March 31, 1953 L. L. BERTRAM ET AL 2,632,924

APPARATUS FOR CLEANING FIBROUS MATERIALS

Filed Aug. 8, 1951 4 Sheets-Sheet 1

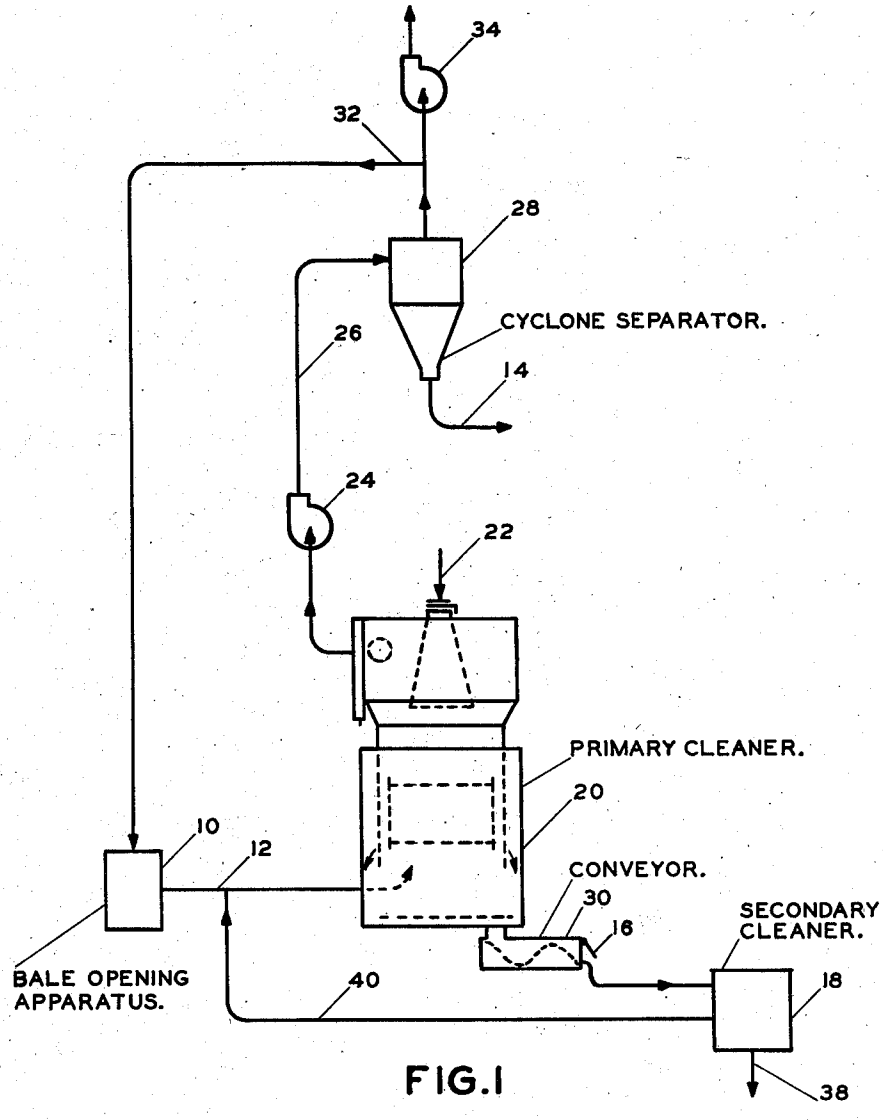

FIG.1

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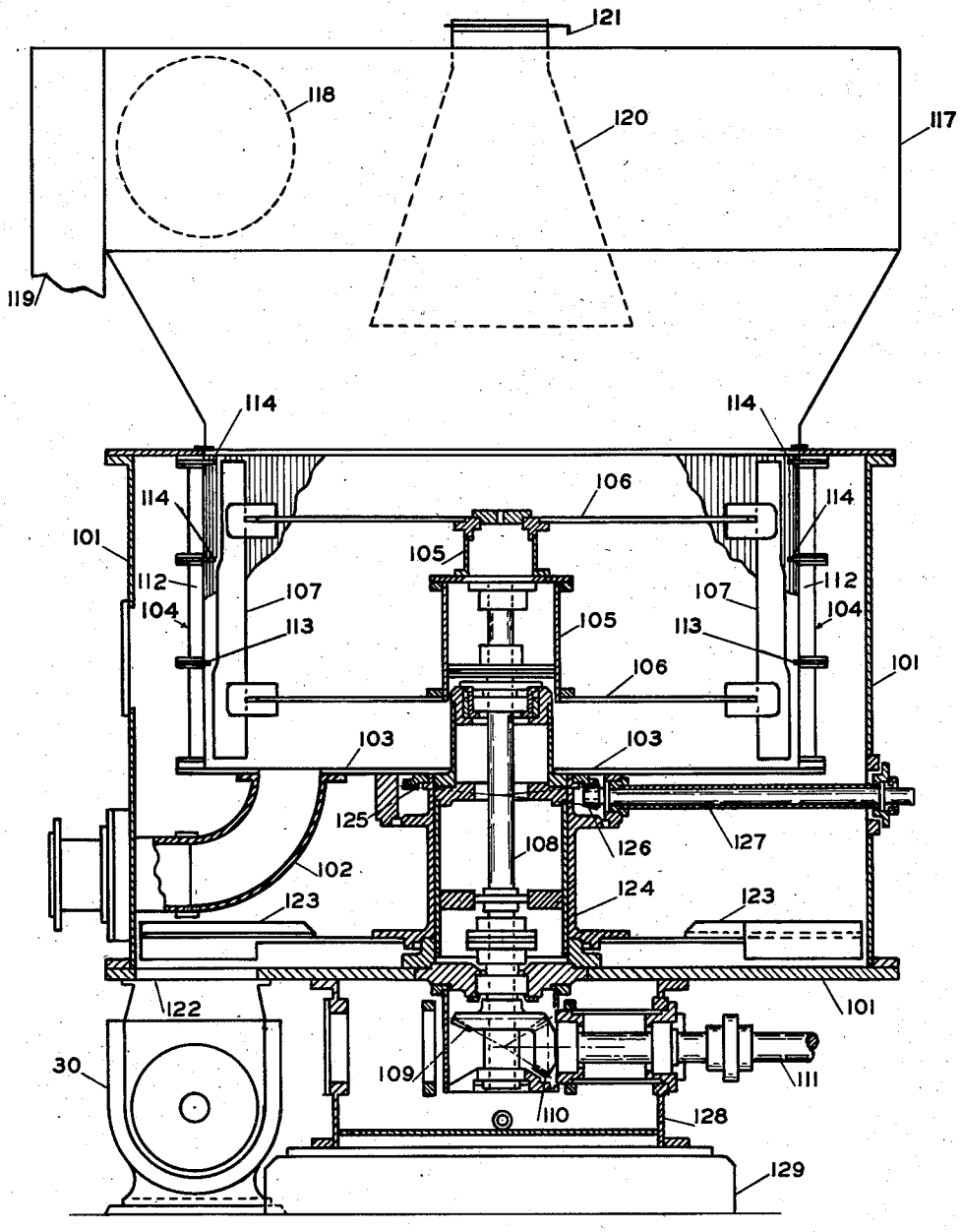

FIG. 2

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APPARATUS FOR CLEANING FIBROUS MATERIALS

Filed Aug. 8, 1951 4 Sheets-Sheet 3

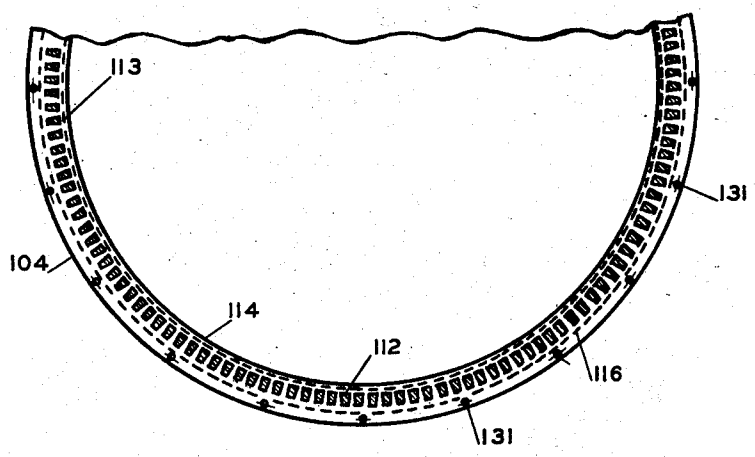

FIG. 3

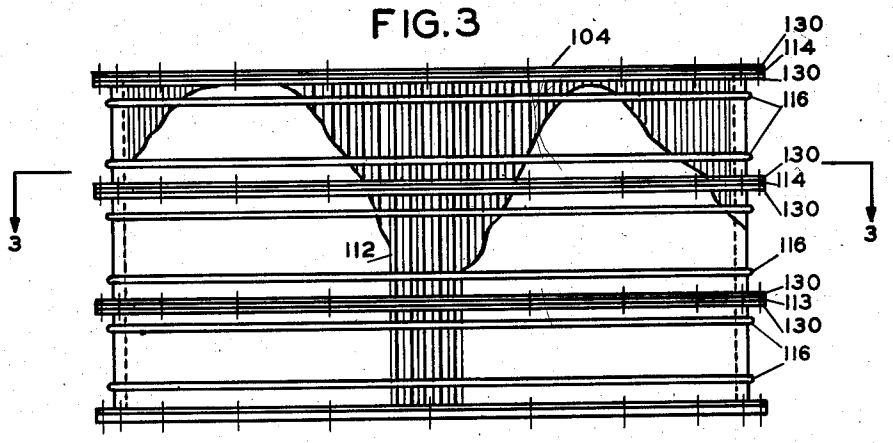

FIG. 4

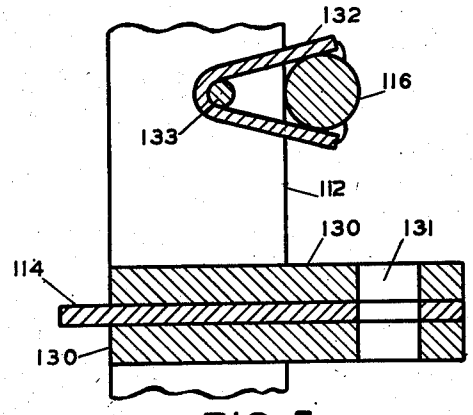

FIG. 5

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Filed Aug. 8, 1951 4 Sheets-Sheet 4

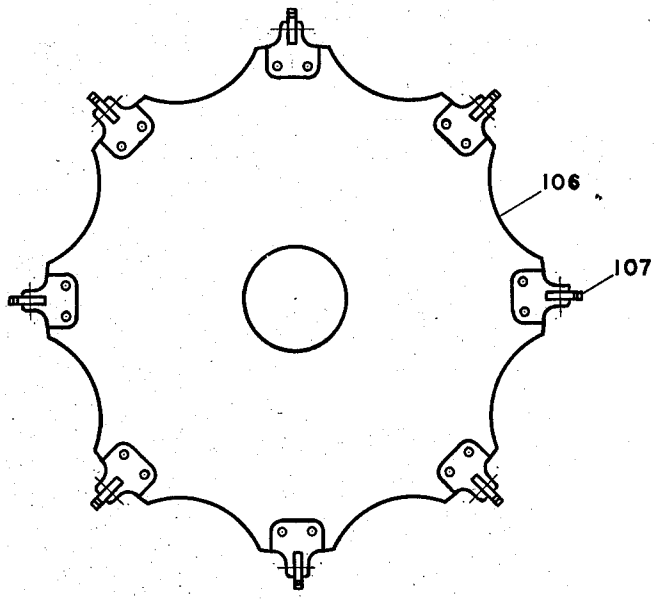

FIG. 6

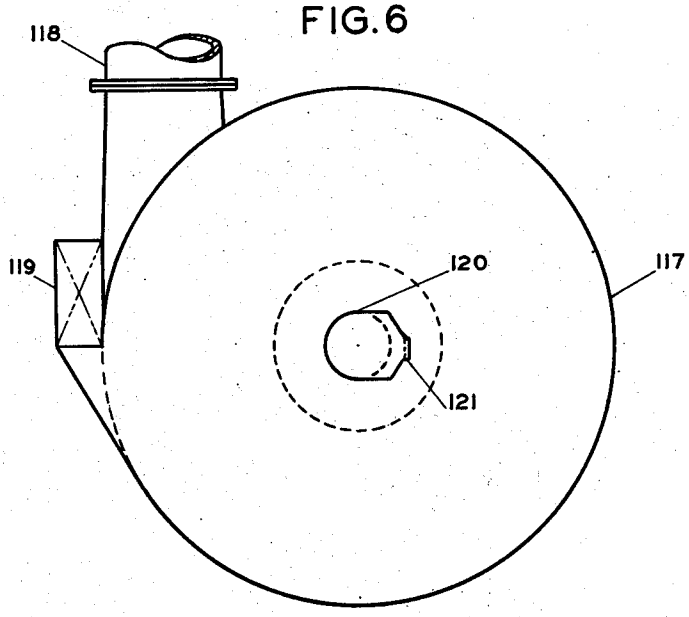

FIG. 7

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UNITED STATES PATENT OFFICE

2,632,924

APPARATUS FOR CLEANING FIBROUS MATERIALS

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Application August 8, 1951, Serial No. 240,834

6 Claims. (Cl. 19—90)

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This invention relates to a process and apparatus for cleaning contaminated light, fibrous material. In a specific aspect this invention relates to a process and apparatus for cleaning contaminated cotton linters.

In various commercial operations it is necessary to remove contaminants from raw materials which are normally light and fibrous prior to the use of these materials in plant operations. For example, cotton linters are used in the preparation of cellulose derivatives such as cellulose acetate, ethyl cellulose, nitrocellulose, and the like. However, before these cotton linters are subjected to the usual digestion operations and the chemical treatments necessary for converting them into the desired commercial products, it is usually necessary to remove contaminants such as dirt, dust, stones, field trash, cottonseed hulls and similar materials from the cotton linters. In most commercial operations it is desirable to produce a comparatively pure cellulose derivative, and the degree of purity of the product depends to a certain extent upon the cleanliness of the raw materials which, in this instance, are the raw cotton linters. Thus, the necessity for procedures and apparatus to produce clean cotton linters or similar light, fibrous material is obvious.

Heretofore cleaning units of various types have been employed to clean light, fibrous materials, such as cotton linters, but these units have disadvantageous requirements or limitations which are deterrents to the use of the particular cleaning apparatus. For example, liquid cleaning apparatus and procedures have been used, but the large amount of liquid, such as water, that must be handled greatly increases the operating costs. Air cleaning apparatus and procedures have also been employed, but the apparatus has been such that only limited and unsatisfactory quantities of material could be effectively cleaned within a given period of time.

It is an object of this invention to provide a novel and improved process and apparatus for cleaning contaminated light, fibrous material.

It is another object of this invention to provide a novel and improved process and apparatus for cleaning contaminated cotton linters.

Further and additional objects of this invention will be apparent from the detailed disclosure hereinbelow.

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The means by which the foregoing and other desirable objects are accomplished by the present invention and the manner of their accomplishment will be readily understood from the following description with reference to the accompanying drawings. In these drawings:

Fig. 1 is a schematic diagram of a process and apparatus for cleaning contaminated cotton linters.

Fig. 2 is a part elevational and part sectional view of the primary cotton linters cleaner employed in the process depicted in Fig. 1.

Fig. 3 is a fragmentary cross sectional view of the perforate inner casing of the primary cleaner;

Fig. 4 is an elevational view of the perforate inner casing of the primary cleaner;

Fig. 5 is an enlarged fragmentary sectional view showing baffle, reinforcing rod and bar arrangement as employed for the perforate inner casing;

Fig. 6 is a plan view of one of the disk-like deflector plates to which the beater blades employed in the primary cleaner are attached;

Fig. 7 is a plan view of the primary cleaner showing the tangential outlet for the cleaned cotton linters.

Referring now to Fig. 1, the process and apparatus for cleaning cotton linters will be described by following the cotton linters to be cleaned and as received at the plant through a complete cleaning operation. Dry linters, obtained in fluffed form by means of conventional bale opening apparatus 10, are pulled through line 12 by a stream of air into the cleaning apparatus 20 which will be described in detail by referring to the other drawings. The linters enter primary cleaner 20 beneath a deflector plate which leads the linters to a zone containing a plurality of rotating beater blades, and as a result of the operation of the beater blades the linters and contaminants are impelled by centrifugal force against an inner perforate casing. Contaminants and some fiber are driven through the perforate casing as the main current of fiber-laden air is drawn into the condensing cover of cleaner 20. As desired or required, additional quantities of air can be admitted to the

cover of cleaner 20 via line 22. From this condensing cover the air and cleaned linters are withdrawn tangentially by the action of suction fan 24 and passed via line 26 into cyclone separator 28. From separator 28 the cleaned cotton linters are withdrawn via line 14, and these linters are now ready for use in chemical operations for the production of cellulose derivatives. Air from which cleaned cotton linters have been separated in zone 28 may exhaust directly to atmosphere through fan 34 or may be returned to the conventional opening apparatus 10 via line 32 to entrain contaminated cotton linters for delivery to cleaner 20.

The contaminants and linters fibers beaten through the inner perforate casing in cleaner 20 are collected in a sealed cavity in a lower portion of cleaner 20, and they are discharged from this cavity by being swept into screw conveyor 39 which operates against a weighted flap 16 or other similar device in order to maintain a seal. Cleaner 20 can be operated in such a manner that the amount of contaminants removed from the cotton linters is variable, and thus the degree of cleaning that is effected is also variable. When only a minimum amount of cleaning is required, the contaminants beaten through the inner perforate casing will be substantially fiber-free. In that event the contaminants can be discarded after removal from cleaner 20. When the cleaner is operated to perform a greater degree of cleaning, the contaminants contain greater amounts of linters fibers, and it is sometimes desirable and economical to recover such linters fibers from the contaminants. In an alternative mode of operation the contaminants and accompanying linters after leaving screw conveyor 30 are passed into a secondary cleaning zone 18. This secondary cleaner may be similar to the primary cleaning apparatus 20 but of smaller size. Alternatively, a machine for producing hull fiber, such as the Reynell-Ware Memphis defibrator, may be employed. Other alternatives include the use of conventional beating equipment such as a Fort Worth beater which is frequently employed in producing raw linters. In some cases, even a rough shaker screen system or an air separation apparatus will effect satisfactory separation. The choice of secondary cleaner 18 depends on the degree of contamination of the rejects which come from conveyor 30 and on the amount of fiber loss which can be tolerated in the process. The objective of the secondary cleaner 18 is to produce concentrated contaminants which may be rejected from the linters purification process via line 38. The fiber-containing fraction from the secondary cleaner 18 may, depending on the apparatus which is used, be clean enough to be employed along with product withdrawn via line 14 from the primary cleaning operation, but usually the degree of contamination of this fraction from the secondary cleaner will be sufficient that the fraction is returned to line 12 via line 40 and recycled through primary cleaner 20.

The amount of cotton linters that passes through the perforate or pervious casing in cleaner 20 and thence passes to cleaner 18 for separation from contaminants is dependent upon the degree of cleanliness desired in the cleaned linters issuing from cleaner 20. If it is necessary to effect only a limited cleaning action in cleaner 20, the proportion of cotton linters that passes to cleaner 18 compared with the total feed of cotton linters to the system is relatively small, and this proportion increases as the severity of the cleaning action in cleaner 20 increases. For most purposes adequate cleaning of the cotton linters can be effected in cleaner 20 when from 5 to 10% of the total feed of cotton linters is passed with contaminants to cleaner 18 where this portion of the cotton linters is subjected to a second cleaning action.

Fig. 2 is a part sectional and a part elevational view of primary cleaner 20. In order to clean the cotton linters this cleaning apparatus subjects the contaminated cotton linters to the centrifugal force of a plurality of vertically disposed beater blades inside a cylindrical casing having perforate or pervious side walls, and at the same time a stream of air is passed upwardly through the cotton linters. As a result of this action, contaminating particles are separated from the linters fibers. Referring now to Fig. 2 in detail, the cleaning chamber is surrounded by imperforate casing 101, and air laden with contaminated cotton linters is introduced to the cleaner via conduit 102. In this drawing only one inlet is shown for the introduction of the air and contaminated linters to the cleaning zone, but, alternatively, a series or plurality of conduits can be used in order to introduce the air and contaminated linters to the cleaning zone at a multiplicity of points. Such alternative introduction at a plurality of points is sometimes desirable in order to obtain an even distribution of air and cotton linters in the cleaning chamber. The cleaning action is carried out in the zone surrounded by solid bottom plate 103 and the vertically disposed perforate side walls 104. Within this cleaning zone is rotor shaft casing 105 to which are attached disk-like solid plates 106, and at the extremities of these solid disk-like plates are attached a plurality of beater blades 107. It has been found desirable, in some cases, to employ eight beater blades in order to obtain efficient cleaning of the linters, but any number of beater blades that produce the desired cleaning can be used. Shaft casing 105 is attached to shaft 108 which operates in combination with a series of bearings, housings, rubber rings, oil and grease lines, and other conventional parts and equipment. However, a detailed description of these conventional parts is not essential to an understanding of the invention, and these parts will not be referred to in detail in this written description of the invention. At the base of shaft 108, spiral bevel gear 109 meshes with spiral bevel gear 110 which is attached to drive shaft 111. This latter drive shaft is attached to a driving mechanism (not shown) which serves as the driving means for revolving or rotating plates 106 and beater blades 107.

In the operation of cleaner 20 the speed of the driving mechanism is adjusted to produce the desired speed of the revolving beater blades, and air laden with contaminated cotton linters is introduced to the cleaning zone via conduit 102 through the solid base plate 103. The point or points of introduction of the air and linters is closer to the central drive shaft than the beater blades 107, but plates 106 are solid to prevent the upward passage of the air and linters therethrough. Consequently, the air and linters pass upwardly in the zone between the beater blades 107 and the perforate casing 104. In its upward passage through this annular space the cotton linters are subjected to the action of upward flowing air and the centrifugal force of the

rotating beater blades. The centrifugal force tends to throw the cotton linters and contaminants against perforate side wall 104, and the upward flowing air tends to carry the cotton linters upwardly through the cleaning zone. When the cotton linters and contaminants are thrown against perforate casing 104 by the centrifugal action of the beater blades, the contaminants, which are heavier and have a greater momentum than the fibrous linters, are carried through the perforate casing while most of the fibrous linters are retained inside the perforate casing. As a result of this action the cotton linters that are removed from the cleaning zone by the upward flowing air are linters from which contaminating materials have been separated. Each beater blade, as it revolves, creates a high pressure area ahead of it and a low pressure area behind it, and in this manner the perforate casing is subjected to fluctuating pressures on the inner side. These fluctuating pressures cause the formation of a fibrous mat followed by partial stripping of the mat from the perforate casing and reclaiming of the fiber.

Perforate casing 104 can be a screen or other similar pervious device which will permit the passage of linters contaminants therethrough while permitting the passage of only a limited amount of linters through the casing. A heavy mesh wire screen or a perforated plate can be used. However, it has been found that a bar screen, similar to that described in detail in Figs. 3, 4 and 5, is particularly suitable for this purpose. This type of screen is a series of vertically disposed elongated metal bars spaced at regular intervals around the periphery of the cleaning zone. The bars are separated sufficiently to permit the passage of the contaminants between the bars, but most of the linters particles are retained within the cleaning zone. The actual dimensions of the individual bars can be varied, but, bars having an inner surface (the surface facing the beater blades) with a width of about ½ inch and spaced at intervals of about ⅛ inch, form a suitable screen for cleaning cotton linters. It is also desirable to use tapered bars, i. e., bars whose outer surface (the surface facing the imperforate casing) is less than ½ inch and about ¼ inch in width. It will be understood that these specific dimensions are merely illustrative, and that screen bars having other dimensions can be used in practicing this invention. Fig. 3 is a plan view of a portion of perforate casing or bar screen 104 wherein individual bar members 112 of the complete bar screen are shown. Fig. 4 is an elevational view of bar screen 104. The inner surface of bar screen 104 is preferably separated into a series of individual sections by a plurality of baffles 113 and 114 which protrude inwardly from the bar screen. Fig. 5 shows an enlarged view of one of these baffles and the relationship of this baffle to an individual bar member of the perforate screen. These baffles are assembled between pairs of ring flanges 130, and the baffles and ring flanges are suitably joined, for example, by machine bolts inserted in openings 131. The individual members of the bar screen are welded or otherwise suitably joined to the ring flanges at their points of juncture therewith. The individual members of the bar screen are connected and maintained rigidly in position by reinforcing rod 116 which is welded or otherwise firmly connected to a U-support bar 132 encircling rod 133 which passes through the members of the bar screen. It will be understood that a plurality of these reinforcing rods are essential for maintaining the individual members of the bar screen rigidly and firmly in the desired position.

In Fig. 2 the lower baffle 113 is shorter in length and protrudes inwardly a shorter distance than upper baffles 114. When baffles are employed, they separate the bar screen into a plurality of separate zones, and the baffles will retain a portion of the linters undergoing the cleaning operation as a filtering mat on the bar screen. In a preferred modification of the equipment, lower baffle 113 protrudes inwardly a shorter distance than do upper baffles 114, e. g., lower baffle 113 may protrude inwardly about ½ inch and upper baffles 114 may protrude inwardly about 1 inch, and as a result the thickness of the linters mat retained on the bar screen will be less below baffle 113 than above it. However, it will be understood that the length or inward protrusion distance of baffles 113 and 114 can be varied. In other modifications, baffle 114 can be 2 inches long or longer while baffle 113 is about ½ inch, and other dimensions can be used within the scope of the invention. In some instances, the baffles can be of equal length. The exact dimensions employed depend upon variable factors, such as the degree of cleanliness desired in the product linters, the severity required in the cleaning operation, the feed employed, and the like. When baffle 113 has an inward protrusion of ½ inch or less and when the beater blades 107 are set close to bar screen 104, it is noted that a large portion of the bars in this section of the screen are exposed, i. e., a stable mat of linters is not formed on the bars. This situation may be desirable, since the entering linters feed is thrown forcibly against the screen in such a manner as to break up the contaminants and free them from the linters. Consequently this section is termed a "breaking section" of the bar screen. When the baffles protrude inwardly a greater distance, as is desirable in the upper section of the bar screen, these baffles retain a mat of linters on the bar screen about equal in thickness to the inward protrusion of the baffle. This mat of linters acts as a filtering means through which the heavy contaminating particles are able to pass but which retains on its surface the lighter fibrous linters, and actually most of the separation of contaminants from linters takes place in this section. Consequently, this section of the bar screen is termed the "filtering section" or "separating section." As a result the contaminating particles pass through the mat and bar screen and enter the annular space between bar screen 104 and external casing 101. The cleaned linters from which contaminating materials have been separated are retained within the area bounded by bar screen 104, and as a result of the action of the upward flowing air passing through the space between beater blades 107 and bar screen 104, these cleaned linters are removed from the cleaning zone into the condensing cover 117 which is disposed above the cleaning zone and outer casing 101.

The "breaking section" or that portion of the bar screen below baffle 113 is an important feature of the cleaning unit. When the contaminated cotton linters strike this portion of the bar screen, a separation of the linters fibers occurs which facilitates the removal of contaminants from the linters fibers. Also, among the contaminants of the cotton linters are cottonseed hulls, and in this "breaking section" these

hulls undergo a defibering action that removes attached linters fibers. This defibering action facilitates the removal of the hulls from the cotton linters and results in an improved cleaning action. Also, the cotton linters, before cleaning, contain large pieces of field trash and other similar material. Upon striking the bar screen in the "breaking section" these large contaminants are broken into pieces sufficiently small to pass through the bar screen. As a result of these various actions discussed above, the "breaking section" improves the overall operation and efficiency of the cleaning unit.

A substantial portion of the linters fibers that pass through perforate casing 104 with contaminants do so in the "breaking section" since a stable mat of linters fibers is not formed in this section of the screen or casing. In order to decrease the amount of fibers passing through casing 104 the "breaking section" thereof can be made solid and impervious. In that event, this section of the casing would still operate as a "breaking section" without effecting a cleaning of the linters by removal of contaminants. The cleaning action in this modification is effected in the "filtering section" where the mat of fibers on the casing aids in the separation of contaminants from fibers and in the prevention of the passage of fibers through the casing.

Condensing cover 117 has a maximum diameter greater than the diameter of the cleaning zone bounded by bottom plate 103 and bar screen 104. Also, the maximum diameter of condensing cover 117 is considerably greater than the width of the passageway between beater blades 107 and bar screen 104. Consequently, the velocity of the air as it passes through condensing cover 117 is considerably less than the velocity of the air passing through the linters cleaning zone. Also, the air upon entering condensing cover 117 tends to pass in an upwardly spiraling path, and the air and cleaned linters are withdrawn from cover 117 through tangential outlet 118 in an upper portion of that cover. This cover is also provided with tramp separator 119 which removes heavy pieces of metal, stones or other contaminating materials that may still be contained in the cotton linters. A damper in the lower portion of tramp separator 19 is used for clean-out purposes and to prevent the flow of air and cleaned linters through separator 119. A deflecting cone 120 is inserted in the upper center portion of condensing cover 117 in order to aid in producing the desired spiraling path of air and linters through the cover and also to provide a means for introducing additional quantities of air to the cover by suitable adjustment of slide gate 121. The velocity of air and linters passing through the cleaning zone can be varied by suitable adjustment of gate 121. By adjustment of gate 121 the actual suction on the cleaner can be varied, and in this manner the period of time during which the linters are retained in the cleaner can be varied as required to effect the desired cleaning of the linters.

Contaminants which were separated from the cotton linters by passage through bar screen 104 are collected above the base plate for outer casing 101 which contains an opening 122 permitting passage of these contaminants to screw conveyor 30 which conducts the contaminants and any accompanying linters away from primary cleaner 20. As indicated previously screw conveyor 30 operates against a weight loaded flap 16 or similar device for maintaining a seal. If the seal is broken, a constant flow of air is established through screw conveyor 30 counter to the flow of material, and this flow of air into cleaner 20 leads to plugging of the bar screen with the resulting failure to clean the contaminated cotton linters. When the cleaner is in operation, the rejects cavity or annular space between outer casing 101 and the inner casing formed by plate 103 and screen 104 is at a subatmospheric pressure, and this pressure is maintained during the cleaning operation. For efficient removal of contaminants from cleaner 20, the zone between plate 103 and the bottom of casing 101 is provided with sweeping means 123 whose arms are attached to casing 124. This latter casing operates in communication with ring gear 125 which is meshed with spiral bevel gear 126 attached to drive shaft 127. This drive shaft is attached to a driving means (not shown) which serves to rotate shaft 127 and thus effect the rotation of sweeping means 123. By the operation of this mechanism the contaminants or rejects from the feed as well as any accompanying cotton linters are swept into opening 122 and thence removed from the cleaner via screw conveyor 30. The lower portion of primary cleaner 20 which is bounded by casing 128 is an oil reservoir and the entire cleaning mechanism is supported by base plate 129.

Fig. 6 is a plan view of one modification of disk-like, deflector plate 106 to which are attached eight beater blades 107. Plate 106 is provided with an opening in the center for insertion of shaft casing 105, and plate 106 is solid in order that air and linters to be cleaned must pass through the space between its periphery and bar screen 104. The spaces between the beater blades 107 in the periphery of plate 106 are curved inwardly or concavely to aid the passage of air and linters through the cleaning zone.

Fig. 7 is a plan view of cleaner 20 showing condensing cover 117, deflecting cone 120, tangential outlet 118 and tramp separator 119.

It will be realized by those skilled in the art that the cleaner described in detail above is quite versatile, that it can be used to clean markedly varying loads of cotton linters or similar fibrous material, and that a product of widely varying degrees of cleanliness can be obtained from this cleaner. For example, the amount of cleaning that is effected can be varied by suitable adjustment of the length or inward protrusion of baffles 113 and 114, particularly the latter. If the length of these baffles is increased, the linters are retained in the cleaning unit a longer period of time, and, consequently, greater quantities of contaminants are removed from the linters. The velocity of the air and the rate of feed of contaminated linters are subject to variation, and as these conditions are varied the degree of cleaning that is performed in the cleaner is varied. Slide gate 121 is adjustable and useful for varying the cleaning time and degree of cleaning for a contaminated linters furnish. The versatility of the cleaner is complemented by the fact that the rotational velocity of revolutions per minute of the beater blades can be varied, and at the higher velocities an improved cleaning of the linters results. However, increasing the rotational velocity of the beater blades tends to increase the heating of the linters in the cleaning zone, and this heating may damage the linters or even result in a fire unless suitable precautions are taken for its prevention. For example, the incoming air velocity or the feed rate of con-

taminated linters can be varied to effect heat removal from the cleaner. Also, the length of baffles 113 and 114 or the setting of slide gate 121 can be adjusted to vary the residence time of the linters in the cleaner, and in this manner undesirable heat can be removed. Numerous other modifications of the operating conditions and of the size and location of parts as well as alternative methods of operation within the scope of the invention will be apparent to those skilled in the art from the above disclosure.

What we claim and desire to protect by Letters Patent is:

1. A cleaner for a contaminated light, fibrous material which comprises, in combination, a cylindrical imperforate casing having a bottom apertured for a shaft and having a discharge opening in said bottom, said casing being open at the top; a shaft extending upwardly through the aperture in the bottom of said casing; a plurality of disk-like plates attached to said shaft and substantially perpendicular thereto; a plurality of beater blades attached to said plates and disposed from said shaft; a perforate cylindrically shaped casing disposed between said beater blades and said imperforate casing and forming an annular space with said imperforate casing; a cover disposed above said perforate casing to enclose said annular space and having a diameter greater than the diameter of said perforate casing and having a tangential opening for withdrawing cleaned fibrous material; means for introducing air laden with contaminated light, fibrous material to said perforate casing; and means for rotating said shaft.

2. A cleaner for contaminated cotton linters which comprises, in combination, a cylindrical imperforate casing having a bottom apertured for a shaft and having a discharge opening in said bottom, said casing being open at the top; a shaft extending upwardly through the aperture in the bottom of said casing; a plurality of solid disk-like plates attached to said shaft and substantially perpendicular thereto; a plurality of beater blades attached to said plates and disposed substantially parallel to said shaft; a second cylindrically shaped casing open at the top and disposed between said beater blades and said imperforate casing and forming an annular space with said imperforate casing, said second casing having a perforate side wall and a series of baffles vertically spaced and extending inwardly toward said beater blades and dividing said perforate side wall into a plurality of separate sections; a cover disposed above said perforate casing to enclose said annular space and having a diameter greater than the diameter of said perforate casing and having a tangential opening for withdrawing cleaned cotton linters; means for introducing air laden with contaminated cotton linters to said perforate casing; and means for rotating said shaft.

3. A cleaner for contaminated cotton linters which comprises, in combination, a cylindrical imperforate casing having a bottom apertured for a shaft and having a discharge opening in said bottom, said casing being open at the top; a shaft extending upwardly through the aperture in the bottom of said casing; a plurality of solid disk-like plates rigidly attached to said shaft and perpendicular thereto; a plurality of beater blades attached to and spaced at regular intervals around the outer extremity of said plates and disposed substantially parallel to said shaft; a second cylindrically shaped casing open at the top and disposed between said beater blades and said imperforate casing and forming an annular space with said imperforate casing, the side wall of said second casing being a perforate bar screen of elongated, vertically disposed plates spaced to permit passage of cotton linters contaminants between said plates while retaining fibrous cotton linters particles inside said imperforate casing, said bar screen being divided into a plurality of separate sections by a series of baffles vertically spaced and extending inwardly toward said beater blades with the lowermost baffle extending inwardly a shorter distance than the uppermost baffle; a cover disposed above said perforate casing to enclose said annular space and having a diameter greater than the diameter of said perforate casing and having a tangential opening for withdrawing cleaned cotton linters; means for introducing air laden with contaminated cotton linters to said perforate casing; and means for rotating said shaft.

4. A cleaner for contaminated cotton linters which comprises, in combination, a cylindrical imperforate casing having a bottom apertured for a shaft and having a discharge opening in said bottom, said casing being open at the top; a shaft extending upwardly through the aperture in the bottom of said casing; a plurality of solid disk-like plates rigidly attached to said shaft and perpendicular thereto; a plurality of beater blades attached to and spaced at regular intervals around the outer extremity of said plates and disposed substantially parallel to said shaft; a second cylindrically shaped casing open at the top and disposed between said beater blades and said imperforate casing and forming an annular space with said imperforate casing, the bottom of said second casing being a solid plate with an opening for the introduction of air laden with contaminated cotton linters and the side wall of said second casing being a perforate bar screen of elongated, vertically disposed plates spaced to permit passage of cotton linters contaminants between said plates while retaining fibrous cotton linters particles inside said imperforate casing, said bar screen being divided into a plurality of separate sections by a series of baffles vertically spaced and extending inwardly toward said beater blades with the lowermost baffle extending inwardly a shorter distance than the uppermost baffle; a cover disposed above said perforate casing to enclose said annular space and having a diameter greater than the diameter of said perforate casing and having a tangential opening for withdrawing cleaned cotton linters, said cover having a second opening for the introduction of air therethrough; means for introducing air laden with contaminated cotton linters to said perforate casing; and means for rotating said shaft.

5. A cleaner according to claim 4 wherein the lowermost baffle extends inwardly toward the beater blades a distance sufficient to retain cotton linters on the inner surface of that section of the bar screen below said lowermost baffle in an amount sufficient to cover only a portion of the inner surface of that section of the bar screen below said lowermost baffle and the uppermost baffle extends inwardly toward the beater blades a distance sufficient to retain cotton linters on the inner surface of that section of the bar screen between said lowermost and said uppermost baffles in an amount sufficient to cover the entire surface of the section of the bar screen between said lowermost and said uppermost baffles with a solid mat of cotton linters.

6. A cleaner according to claim 4 wherein a sweeping device rotatable in a plane parallel with the bottom of said imperforate casing is disposed in the space between the bottom of said imperforate casing and the bottom of said perforate casing.

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