

Jan. 20, 1953

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2,625,713

FIBER TRANSFER AND CLEANING MEANS

Filed Oct. 4, 1950

2 SHEETS—SHEET 1

Fig. 1.

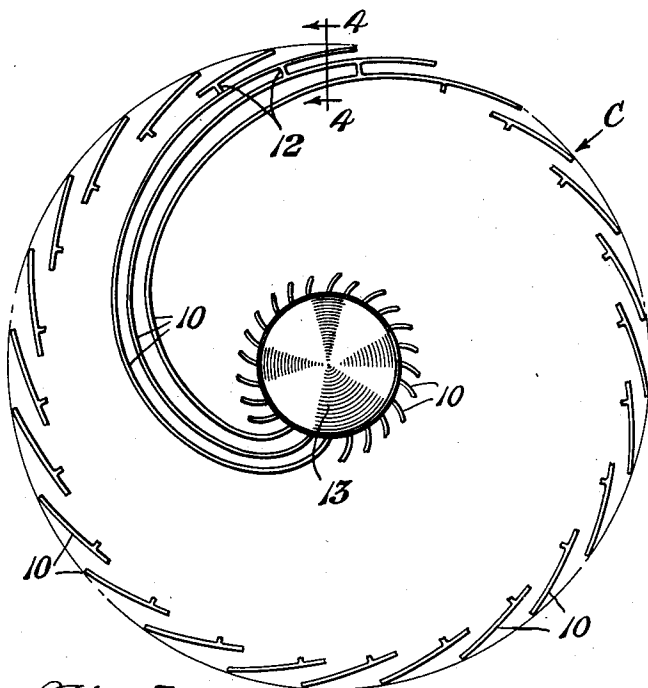
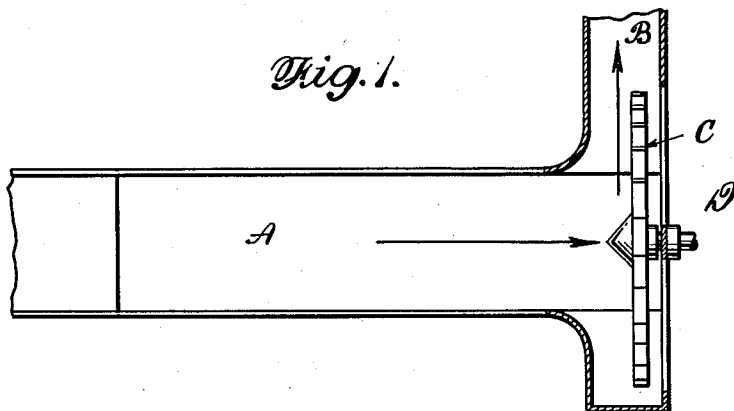


Fig. 3.

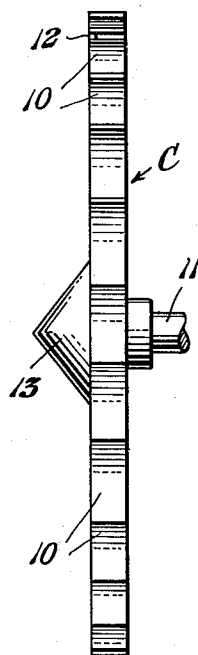


Fig. 2.

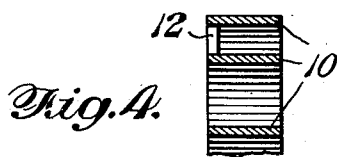


Fig. 4.

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2 SHEETS—SHEET 2

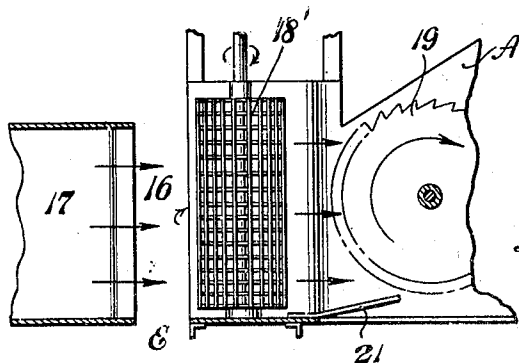
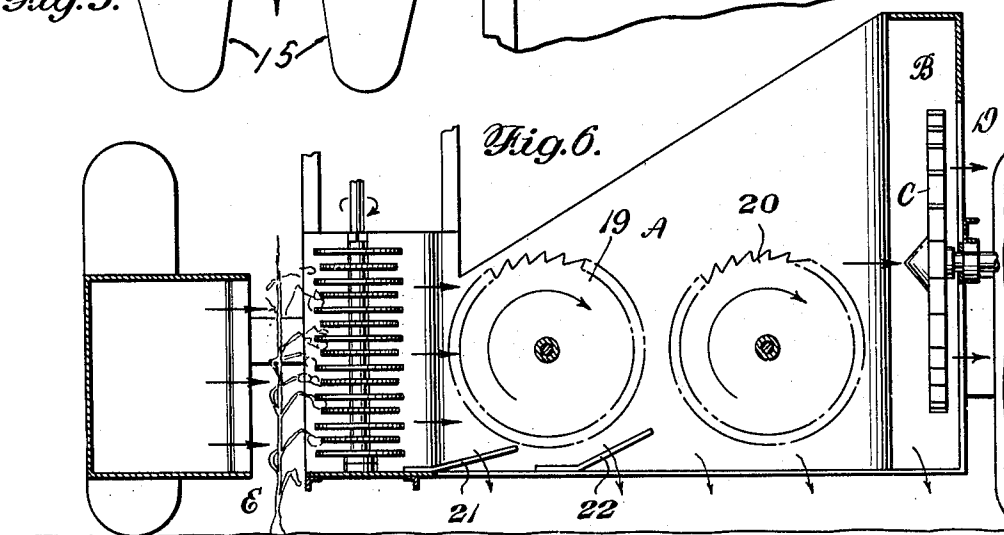
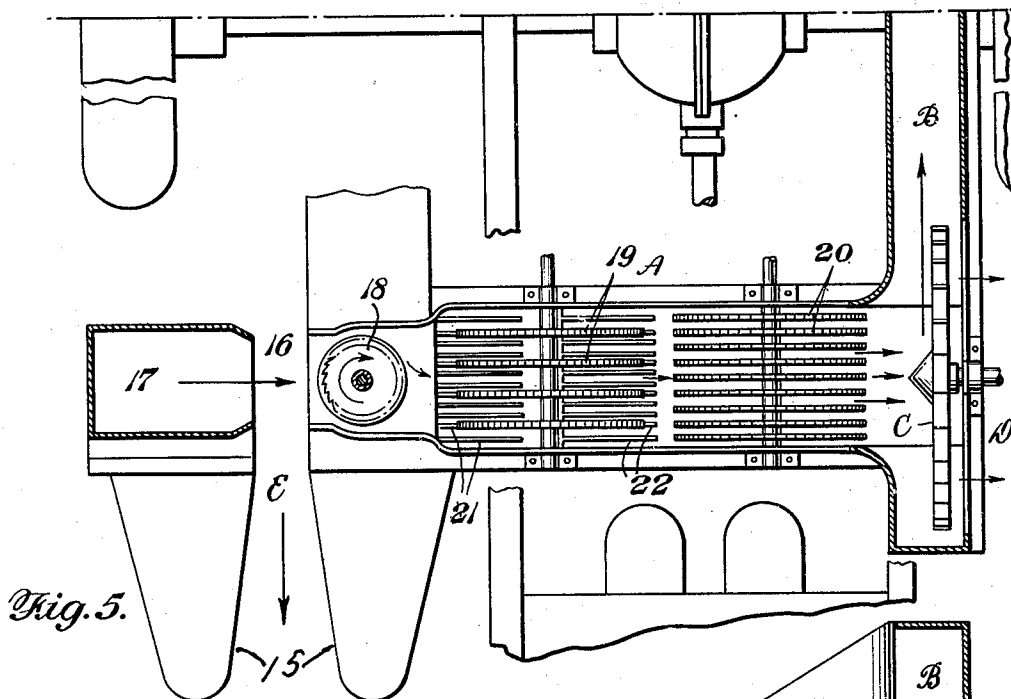


Fig. 7.

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FIBER TRANSFER AND CLEANING MEANS

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Application October 4, 1950, Serial No. 188,399

10 Claims. (Cl. 19—93)

1

The invention relates to improvements in fiber transfer and cleaning means. The present invention is a continuation-in-part of my pending application Serial No. 598,043, filed June 7, 1945, now abandoned, entitled "Cotton Picker," and as to some of the features herein disclosed is an improvement on the disclosure of my prior Patents Nos. 1,961,447 and 2,484,524.

In accordance with the disclosure of the aforesaid application Serial No. 598,043, and of my Patent No. 2,484,524, a powerful air blast is employed for blowing the bolls of growing cotton against a toothed picker unit located at or near the inlet of a fiber transfer passage. The cotton picking unit is of such construction that it will strip the fibers from the cotton bolls and deliver the fibers to the transfer passage, and will at the same time allow the air blast to pass freely through the unit into the transfer passage, where such blast serves as a medium for conveying the cotton fibers to another location, such as a storage hopper carried by the vehicle on which the cotton picker is mounted.

While a powerful air blast is required for blowing the cotton bolls against the picking unit, it is desirable to release some of the air pressure during transfer of the fibers to their destination, and accordingly the transfer passage may be open at the top, bottom and both ends, and, if desired, relief openings may also be provided in the side walls of the transfer passage. While passing through the passage a portion of the trash may be separated from the fibers and allowed to drop by gravity as the air blast diminishes in intensity.

As disclosed in my aforesaid application Serial No. 598,043, and in Patent No. 2,484,524, the cotton fibers, after moving in a substantially horizontal direction through the transfer passage, are brought into contact with a rotatable spirally spoked centrifugal transfer member which is so formed and operated as to permit particles of dust and trash to pass therethrough while retaining the fibers, and then centrifugally discharging them at a high rate of speed through a delivery passage extending at an angle to the first or inlet portion of the transfer passage, said delivery portion of the transfer passage leading to any suitable location, such as a storage hopper. The fibers driven by the original air blast engage the centrifugal transfer and cleaning member substantially axially and are discharged peripherally by said transfer member into the second or delivery portion of the transfer passage. This centrifugal transfer and cleaning member con-

2

stitutes an important feature of the present invention.

While the invention is applicable to the particular cotton picker disclosed in my prior application and in Patent No. 2,484,524, it will be apparent that the invention is of more general application and that the centrifugal transfer and cleaning member may be used in other connections where it is desired to change the direction of movement of air-borne fibers or the like while at the same time separating therefrom particles of dust, trash and the like.

The invention will be more readily understood by reference to the accompanying drawings and the following detailed description, in which specific embodiments of the inventive thought are set forth by way of illustration rather than by way of limitation.

In the drawings:

Fig. 1 is a diagrammatic view showing a fiber transfer passage including an inlet portion and a delivery portion extending at an angle thereto, with my improved centrifugal transfer and cleaning unit;

Fig. 2 is a side elevational view of the centrifugal transfer and cleaning unit.

Fig. 3 is a front view of the centrifugal transfer and cleaning unit, a portion only of the spiral spokes being shown;

Fig. 4 is a detail on the line 4—4 of Fig. 3;

Fig. 5 is a top plan view largely diagrammatic in character showing the application of the invention to a cotton picker similar to that shown in my Patent No. 2,484,524, parts being shown in section;

Fig. 6 is a central vertical section of the same, parts being shown in elevation;

Fig. 7 is a view similar to Fig. 6 suggesting the application of the invention to a cotton picker of the type disclosed in my prior Patent No. 1,961,447, part of the transfer passage being broken away.

To illustrate the invention in its simplest terms as diagrammatically shown in Fig. 1 it may be assumed that fibers of cotton or the like are being conveyed by means of an air blast through an inlet or feeding portion A of a suitable transfer passage, which is also provided with a delivery portion or cotton receiver B extending at an angle to the inlet portion. Mounted at the end of the inlet portion of the transfer passage is a centrifugal transfer and cleaning member C mounted facing the inlet passage A and arranged to receive fibers approaching the member C in an axial direction but being adapted to

3

deliver them peripherally through the outlet passage or receiver B. The member C comprising a spiral grill wheel and collector may be mounted in any suitable frame member but it will be understood that the wall portion in rear of the member C is preferably open to permit air from the inlet portion A of the transfer passage to pass therethrough, carrying with it trash which is passed axially through the centrifugal transfer and cleaning member C.

As shown in Figs. 2, 3 and 4, the centrifugal transfer and cleaning member C comprises a plurality of spiral spokes 10 secured at the center to a suitable shaft 11 and curving outwardly therefrom. The curvature may be that of an involute curve. Successive spokes may be connected to the adjacent spokes near their peripheries by suitable connecting means 12 which lend a certain degree of rigidity to the structure. A conical cap 13 may be provided at the front of the device, being preferably secured to the shaft 11. The shaft 11 may be driven by any suitable means in a direction to deliver the fibers peripherally through the delivery passage or receiver B. Dirt and trash pass through the member C between the spiral spokes thereof and are discharged in the direction of the original air blast, as indicated at D. The spirally spoked transfer member C acts as a blower and creates an air blast in the direction of the outlet passage or receiver B which assists in the delivery of the fibers through such passage, and corresponds generally with the member 28 of my prior Patent No. 2,484,524.

It will be apparent that the feed or inlet portion A of the transfer passage may be provided with any suitable cleaning or separating means as disclosed, for example, in my prior application Serial No. 598,043, and Patent No. 2,484,524, and that a fiber picker unit may be provided adjacent the inlet of such passage as disclosed in the aforesaid application. It will be further apparent that the air blast which serves to transfer the cotton fibers through the passage A may also serve to direct cotton bolls on growing plants against rotary picker units in accordance with the disclosure of my aforesaid application and patent. The delivery or outlet passage B may, if desired, be connected with suction means which assists in the transfer of fibers through such passage, as described in said application and patent, but the use of such additional means has been found to be unnecessary since the centrifugal member C functions as a blower. While the centrifugal transfer and delivery member C is particularly adapted for use in connection with the system disclosed in my application Serial No. 598,043, and Patent No. 2,484,524, it will be apparent that it may also be used in other connections as, for example, in the delivery of cotton fibers to a cotton gin or the like where it may be desirable to change the direction of movement of the fibers and also to remove, so far as possible, the dirt and trash which may have accumulated in the cotton which is to be delivered to the gin.

In Figs. 5 and 6 the invention is disclosed in connection with a cotton picker similar to that set forth in my application Serial No. 598,043 and in my Patent No. 2,484,524, dated October 11, 1949, except that in the present instance the picking units are set to rotate in the opposite direction from that in which the saws rotate in the aforesaid application and patent, while in Fig. 7 the invention is shown illustrated in

4

connection with a rotating mesh picker of the type disclosed in my earlier Patent No. 1,961,447, dated June 5, 1934.

Referring particularly to Fig. 5 the fiber transfer and cleaning mechanism, including the feed and receiving passages A and B and the centrifugal transfer and cleaning member C, form part of a cotton picker carried by a vehicle adapted to move in the direction of the arrow E through a field of cotton. The vehicle is only diagrammatically illustrated and as shown is provided with a pair of forwardly projecting guide members 15 which serve to direct the plants of a row of cotton into a plant picking passage 16 where cotton bolls carried by said plants are adapted to be forcibly directed by means of a powerful air blast emerging through nozzle outlet 17 across the plant passage 16, against a rotary picking unit 18 located adjacent the inlet end of the cotton transfer passage in the form of spaced saws separated by guide disks of larger diameter than the saws, which picking units may be of the type disclosed in my Patent No. 2,484,524, except that in accordance with the present disclosure the picker unit is rotated in a direction opposite to that disclosed in the said patent. This arrangement has been found to be particularly desirable in that by causing the picker unit to rotate in a direction opposite to the direction of movement of the vehicle the cotton bolls themselves are not damaged and only the lint is removed, whereby much cleaner cotton is obtained than was heretofore possible.

The air blast from the nozzle 17 passes through the picker unit 18 and causes the lint together with some trash to pass through the inlet portion A of the transfer passage, in which portion are mounted suitable transfer and cleaning elements such as are set forth and claimed in my application Serial No. 598,043. These include a preliminary cleaning unit 19 having relatively widely spaced horizontally mounted saws and a second transfer and cleaning unit 20 having a larger number of more closely spaced toothed disks or saws. At the bottom of the inlet portion A of the transfer passage there may be provided sets of upwardly and forwardly inclined fingers 21 and 22 which allow trash to pass therethrough and fall through the open bottom of the passage but serve to direct the lint upwardly against the teeth of the rotary units 19 and 20 under the influence of the powerful air blast passing through the transfer passage. The second transfer member 20 is arranged to direct lint against the centrifugal transfer and cleaning unit C substantially centrally thereof, which unit C serves to change the direction of movement of the lint and pass the same through the outlet or fiber receiving portion B of the transfer passage while permitting most of the remaining trash to pass out at D along with the major portion of the air blast.

A similar arrangement is diagrammatically illustrated in Fig. 7, in which a reticulated picker unit 18' similar to the picker unit disclosed in my Patent No. 1,961,447 is substituted for the saw unit 18 of Figs. 5 and 6. In this arrangement the picker unit is likewise driven in a direction reverse to the direction of movement of the vehicle upon which the device is mounted. The reticulated picker 18 may, if desired, be provided with small teeth or hooks to aid in the removal of the lint, such hooks being preferably rearwardly directed similarly to the saw teeth of picker unit 18 shown in Figs. 5 and 6. In the

5

modification shown in Fig. 7 the transfer passage A is only partially shown, it being understood that the remaining portion may be the same as that disclosed in Figs. 5 and 6 with the inclusion of the centrifugal cleaning and transfer unit C at the end of such passage arranged to deliver the fiber to a cotton receiving portion B.

The reverse rotation of the picker units 18 and 18' per se is not my invention but is the invention of Alexander R. Nisbet, Jr., as set forth in his application Serial No. 215,763, filed March 15, 1951, entitled "Cotton Picking Machine."

The invention has been described in detail for the purpose of illustration but it will be obvious that numerous modifications and variations may be resorted to without departing from the spirit of the invention.

It will be understood that any desired type of receiver may be employed in connection with this apparatus, and if desired auxiliary means may be provided, either pneumatic or mechanical as desired, to assist in the delivery of the fiber to the final receiver.

I claim:

1. A cotton cleaner and conveyor comprising a frame or casing having spaced side walls forming between them a transfer passage open at the bottom and having an inlet at one end and an outlet at the other, means including a blower located at the entrance to said transfer passage for feeding cotton into and through said passage, cotton cleaning means in said passage comprising a toothed separator roller formed of spaced saw disks mounted for rotation on a horizontal axis between said side walls, a screen located in said passage beneath and slightly in advance of said separator roller comprising a series of parallel upwardly and forwardly inclined rods adapted to allow heavy trash to fall between the rods and through the open bottom and serving to direct the cotton upwardly against the separator roller under the influence of said blast, the space between the saws being substantially unobstructed, thereby permitting air and dirt particles to pass freely therethrough.

2. A cotton cleaner and conveyor comprising frame members providing an open bottomed cotton transfer passage therebetween, blower means located in advance of the entrance to said transfer passage for forcing cotton fibers to be cleaned through said passage, and means for cleaning the cotton fibers as they are conveyed through said passage by said air blast comprising a pair of spaced apart rotary cleaning units, each unit comprising a plurality of spaced saw disks mounted for rotation about an axis extending transversely of said passageway, and deflecting and screening means located below and intermediate said cleaning units comprising a series of spaced rods forwardly and upwardly inclined from the first rotary unit toward the second for separating out trash and allowing the same to pass through the open bottom of the transfer passage while directing cotton fibers from which dirt particles have been removed against the saws of the second cleaning unit, the space between the saw disks being substantially unobstructed, permitting air and dirt particles to pass freely therethrough.

3. A cotton cleaner and conveyor comprising frame members providing a cotton transfer passage therebetween, blower means for forcing cotton fibers to be cleaned through said passage, and means for cleaning the cotton fibers as they are conveyed through said passage by said air

6

blast comprising a pair of spaced apart rotary cleaning units each comprising a plurality of spaced saw disks mounted for rotation about an axis extending transversely of said passageway, and deflecting and screening means located below and intermediate said cleaning units comprising a series of spaced rods forwardly and upwardly inclined from the first rotary unit toward the second for separating out trash and directing cotton fibers from which dirt particles have been removed against the saws of the second cleaning unit, the saws of the first unit being more widely spaced than the saws of the second unit.

4. A cotton cleaner and conveyor as set forth in claim 2, wherein upwardly and forwardly inclined screening rods are employed for separating trash and for delivering cotton to the saws of the first cleaning unit.

5. A cotton cleaner and conveyor comprising a frame or casing having spaced side walls forming between them a passage having an inlet at one end and an outlet at the other, means including an air blast for feeding cotton into and through said passage, cotton cleaning means in said passage comprising a toothed separator roller formed of spaced saw disks mounted for rotation on a horizontal axis between said side walls, a screen located in said passage beneath and slightly in advance of said separator roller comprising a series of parallel upwardly and forwardly inclined rods adapted to allow heavy trash to fall between the rods and serving to direct the cotton upwardly against the separator roller under the influence of said blast, means comprising a wheel having spaced spiral spokes, providing spiral passages between them, located at the discharge end of the passage and serving to change the direction of movement of the cotton emerging from said passage while permitting dirt to pass therethrough under the influence of said air blast, and means for rotating said wheel.

6. For use with an ambulant cotton picking machine, apparatus carried thereby for cleaning fibrous material containing relatively heavy extraneous solid particles, while passing to a place of storage, comprising means providing a transfer passage having a material inlet at one end, a fiber outlet passage spaced from the inlet and leading to a place of storage, and an open bottom through which separated extraneous solid material may be removed by gravity, air blast means located in advance of the transfer passage inlet for passing fibrous materials through the transfer passage from the inlet to the outlet passage, and means for cleaning said fibrous material while passing through the transfer passage comprising a rotary cleaning unit including a plurality of spaced saw disks mounted for rotation about an axis extending transversely of the passageway, and inclined deflecting and screening means located within said transfer passage slightly in advance of the spaced saw disks and serving to deflect fibrous material carried by the air blast against the saw disks while permitting waste material to pass therethrough and out of the machine through the open bottom of the transfer passage.

7. A cleaning apparatus as set forth in claim 6, wherein a series of rotary cleaning units are mounted in the transfer passage with deflecting and screening means associated with each unit.

8. An apparatus as set forth in claim 6, wherein combined screening and deflecting means comprising a rotor having spaced spiral blades providing open spiral passages therebetween, is lo-

7

cated at the juncture of the transfer passage and the fiber outlet passage, said rotor serving to direct cleaned fibrous material from the transfer passage to and through the fiber outlet passage while permitting dirt to pass between the blades to a dirt outlet.

9. An apparatus for transferring and cleaning fibrous material containing relatively heavy dirt and trash particles, comprising a main transfer passage having an inlet, a dirt and trash outlet substantially in alignment with the inlet, and a fiber outlet passage directed at an angle to the main transfer passage, air blast means located in advance of the inlet to said main transfer passage for passing said material through the main transfer passage, and combined dirt and trash separating and fiber transfer and blowing means located in the main transfer passage intermediate the material inlet and the dirt and trash outlet and substantially at the juncture of the fiber outlet passage with the main passage, said means comprising a rotor having spaced spiral blades providing spiral passages therebetween, and means for driving said rotor, said rotor serving to direct the fibrous material from the main transfer passage to and through the fiber outlet passage while permitting dirt to pass between the blades to the dirt outlet.

8

10. An apparatus as set forth in claim 9, wherein cleaning means are provided in the transfer passage intermediate the material inlet and the spiral bladed rotor, comprising a rotary unit formed of a series of spaced saw disks mounted for rotation on an axis extending transversely of the main transfer passage, and combined screening and fiber deflecting means located slightly in advance of the spaced rotating saw disks.

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