June 3, 1947. F. E. DEEMS ET AL 2,421,483

COTTON CLEANER

Filed Dec. 28, 1944 3 Sheets-Sheet 1

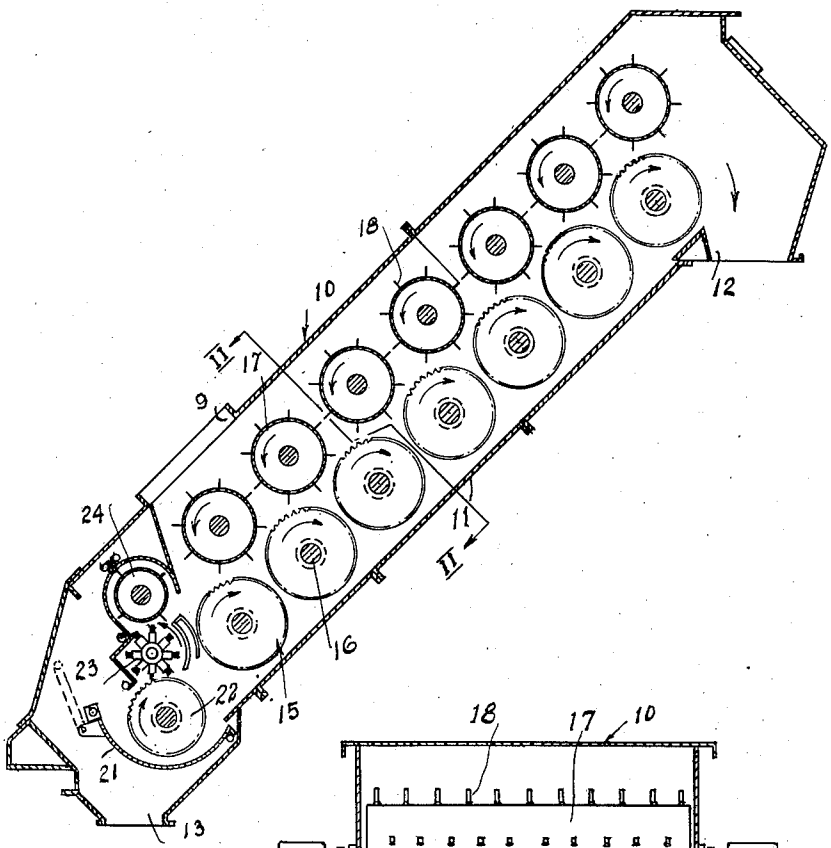


Fig 1

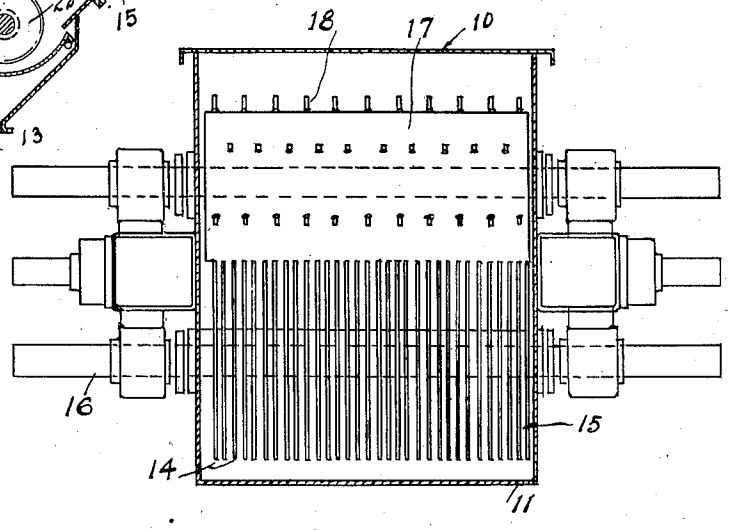


Fig 2

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COTTON CLEANER

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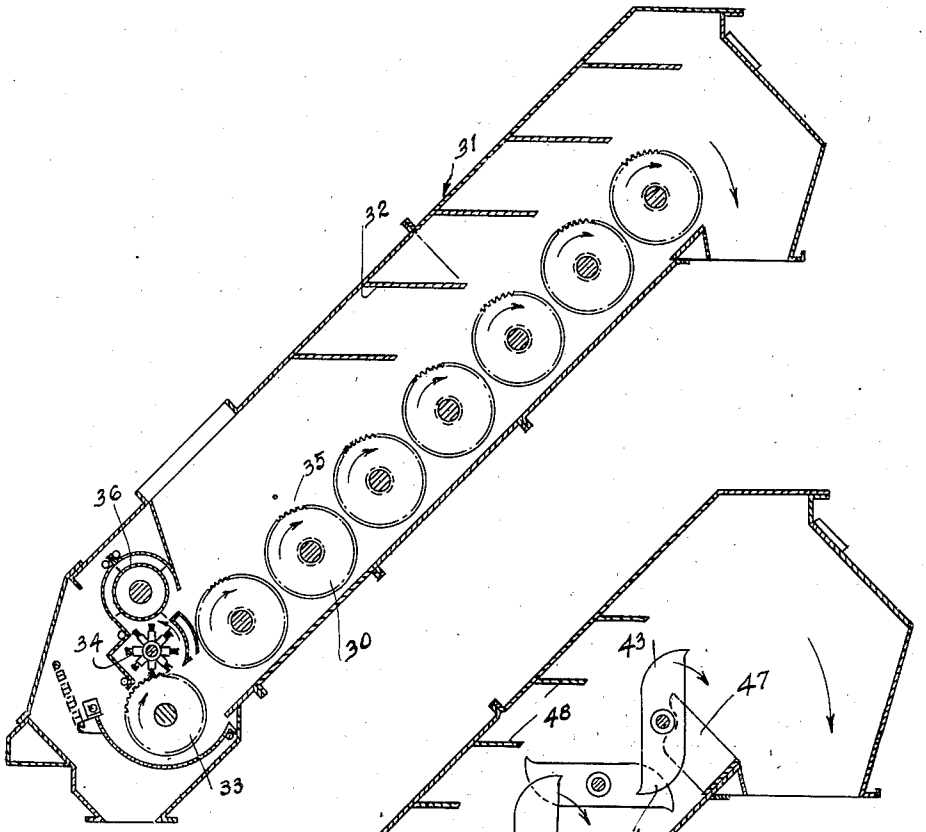


Fig 3

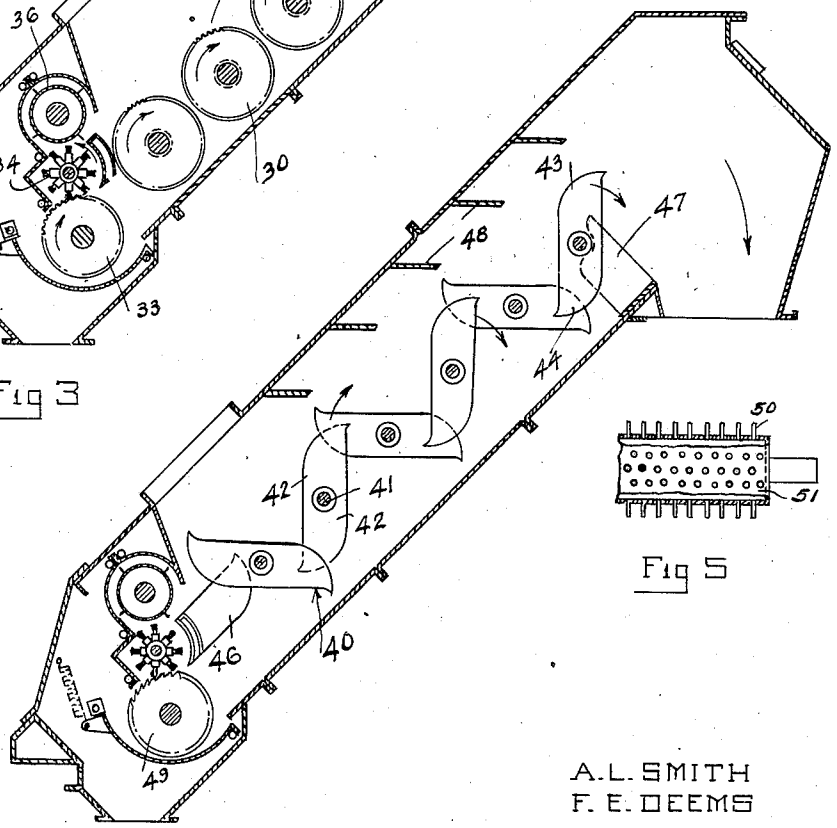


Fig 4

Fig 5

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Filed Dec. 28, 1944 3 Sheets-Sheet 3

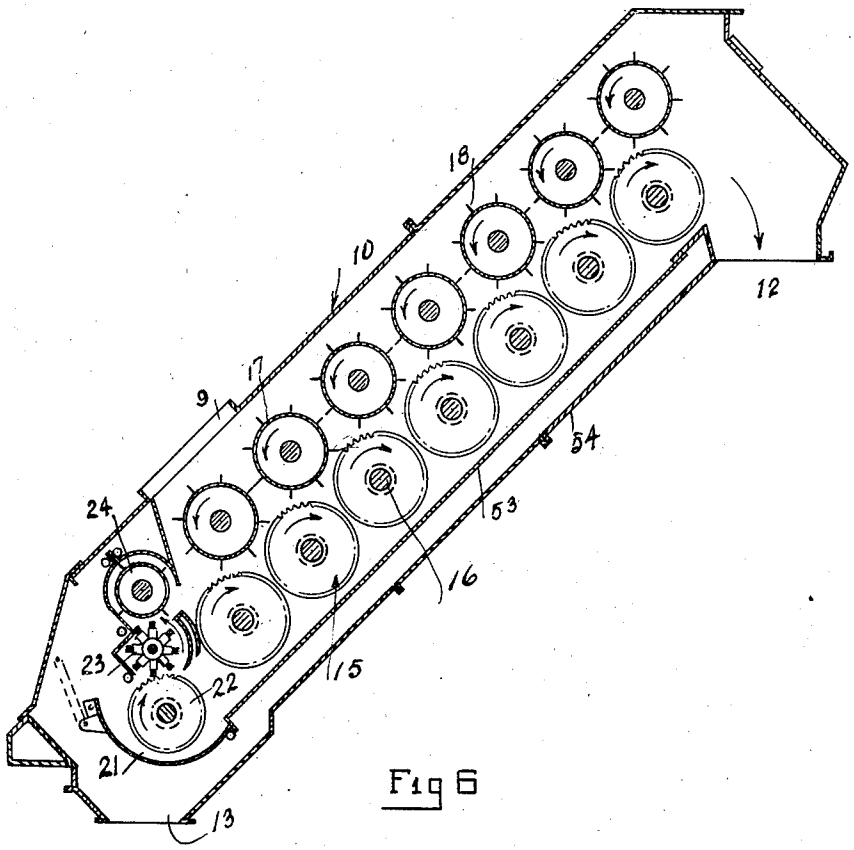


Fig 6

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UNITED STATES PATENT OFFICE

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COTTON CLEANER

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Application December 28, 1944, Serial No. 570,119

8 Claims. (Cl. 19—93)

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This invention relates to cotton cleaners and has for an object the provision of apparatus of the character designated which shall embody a plurality of cleaning cylinders upon which the cotton is supported while being cleaned, and over which it is moved, and has for an object the provision of apparatus of the character designated which shall include improved means for effecting a more thorough separation of the cotton and trash, and shall also include means for reclaiming cotton out of the foreign matter separated initially from the cotton.

A further object of our invention is the provision of cotton cleaning apparatus embodying cleaning elements which shall be especially adapted for separating green leaves and sticks from cotton as it comes from the field.

In the previously filed application of Lucien L. McDaniel and Frank E. Deems, Serial No. 547,371, filed July 31, 1944, and now Patent No. 2,384,383, granted September 4, 1945, assigned to Continental Gin Company, there is shown, described and claimed a cotton cleaner which includes a row of cleaning cylinders each comprising a multiplicity of cleaning elements which are spaced apart sufficiently to permit trash to fall therebetween but are close enough together to support the cotton being cleaned. The cylinders also are similarly spaced apart with respect to each other to permit trash to pass. The apparatus therein disclosed has proved highly efficient in the separation of green leaves and sticks from cotton as it comes from the field, but in operation, a certain amount of cotton passes between the cleaning elements and between the cylinders together with the foreign matter. It is a prime purpose of this invention therefore to provide means for separating cotton out of the trash thus discharged between the cleaning elements and to return the cotton thus reclaimed to the cleaning apparatus for repassage.

In accordance with this invention, we employ similar cleaning cylinders and incline the row of cylinders upwardly. The cotton travels upwardly over the upper surfaces of the row of cylinders, allowing the trash to fall downwardly between the cleaning elements and between the cylinders moving by gravity toward the lower end of the row. At the lower end of the row, we provide a reclaiming saw cylinder together with a doffer and means associated with the doffer to return the cotton to the row of cleaning cylinders. In order to agitate the cotton, we may provide an upper row of agitating cylinders to cooperate with the lower row of cleaning cylinders, as in

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the previously filed application of McDaniel and Deems aforesaid. Furthermore, the elements upon which the cotton is supported while being cleaned may comprise the relatively thin disks hereinbefore mentioned or they may comprise spiked cylinders or disks of a shape other than circular, but which are so shaped and spaced as to support and clean the cotton as it is moved thereover.

Apparatus embodying features of our invention is illustrated in the accompanying drawings, forming a part of this application, in which

Fig. 1 is a longitudinal sectional view showing one form of our apparatus;

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

Fig. 3 is a longitudinal sectional view showing a modified form of apparatus;

Fig. 4 is a detail sectional view showing apparatus embodying a modified form of disks for supporting the cotton as it is being cleaned;

Fig. 5 is a fragmentary sectional view showing a modified form of cleaning cylinder, and

Fig. 6 is a view similar to Fig. 1 showing a still further modified form of our invention.

Referring now particularly to Figs. 1 and 2 of the drawing, we show an elongated upwardly inclined casing 10, having a downwardly slanting bottom 11. Cotton to be cleaned is admitted into the casing through an opening 9 located in the top wall near the lower end of the casing. The cleaned cotton is discharged from the casing through an opening 12 in the bottom, disposed near the upper end of the casing. Dirt and trash separated from the cotton is discharged from the casing through an opening 13 at the extreme lower end of the casing. Disposed within the casing 10 is a row 15 of cleaning cylinders, each comprising a multiplicity of relatively thin metal disks 14 mounted on a shaft 16, and spaced apart on the shaft 16 a sufficient distance to permit trash to fall between the elements but close enough to support the cotton on the upper surface of the cylinder. We have found that a spacing of approximately 3/8 inch gives satisfactory results. The disks 14 are preferably serrated as shown with relatively coarse teeth to aid in moving the cotton upwardly along the upper surfaces of the row of cleaning elements and to aid in agitating the cotton while being cleaned. The cylinders forming the cleaning elements are rotated by any suitable means, not shown, in the directions indicated by the arrows in Fig. 1 so as to carry the cotton from the lower end of the casing toward the upper end.

Mounted above the row of cleaning cylinders just described, is a row of agitating cylinders 17 which are provided with agitating elements which may comprise spikes 18. The row of agitating cylinders 17 is spaced directly above the cleaning cylinders and the cylinders are rotated by any suitable means, not shown, in the directions shown by the arrows, that is, in a direction opposite to the direction of rotation of the cleaning cylinders. Cotton to be cleaned is fed through the opening 9 onto the upper surface of the agitating cylinders 17 and is carried downwardly onto the upper surface of the row of cleaning cylinders 15 and from thence is carried upwardly over the upper surfaces of the cleaning cylinders to the cotton outlet 12. The cleaning cylinders 15 each act to toss the cotton upwardly toward the agitating cylinders, where it is engaged by the spikes 18 and is tossed back against the next succeeding cleaning cylinder. The cotton is thus tossed back and forth between the cleaning and agitating cylinders in its travel from the lower end of the casing toward the upper end. At the same time the cleaning cylinders engage the leaves and trash in the cotton and separate them from the cotton.

Leaves and trash passing between the thin disks 14 of the cleaning cylinders fall downwardly on the bottom 11 of the casing and move downwardly along said bottom to the lower end of the casing. The row of cleaning cylinders 15 is closely spaced with respect to the bottom so that if the trash should bank up on the bottom 11 it will be engaged by a cleaning cylinder and moved downwardly. At the lower end of the casing 10 is a screen 21 and mounted directly over the screen 21 is a reclaiming saw cylinder 22. The saw cylinder 22 is disposed to engage the trash with such cotton as may have passed between the disk 14 and separate the cotton from the trash before it is finally discharged through the screen 21. The cotton separated from the trash is removed from the reclaiming cylinder 22 by means of a doffer cylinder 23 and is carried upwardly to be engaged by a kicker roll 24 which discharges the cotton thus reclaimed onto the cleaning cylinders 15 whereupon it moves over the cleaning cylinders again with the other cotton being introduced through the opening 9.

In Fig. 3 of the drawing we show a modified form of our invention, in which we omit the row of agitating cylinders 17. In accordance with this modification, we provide a row of cleaning cylinders 30 mounted in a casing 31 in a manner similar to the row of cleaning cylinders 15 already described. Each of the cleaning cylinders comprises a multiplicity of relatively thin serrated disks 35 over which the cotton travels to be cleaned, which disks are mounted and spaced similarly to the disks 14 already described. In the upper part of the casing 31, we provide baffle members 32 above the cleaning elements 30, which are so positioned that cotton is thrown upwardly against them by the rapidly rotating cleaning elements, and falls downwardly onto the next succeeding cleaning elements. Adjacent the row of cleaning elements 30, near the lower end thereof, is a reclaiming saw cylinder 33, having a doffer 34 associated therewith, and a kicker roll 36 positioned to return cotton picked up by the reclaiming saw to the row of cleaning cylinders 30. In all other respects this modification is similar to that already described in connection with Figs. 1 and 2.

In Fig. 4 of the drawing, we show a still further modified form of our invention in which the cleaning elements 40 of the cleaning cylinders are mounted on shafts 41, and instead of being circular in shape, are in the form of elongated plates having opposed parallel straight sides 42 and oppositely curved ends 43 and 44. The plates on one shaft 41 extend between the plates on adjacent shafts and are mounted with their longer dimensions at right angles to the plates on adjacent shafts. At the lower end of the row is a stationary assembly of plates 46 cooperating with the lower cleaning cylinder, and at the upper end is a second stationary assembly 47 cooperating with the upper cleaning cylinder to form a continuous supporting surface. There is thus provided a continuous supporting surface for the cotton comprised of thin relatively closely spaced elongated plates. The cleaning cylinders are rapidly rotated in the directions shown by the arrows and act to throw the cotton being cleaned upwardly against baffle members 48 which aid in separating the dirt and trash from the cotton. The row of cleaning cylinders and the casing therefor, in accordance with this modification, are upwardly inclined as in the other modifications hereinbefore described, and a reclaiming saw 49 is located at the lower end of the casing as in the previously described modifications.

In Fig 5 is a still further modified form of cleaning cylinder in which the cleaning elements are in the form of spikes 50, mounted on a drum 51 and so spaced as to provide passage for dirt and trash between them and to provide a supporting surface for the cotton being cleaned.

The apparatus shown in Fig. 6 of the drawing is similar in all respects to that shown in Fig. 1 except that a perforated screen 53 is provided below the cleaning cylinders 15 through which sand, dirt and fine trash separated from the cotton in the cleaning operation can pass and fall on a solid bottom 54, down which it moves by gravity to the outlet 13, without being engaged by the reclaiming saw cylinder 22. The larger trash, sticks and leaves, to which particles of cotton may cling, move down the perforated bottom 53 to the lower end where they are engaged by the reclaiming saw 22.

From the foregoing description, the operation of our improved cotton cleaner will be readily understood. Cotton as it comes from the field containing green leaves, trash, dirt and other foreign matter is fed into the casing through the opening 9, or into a corresponding opening in the modified forms shown, and is caused to travel over the upper surfaces of the cleaning cylinders. In the form shown in Fig. 1 of the drawing the cotton is further agitated by means of the spiked agitating cylinders 17 and as the cotton travels upwardly over the cleaning cylinders 15, the leaves, dirt and trash are separated therefrom and fall downwardly between the cleaning elements onto the bottom 11 of the casing. It there travels by gravity downwardly toward the lower end of the casing, where it is engaged by the reclaiming saw 22 which separates any cotton therefrom that may have accompanied the trash, and the trash passes through the screen 21 to the outlet 13. The cotton separated from the trash by the reclaiming saw 22 is doffed by the doffer 23 and is returned by the kicker roll 24 to the row of cleaning cylinders 15. The cleaned cotton is discharged through the outlet 12 near the upper end of the casing 10. In the form of apparatus shown in Fig. 6 of the draw-

ing the sand, dirt, and fine trash pass through the perforated bottom 54 and thence down to the outlet 13 without being engaged by the reclaiming saw cylinder 22.

The operation of the apparatus shown in Figs. 3 and 4 is similar to that described for Figs. 1 and 2 except that there is omitted the upper row of agitating cylinders 17 and the cotton being cleaned is thrown by action of the cleaning elements up against the baffles 48 in the upper part of the casing, which action aids in separating the dirt and loose trash from the cotton so that it may fall downwardly between the disks as hereinbefore described. In all the forms of our invention it will be seen that the upward inclination of the row of cleaning cylinders and the casing therefor causes the return of the trash to the lower end of the casing where it may be acted upon by the reclaiming saw cylinder.

From the foregoing it will be apparent that we have devised an improved cotton cleaner which embodies cleaning elements in the form of relatively thin, closely spaced disks, so disposed as to provide a supporting surface for the cotton being cleaned as well as an active cleaning mechanism, and provide in association therewith means for reclaiming any cotton which may accompany the trash passing between the closely spaced disks.

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

What we claim is:

1. A cotton cleaner comprising a row of rotary cleaning cylinders each comprising a multiplicity of thin plates spaced to support the cotton and to allow foreign matter removed therefrom to pass down between the plates, means to feed cotton to be cleaned onto the upper surface of the row of cleaning cylinders near one end thereof, means to collect the foreign matter passing between the plates, a reclaiming saw cylinder disposed to act on the foreign matter and reclaim cotton therefrom, said collecting means directing the foreign matter to the reclaiming saw cylinder, and means to remove cotton from the reclaiming saw cylinder and return it to the upper surface of the row of cleaning cylinders.

2. A cotton cleaner comprising an upwardly inclined row of rotary cleaning cylinders each comprising a multiplicity of thin disks spaced to allow trash and other foreign matter removed from the cotton to pass therebetween and disposed to form a supporting and cleaning surface, an upwardly inclined casing for the cleaning cylinders having a feed inlet in the top near the lower end thereof, an outlet for cleaned cotton near the upper end thereof, a reclaiming saw cylinder in the lower end of the casing, means for directing foreign matter which has passed between the disks to the reclaiming saw cylinder, and an outlet for trash at the lower end of the casing.

3. In a cotton cleaner, an upwardly inclined row of rotary cleaning cylinders adapted to support the cotton being cleaned on the upper surfaces of the cylinders and transport it from the lower to the upper end of the row, each of said cylinders comprising a multiplicity of relatively thin disks spaced for the passage of foreign matter between the disks and disposed to support the cotton while it is being cleaned, a cleaner casing having an upwardly inclined bottom down which foreign matter is adapted to move by gravity, an outlet for cleaned cotton at the upper end of the inclined bottom and an outlet for foreign matter at the lower end thereof, a reclaiming saw cylinder adjacent the lower end of the row of cleaning cylinders and disposed to engage trash moving down to the inclined bottom, and means to return reclaimed cotton to the upper surface of the row of cylinders.

4. A cotton cleaner in accordance with claim 1 in which the plates comprising the cleaning cylinders are elongated and are provided with curved ends, and in which baffle means are provided in the upper part of the casing above the row of cylinders against which cotton is thrown by the disks.

5. A cotton cleaner as set forth in claim 3 in which a row of agitating cylinders is provided above the row of cleaning cylinders and extending parallel thereto and disposed to engage and agitate the cotton passing over the row of cleaning cylinders, together with means to feed cotton to be cleaned into the casing onto the row of agitating cylinders to be carried thereby between the rows of cleaning and agitating cylinders.

6. A cotton cleaner comprising an upwardly inclined row of rotary cleaning cylinders each comprising a multiplicity of thin disks having cleaning elements thereon and spaced to allow trash and other foreign matter removed from the cotton to pass therebetween and disposed to form a supporting and cleaning surface, an upwardly inclined casing for the cleaning cylinders having a feed inlet in the top near the lower end thereof, an outlet for cleaned cotton near the upper end thereof and an outlet for trash and other foreign matter near the lower end thereof, an inclined screen disposed immediately below the row of cleaning cylinders and adapted to screen out the sand, dirt and fine trash from the foreign material passing downwardly between the cleaning elements, a reclaiming saw cylinder in the lower end of the casing disposed to act on the trash remaining on said screen and reclaim cotton therefrom, said screen directing the trash thereon to the reclaiming saw cylinder.

7. A cotton cleaner comprising a row of rotary cleaning cylinders each comprising a multiplicity of thin plates spaced to support the cotton being cleaned and to allow foreign matter removed from the cotton to pass down between the plates, means to feed cotton to be cleaned onto the upper surface of the row of cleaning cylinders near one end thereof, a screen disposed beneath the row of cleaning cylinders and adapted to screen out sand, dirt and finer trash from the foreign matter passing between the cleaning elements, means to collect the foreign matter remaining on the screen, a reclaiming saw cylinder disposed to act on said last mentioned foreign matter and reclaim cotton therefrom, said screen directing the trash thereon to the reclaiming saw cylinder, and means to remove cotton from the reclaiming saw cylinder and return it to the upper surface of the row of cleaning cylinders.

8. In a cotton cleaner, a row of rotary cleaning cylinders with the cylinders disposed in closely spaced relation to provide a supporting surface for the cotton as it is being cleaned and to permit the passage of dirt, trash and other foreign matter between the cylinders, each of said cylin-

ders having agitating and cleaning elements thereon spaced to permit the passage of dirt and trash therebetween but close enough to support and form a screen for the cotton being cleaned, means to feed cotton to be cleaned onto the upper surface of the row of cleaning cylinders near one end thereof, means to collect the foreign matter passing between the cleaning elements, a reclaiming saw cylinder disposed to act on the foreign matter and reclaim cotton therefrom, said collecting means directing the foreign matter to the reclaiming saw cylinder, and means to remove cotton from the reclaiming saw cylinder and return it to the upper surface of the row of cleaning cylinders.

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