No. 854,232. PATENTED MAY 21, 1907.

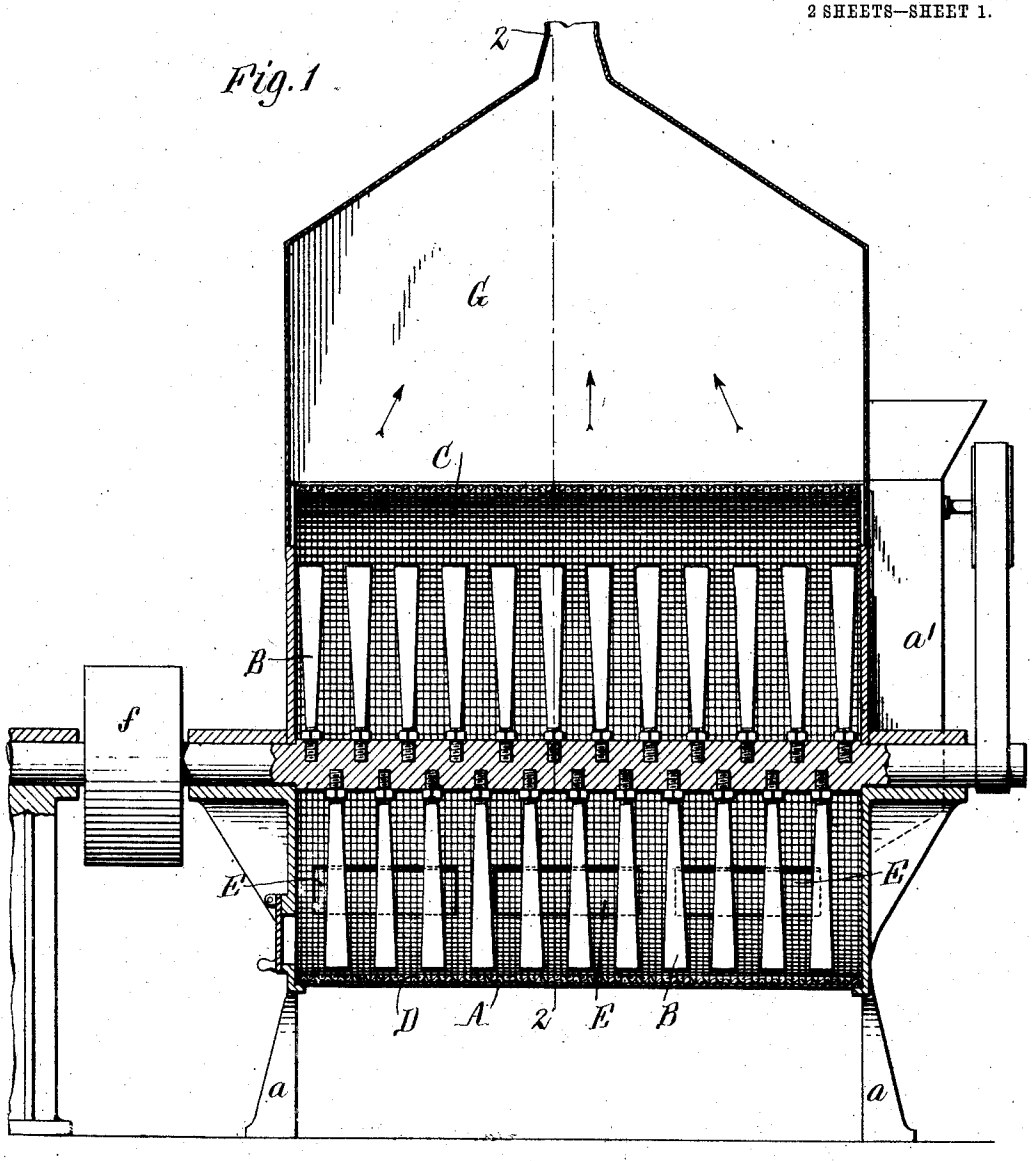
W. OLIVER.

MACHINE FOR DELINTING COTTON SEED HULLS.

APPLICATION FILED JAN. 14, 1907.

2 SHEETS—SHEET 1.

Fig. 1.



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2 SHEETS—SHEET 2.

Fig. 2.

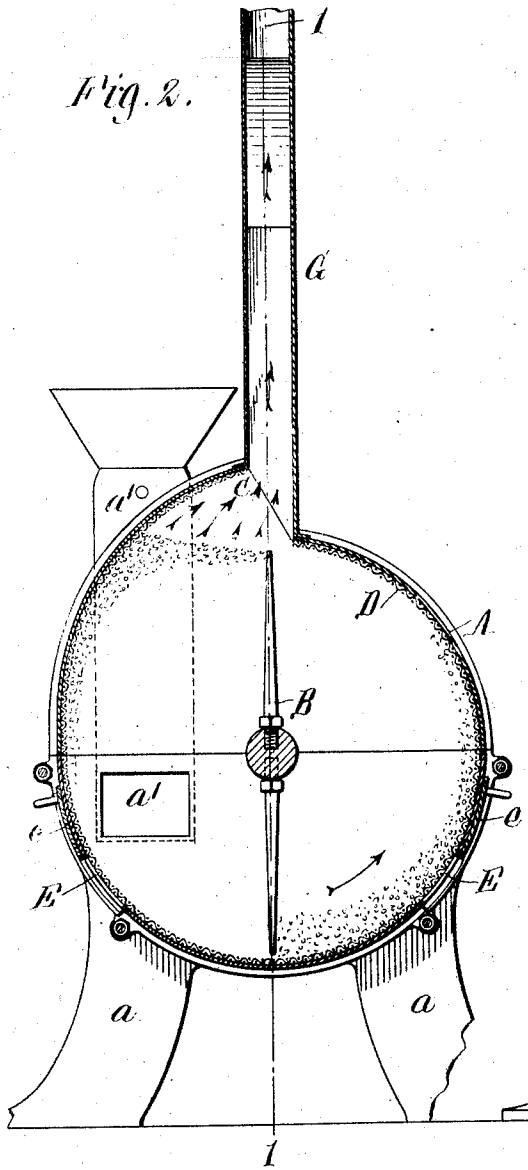
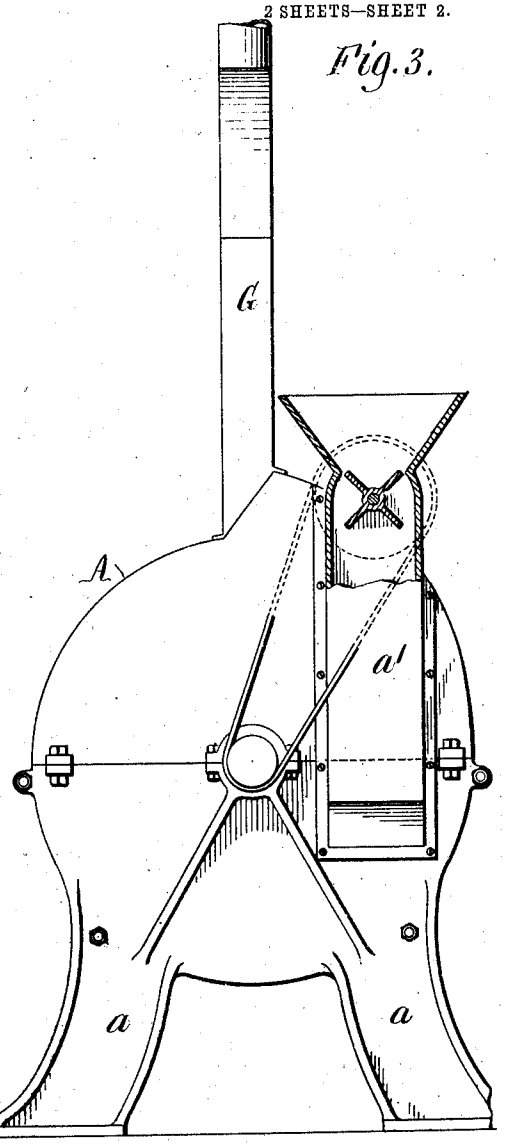


Fig. 3.



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UNITED STATES PATENT OFFICE.

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MACHINE FOR DELINTING COTTON-SEED HULLS.

No. 854,232. Specification of Letters Patent. Patented May 21, 1907.

Application filed January 14, 1907. Serial No. 352,118.

To all whom it may concern:

Be it known that I, WILLIAM OLIVER, a citizen of the United States, residing at Lockport, in the county of Niagara and State of New York, have invented a new and useful Improvement in Machines for Delinting Cotton-Seed Hulls, of which the following is a specification.

This invention relates more particularly to machines for delinting cotton seed hulls, that is, for removing and separating from the hulls the lint or short fiber adhering thereto.

It has been found commercially impractical to remove the lint or short fiber from the whole cotton seeds, and in preparing the seeds for the manufacture of oil therefrom they are first broken up and the meat or kernels, from which the oil is expressed, are separated from the hulls preparatory to removing the lint or fiber from the hulls. The hulls constitute a good feed for cattle, but the lint is very injurious to the cattle and therefore decreases the value of the hulls. The lint or short fiber, on the other hand, is used in the arts, for instance, in the manufacture of paper and explosives. The lint can be recovered from the hulls by chemical methods but these are expensive both because of the cost of the chemicals employed and because of the loss of the hulls which are destroyed. Many attempts have therefore been made to devise mechanical means for removing the lint from the hulls but few, if any, of these devices will completely separate the lint from the hulls, thus still leaving a considerable amount of lint on the hulls. The lint obtained, on the other hand, is broken so short as to reduce its value and contains a large amount of fine bran or powdered hulls. The machines of which I am aware are also so expensive to operate that the cost of the products is unduly great.

The object of this invention is to produce a practical and economical machine or apparatus for thoroughly detaching and separating the lint from the hulls in such a manner that both the hulls and fiber are saved in a merchantable or salable condition. The machine whereby this result is accomplished, briefly stated, is organized and operates as follows: The hulls with the lint adhering thereto are fed in a cylindrical casing having a roughened or abrasive inner surface. Rapidly rotating beaters or stirrers in the cylinder sweep or carry the hulls around the cylinder so that the lint is detached from the hulls by the attrition of the hulls against each other and the wall of the cylinder. The cylinder has a peripheral enlargement or separating space at its upper portion from which ascends an exhaust trunk or flue leading to a dust collector. When the hulls in their motion around the cylinder reach the enlargement or separating space at the upper portion of the cylinder, they will be projected into said separating space and loosened up and agitated therein so that the detached fiber or lint will be separated from the hulls and carried out of the cylinder by the exhaust or suction in the exhaust trunk. The location and shape of the separating space and its connection with the exhaust trunk are such that the hulls and meal which are momentarily in suspension in the separating space can drop freely back into the rotating mass of material in the casing. The lint is separated from the air current by the dust collector and the delinted hulls pass out of the cylinder through suitable screened discharge openings therein.

In the accompanying drawings, consisting of two sheets: Figure 1 is a longitudinal sectional elevation in line 1—1, Fig. 2, of a separating machine embodying the invention. Fig. 2 is a transverse sectional elevation thereof in line 2—2, Fig. 1. Fig. 3 is an end elevation, partly in section, thereof.

Like letters of reference refer to like parts in the several figures.

A represents the cylinder or casing and B the rotary beaters or stirrers therein. The casing is stationarily supported in substantially horizontal position by legs *a*, or other suitable means, and is provided, preferably at one end, with a feed spout *a'* through which the hulls are introduced into the cylinder. Except as hereinafter described, the cylinder may be of any suitable construction. It is shown as made of upper and lower halves bolted or otherwise secured together to facilitate manufacture and repairs. The casing is substantially cylindrical in shape except for a peripheral enlargement or protuberance at or near its top, forming an interior chamber or separating space C which protrudes outwardly beyond the circle of the adjacent portions of the cylindrical wall of the casing. This separating space preferably extends the full length of the caisng and its peripheral wall is preferably eccentric to the remaining

portion of the cylindrical wall of the casing, which is concentric with the axis of the rotary beater, and merges at its lower end into said concentric portion of the wall. The cylindrical wall of the casing is lined with the usual coarse woven wire fabric D or is otherwise suitably roughened interiorly to produce the necessary abrasion on the material. Discharge openings E for the hulls from which the lint has been detached, having suitable doors or closures *e*, are provided, preferably in the lower portion of the cylindrical wall of the casing. The woven wire lining forms screens over these openings which allow only the escape of the delinted hulls.

The beater may be of any suitable construction adapted to rub the hulls over the inner surface of the casing to detach the lint without unnecessarily breaking up or pulverizing the hulls. The beater shown consists of blades secured to a shaft *f* from which they project radially. The beater shaft is journaled in bearings in the ends of the casing and is provided with a pulley *f'* for a drive belt.

G represents an exhaust trunk or flue which leads upwardly from the upper portion of the casing and communicates with the enlargement or separating space C thereof. Preferably the trunk extends from end to end of the casing but is relatively narrow transversely of the casing. The opposite side walls of the trunk join the ends of the concentric and eccentric portions respectively of the cylindrical wall of the casing, and at least the lower end of the trunk which connects with the casing should be vertical so that no surface or shelf is formed on which the material can lodge in the operation of the machine. An exhaust fan or other means, not shown, is connected with the exhaust trunk for creating a suction or upward draft therein to draw the lint up out of the casing and the trunk leads to a dust collector of any suitable sort (not shown) for separating the lint from the air current.

The operation of the machine is believed to be as follows: The hulls with the lint or short fiber adhering thereto are fed into the casing and are carried around therein in the direction indicated by the arrow in Fig. 2, by the rapidly rotating beaters or blades B, and the lint is detached from the hulls by the attrition or abrasion of the hulls upon each other and upon the rough surface of the casing. When the material is carried past the upper end of the concentric portion of the cylindrical wall into the separating space, it will be free to move outwardly beyond the cylindrical space in which it is confined by the concentric portions of the casing, and it will be thrown outwardly more or less tangentially in this space by the beaters and the action of centrifugal force. The material thus expands or opens up, as it were, in the separating space in the immediate vicinity of the exhaust trunk, and is also agitated so that the particles are caused to change position by reason of their rebounding from the eccentric portion of the wall of the casing against which they are thrown, thereby liberating the detached lint from the hulls with which it is mixed so that it is carried off by the suction in the exhaust trunk. The suction is so regulated that it will only lift the lint and the small amount of very fine dust, which is as light as lint, into the exhaust trunk, and the heavier material consisting of the broken hulls with or without lint attached thereto will fall back under the action of gravity into the rotating mass of material in the casing and will be again carried around in the casing by the beaters. As the exhaust trunk leads vertically from the separating space, no surface or ledge is formed on which the material can lodge and collect, and particles of hull light enough to be held by the suction on such a ledge, if one were present, will fall back into the main part of the casing. The delinted hulls gradually find their exit from the casing through the screened discharge openings E, but the detached lint, and hulls with lint attached do not escape through these openings, which is believed to be due to the size of the screen openings and the combined action of the inward draft through these openings and centrifugal force which tends to keep the heavier hulls outermost. As the particles of the material are repeatedly thrown out into separating space where the suction can more readily act upon them, as explained, the detached lint is more quickly separated from the hulls, the separation thus being effected before the action is continued so long as to grind the hulls and lint into fine particles. Cleaner lint of longer fiber is thus insured as there will be less dust light enough to be carried off with the lint. The small percentage of dust carried off by the air with the lint can be eliminated from the lint chemically at a small expense. It is possible with the machine described to produce a better grade of fiber, that is, longer and cleaner fiber, and at the same time to remove a very much larger percentage of the lint from the hulls and leave the hulls in better condition than can be effected in any of the machines of which I am aware at present employed for the purpose.

I claim as my invention:

1. The combination of a substantially horizontal casing which is partially cylindrical in shape but is provided with an enlargement or separating space at its upper portion having unobstructed communication with the interior of the main part of the casing, means for rubbing the material against the cylindrical wall of said casing, and a suction trunk leading from said separating space of the cas-

ing and having a substantially upright connection with said casing whereby no surface is formed upon which the material can lodge, substantially as set forth.

2. The combination of a substantially horizontal casing which is substantially cylindrical in shape but is provided with an enlargement or separating space at its upper portion having unobstructed communication with the interior of the main part of the casing, a rotary beater in said casing, and a suction trunk leading from said separating space of the casing and having a substantially upright connection with said casing whereby no surface is formed upon which the material can lodge, substantially as set forth.

3. The combination of a substantially horizontal casing which is substantially cylindrical in shape, the cylindrical wall of said casing having a concentric portion and an eccentric portion forming a separating space at the upper portion of the casing, means for rubbing the material against the cylindrical wall of said casing, and a suction trunk ascending from said separating space, substantially as set forth.

4. The combination of a substantially horizontal casing which is substantially cylindrical in shape, a rotary beater in said casing, the cylindrical wall of said casing having a portion concentric with the axis of said beater and an eccentric portion forming a separating space at the upper portion of the casing, and a suction trunk ascending from said separating space, substantially as set forth.

5. The combination of a substantially horizontal casing which is substantially cylindrical in shape, a rotary beater in said casing, the cylindrical wall of said casing having a portion concentric with the axis of said beater and an eccentric portion forming a separating space at the upper portion of the casing, and a suction trunk having opposite substantially upright walls joining the adjacent ends of said concentric and eccentric wall portions of the casing, substantially as set forth.

6. The combination of a substantially horizontal casing which is substantially cylindrical in shape, the cylindrical wall of said casing having a concentric portion and an eccentric portion forming a separating space at the upper portion of the casing and having discharge openings in its lower portion, a perforated lining for the cylindrical wall of said casing crossing said discharge openings, a rotary device for rubbing the material against said lining, and a suction trunk ascending from said separating space, substantially as set forth.

Witness my hand, this 10th day of January, 1907.

WILLIAM OLIVER.

Witnesses:
MARK J. TOVELL,
HENRY OLIVER.