a minimum of rollers and saws, thus affording a clearer path for the cotton through the apparatus, and at the same time subjecting the cotton to all necessary cleaning and hull extracting operations.

Another object of my invention is to provide a cotton hull extractor and cleaner in which heated air may be introduced to dry the cotton and in which means are provided to direct the stream of heated air in a manner to aid in separating the hulls and trash from the cotton.

A still more specific object of my invention is to provide a cotton hull extractor and cleaner, including a saw cylinder and a hull board, the hull board being of such width and so disposed with respect to the saw cylinder that the hulls instead of passing downwardly between the lower end of the hull board and the saw cylinder, as heretofore, are thrown out over the top of the hull board.

Apparatus for separating hulls from seed cotton, as heretofore known to me, has consisted essentially of one or more main saw cylinders each having a stripper roller, or other equivalent hull ejecting mechanism associated therewith, and an inclined hull board mounted alongside the saw cylinder in a position to receive hulls ejected by the hull ejecting mechanism and allow them to feed downwardly alongside the counter-moving side of the saw cylinder, finally passing through the space between the lower edge of the hull board and the saw cylinder. Usually, the hulls from the first main unit passed to a second and probably to a third unit where the treatment indicated was duplicated. This treatment resulted in a crushing and grinding of a large portion of the hulls into fine trash which mixed with the cotton and was very difficult to remove. In accordance with my invention, I have provided apparatus whereby the work heretofore performed by a plurality of saw cylinders, is accomplished by a single saw cylinder and the hulls are treated in such a way that they are not subjected to a crushing and grinding action, thus avoiding small particles of trash getting into the cotton and providing for a minimum of moving parts in the apparatus.

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The mechanical operations in my improved apparatus are aided by a stream of heated air which is introduced primarily for the purpose of drying the cotton, but which is so directed within the apparatus as to aid in separating the hulls from the cotton. In order to accomplish this, I introduce the air directly above the stripper roller and provide deflecting means which direct the stream of air around the stripper roller and between the stripper roller and the saw cylinder, the stripper roller aiding in maintaining the velocity of the air current, whereby the air current aids in throwing out the hulls from the saw cylinder.

These and other advantages which will become apparent from a further reading of this specification, are illustrated in the accompanying drawings forming a part of this application, in which:

Fig. 1 is a vertical sectional view through a cotton hull extractor and cleaner made in accordance with my invention;

Fig. 2 is a sectional plan view taken along the line II—II of Fig. 1;

Fig. 3 is a detail sectional view of the hull board showing the means of its attachment to the casing; and

Fig. 4 is a fragmentary sectional view of the saw cylinder.

Referring now to the drawings for a better understanding of my invention, my improved hull extractor and cleaner comprises a casing 10 having a feed opening 11, a generally hopper shaped bottom 12, an outlet 13 for cotton that has been cleaned, and an outlet 14 for hulls, trash and air. Two feed rollers 16 feed seed cotton and hulls, as the cotton comes from the field, downwardly onto a spiked picker roller 17 which is rotating in the direction indicated by the arrow and which throws the cotton into an opening chamber 18. A boll opening roller 19 of conventional design is mounted in the chamber 18 over a screen 21 and rotates in the direction indicated by the arrow. The roller 19 opens the bolls in a manner well understood, and discharges fine dirt and trash through the screen 21 from whence it falls downwardly into the hopper bottom 12. Cotton and hulls are discharged from the chamber 18 through a narrow opening 22 where they are again engaged by the under side of the spiked picker roller 17 and are thrown downwardly through the opening 22 onto the upgoing side of the saw cylinder 23 which is rotating in the direction indicated by the arrow. The saw cylinder 23, as shown in Fig. 4, is in the form of a drum with U-shaped strips 24 thereon having saw teeth on their peripheries. As the cotton moves down onto

the saw cylinder 23, it moves over a deflector or slide 25, inclined as shown, and which is adjustable to vary the distance between the lower edge thereof and the saw cylinder. The adjustment described is provided by means of adjusting bolts 26 which pass through slotted openings 27 in the downturned ends of the deflector and which pass out through the end of the casing 10.

The cotton and hulls are engaged by the saw cylinder 23 and are carried upwardly by the saw cylinder in the direction indicated by the arrow. Mounted over the saw cylinder 23 is a stripper roller 28 which is comprised, as shown, of a plurality of slats 28a having outturned trailing edges 28b which are inclined rearwardly with respect to the direction of rotation and which thus form longitudinal vanes on the surface of the roller. These vanes have close clearance with respect to the saw cylinder 23 and serve to knock back or separate all hulls accompanying the cotton being carried around by the saws 24. Mounted closely adjacent the lower, upgoing side of the stripper roller 28 is an inclined baffle 29 which serves the double function of preventing any hulls from being carried around by the stripper roller 28 and also prevents any cotton from being thrown upwardly by the spiked picker roller 17.

The hulls separated from the cotton by the stripper roller 28 pass downwardly between the lower edge of the deflector 25 and the saw cylinder 23 and fall onto an inclined hull board 31. The hull board 31 is of such inclination that hulls and cotton move down it by gravity toward the saw cylinder 23. As shown in Fig. 3 of the drawing, it is comprised of an upper section 31a and a lower section 31b. The lower section, as shown, is mounted with very close clearance with respect to the saw cylinder 23 whereby the passage of hulls between the lower edge thereof and the saw cylinder is precluded. The distance between the lower edge of the hull board and the saw cylinder is made adjustable as shown in Fig. 3, by means of angle members 32, secured to the ends of the hull board section 31b and which are provided with slots 33 through which bolts 34 pass to secure them to the end of the casing. The upper edge of the section 31b is secured to the casing by means of bolts 36. The lower edge, of the section 31a of the hull board overlaps and rests on the lower section 31b. The upper edge of the section 31a is supported by means of angled brackets 37 secured to the ends thereof and which are provided with a plurality of downwardly opening slots 38 therein which are adapted to hook over studs 39 in the casing, whereby the width of the hull board may be adjusted.

Extending from end to end of the apparatus is a partition 41 which is mountted to the rear of, and in spaced relation to the upper edge of the hull board 31. Connected to the lower edge of the partition 41 is a slide 42 which leads downwardly to a conveyor trough 43 mounted under the saw cylinder 23. The conveyor trough 43 has a central discharge opening 44. See Fig. 2. Mounted in the conveyor trough 43 is a spiked conveyor 46 having the spikes 47 and 48 thereon arranged in spiral rows inclined in opposite directions whereby material falling in the conveyor is carried to the central discharge opening 44. A deflector 49 mounted over the slide 42 serves to deflect material moving down the slide to the sides of the opening 44 whereby it does not fall directly into the opening 44.

The hulls which are ejected by the stripper roller 28 and which fall downwardly onto the hull board 31, move down the inclined hull board to be engaged by the upgoing side of the saw cylinder 23. The saw cylinder 23 is rotating at a relatively rapid rate, whereby hulls engaged by the saw cylinder and which have no cotton clinging to them are thrown out over the upper edge of the hull board 31 by centrifugal force. I have discovered that hulls having cotton clinging to them are not thrown so far by centrifugal force and are caught by the hull board and move downwardly to be engaged again by the saws 24. The cotton is engaged by the saws 24 and carried upwardly and around by the saw cylinder, the hulls being ejected by means of a stripper roller 28. The cotton carried around under the stripper roller 28 is doffed from the saw cylinder 23 by means of a doffing brush 51 in a manner well understood.

It will be seen that the hulls which are thrown out by means of the saw cylinder 23 over the upper edge of the hull board 31 move down the slide 42 into the conveyor trough 43. Here they are engaged by the spiked conveyor roller 46 and are thrown upwardly against the saw cylinder 23. If there is any cotton clinging to the hulls, the cotton is thus separated from the hulls and is carried around by the saws 24, the hulls being separated from the cotton either by engaging the lower edge of the hull board 31, or should they pass the hull board 31, by the stripper roller 28.

In accordance with my invention, the mechanical operations just described are aided by an air current. To accomplish this purpose, I introduce heated air into the upper portion of the casing through a conduit 52 and an opening 53, which extends across the top of the casing directly above the stripper roller 28. Located between the opening 53 and the picker roller 17 is a baffle 54 which directs the current of air against the stripper roller 28. On the other side of the opening 53 is an inwardly inclined baffle 56 which also directs the air current downwardly against the stripper roller. Joining the lower edge of the baffle 56 is an arcuate plate 57 which extends around the stripper roller 28 with close clearance with respect thereto, to a point just above the upper periphery of the saw cylinder 23. The stripper roller 28, rotating rapidly, thus acts as a vane pump to augment the velocity of the air current and carry it around between the opening between the stripper roller and the saw cylinder 23, thereby aiding in ejecting the hulls from the cotton. The heated air thus introduced passes downwardly through the apparatus and aids in drying the cotton, as well as the operation of the machine.

From the foregoing description, it will be seen that the position and adjustment of the deflector 25 and the hull board 31 are very important in providing a freer path for the cotton through the apparatus. The deflector 25 is so adjusted as to direct the cotton from the breaker chamber 18 to the saw cylinder and the distance between the lower edge of the deflector 25 and the periphery of the saw cylinder should be such as to provide a path for the hulls thrown out by the stripper roller 28 to pass downwardly to the hull board 31. Also, the lower edge of the hull board 31 should be adjusted so as to preclude the passage of the hulls between the hull board and the saw cylinder and the width of the hull board 31 should be adjusted to the extent necessary to permit the throwing out of the empty hulls by the saw

cylinder, but to preclude the throwing out of hulls containing cotton, thus permitting them to move downwardly over the hull board to be re-engaged by the saw cylinder. As may be seen in Fig. 1, the limits of adjustment of the upper edge of the hull board 31 lie between the level of the rotational axis of the saw cylinder and the upper periphery thereof. Any cotton which may be thrown out by the saw cylinder and which moves downwardly into the conveyor trough 43 is reclaimed by reason of the spiked conveyor roller 46 throwing the material in the conveyor trough up against the saws for the lint therein to be engaged by the saws.

The cotton doffed by the doffing brush 51 falls downwardly in the casing and is engaged by a deflector 61 which directs it downwardly onto the upper of a series of cleaning rollers 62, 63, and 64 mounted at progressively descending levels over screens 66, 67, and 68 respectively. The cleaning rollers 62, 63, and 64 rotate in the directions indicated by the arrows to carry the cotton downwardly over their upper peripheries and then upwardly moving it over the screens 68, 67, and 66 to discharge it through the opening 13. Trash falling through the screens 66, 67 and 68 falls into the hopper bottom 12 of the apparatus and is removed therefrom, along with other trash, by means of a trash removing conveyor 69.

From the foregoing, it will be apparent that I have devised an improved cotton hull extractor and cleaner which is simple and economical of design, has a minimum of moving parts, performs all adequate cleaning operations, and which provides a relatively free path for the material passing therethrough.

While I have shown my invention in but one form, it will be obvious to those skilled in the art that it is not so limited, but is susceptible of various changes and modifications without departing from the spirit thereof, and I desire, therefore, that only such limitations shall be placed thereupon as are specifically set forth in the appended claims.

What I claim is:

1. In a seed cotton hull extractor and cleaner, a casing, a rotary saw cylinder in the casing, means to feed cotton into the casing against the upgoing side of the saw cylinder, hull ejecting means associated with the saw cylinder, an inclined hull board mounted with its lower end closely adjacent the upgoing side of the saw cylinder to preclude the passage of hulls therebetween and in position to receive hulls from the hull ejecting means and direct them downwardly against the saw cylinder, a partition in the casing spaced from the upper edge of the hull board and forming therewith a passage open at the top for hulls thrown by the saw cylinder over the upper edge of the hull board, a slide secured to the lower edge of the partition, a conveyor trough disposed beneath the saw cylinder to receive the hulls from the slide, and a spiked conveyor in the trough disposed to throw hulls upwardly against the saw cylinder.

2. In a seed cotton hull extractor and cleaner, a casing, a rotary saw cylinder in the casing, means to feed cotton into the casing adjacent the upgoing side of the saw cylinder, hull ejecting means associated with the saw cylinder, an inclined hull board made in sections with the upper section overlapping the lower, together with adjusting means to mount the upper section to vary the inclined depth of the hull board, means to mount the hull board with its lower end closely adjacent the upgoing side of the saw cylinder in position to receive hulls from the hull ejecting means and direct them downwardly against the saw cylinder, a partition in the casing spaced from the upper edge of the hull board and forming therewith a passage open at the top for hulls thrown by the saw cylinder over the upper edge of the hull board, a slide secured to the lower edge of the partition, a conveyor trough disposed beneath the saw cylinder to receive the hulls from the slide, and a spiked conveyor in the trough disposed to throw hulls upwardly against the saw cylinder.

3. Apparatus as defined in claim 1 in which the hull ejecting means comprises a stripper roller together with means to introduce a stream of air into the casing over the stripper roller, and deflecting means in the casing disposed to direct and confine the stream of air to movement around the stripper roller and between said roller and the saw cylinder to aid in throwing out hulls from the cotton.

4. In a seed cotton hull extractor and cleaner, a casing, a saw cylinder mounted in the casing, a downwardly inclined hull board mounted in the casing alongside the upgoing side of the saw cylinder and having its lower edge closely spaced with respect to said saw cylinder to preclude the passage of hulls therebetween, a downwardly inclined deflector mounted above and in spaced relation to the hull board, means to feed cotton and hulls downwardly over the deflector onto the saw cylinder, a stripper roller mounted over the saw cylinder in closely spaced relation thereto, a partition in the casing in spaced relation to the upper edge of the hull board providing a passage open at the top between the hull board and the partition, a slide at the lower edge of the partition, a conveyor trough under the saw cylinder at the lower edge of the slide, a spiked roller in the conveyor trough to throw hulls upwardly against the saw cylinder, and means to discharge hulls from the conveyor trough.

5. In a cotton hull extractor and cleaner, a casing, a saw cylinder mounted to rotate in the casing, means to feed cotton and hulls onto the upgoing side of the saw cylinder, a stripper roller mounted over the saw cylinder in closely spaced relation thereto and rotating in a direction for adjacent surfaces to move oppositely to each other, a hot air conduit connected to the casing over the stripper roller, and baffle means connected to the casing on opposite sides of the conduit and shaped to confine and to direct the heated air around the stripper roller in the direction of its rotation and between the stripper roller and the saw cylinder.

6. Apparatus as set forth in claim 5 in which the saw cylinder is in the form of a drum with saw teeth mounted thereon, the stripper roller is in the form of a drum with a plurality of longitudinal strips extending outwardly therefrom, and in which the baffle means consists in part of an imperforate arcuate plate disposed closely adjacent the downgoing side of the stripper roller.

7. In a cotton hull extractor and cleaner, a casing, a saw cylinder mounted to rotate in the casing, means to feed cotton and hulls onto the upgoing side of the saw cylinder, a stripper roller mounted over the saw cylinder in closely spaced relation thereto and rotating in a direction for adjacent surfaces to move oppositely to each other, an inclined hull board mounted alongside

the upgoing side of the saw cylinder, with its lower edge closely adjacent the saw cylinder to preclude the passage of hulls therebetween, means to vary the inclined depth of the hull board, a partition in the casing extending parallel to and in spaced relation to the upper edge of the hull board and forming therewith a passage open at the top to receive hulls thrown over the upper edge of the hull board, means to reclaim cotton thrown out with the hulls over the upper edge of the hull board, and a deflector interposed between the means to feed cotton and hulls and the hull board to direct cotton and hulls against the saw cylinder.

8. In a cotton hull extractor and cleaner, a separating unit including a saw cylinder having hull ejecting and cotton removing means associated therewith, an inclined hull board mounted alongside the upgoing side of the saw cylinder with its lower edge in closely spaced relation to the saw cylinder to preclude the passage of hulls therebetween, a partition in the cleaner extending parallel to the hull board in spaced relation thereto to provide therewith a passage for hulls to be thrown out over the top of the hull board by the saw cylinder, a reclaiming unit mounted under the saw cylinder to cooperate therewith, means to deliver hulls thrown out over the hull board to the reclaiming unit, and means to discharge hulls from the reclaiming unit.

9. In a cotton hull extractor and cleaner, a separating unit including a saw cylinder having hull rejecting and cotton removing means associated therewith, an inclined hull board mounted alongside the upgoing side of the saw cylinder with its lower edge in closely spaced relation to the saw cylinder to preclude the passage of hulls therebetween, a partition in the cleaner extending parallel to the upper edge of the hull board and in spaced relation thereto to provide a passage for hulls to be thrown out over the top of the hull board by the saw cylinder, the upper edge of the hull board lying at a level between that of the center of the saw cylinder and the upper periphery thereof, and means to reclaim lint from the hulls thrown out over the hull board.

10. In a cotton hull extractor and cleaner, a separating unit including a saw cylinder having hull ejecting and cotton removing means associated therewith, an inclined hull board mounted alongside the upgoing side of the saw cylinder with its lower edge in closely spaced relation to the saw cylinder to preclude the passage of hulls therebetween, a partition in the cleaner extending parallel to the upper edge of the hull board and in spaced relation thereto to provide a passage for hulls to be thrown out over the top of the hull board by the saw cylinder, the upper edge of the hull board lying at a level between that of the center of the saw cylinder and the upper periphery thereof, means to vary the inclined depth of the hull board, and means to reclaim lint from the hulls thrown out over the hull board.

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