I. MEURLING.

FEEDING, CLEANING, AND SEPARATING DEVICE.

APPLICATION FILED MAY 8, 1909.

1,100,759. **Patented June 23, 1914.**

3 SHEETS—SHEET 1.

Fig. 1,

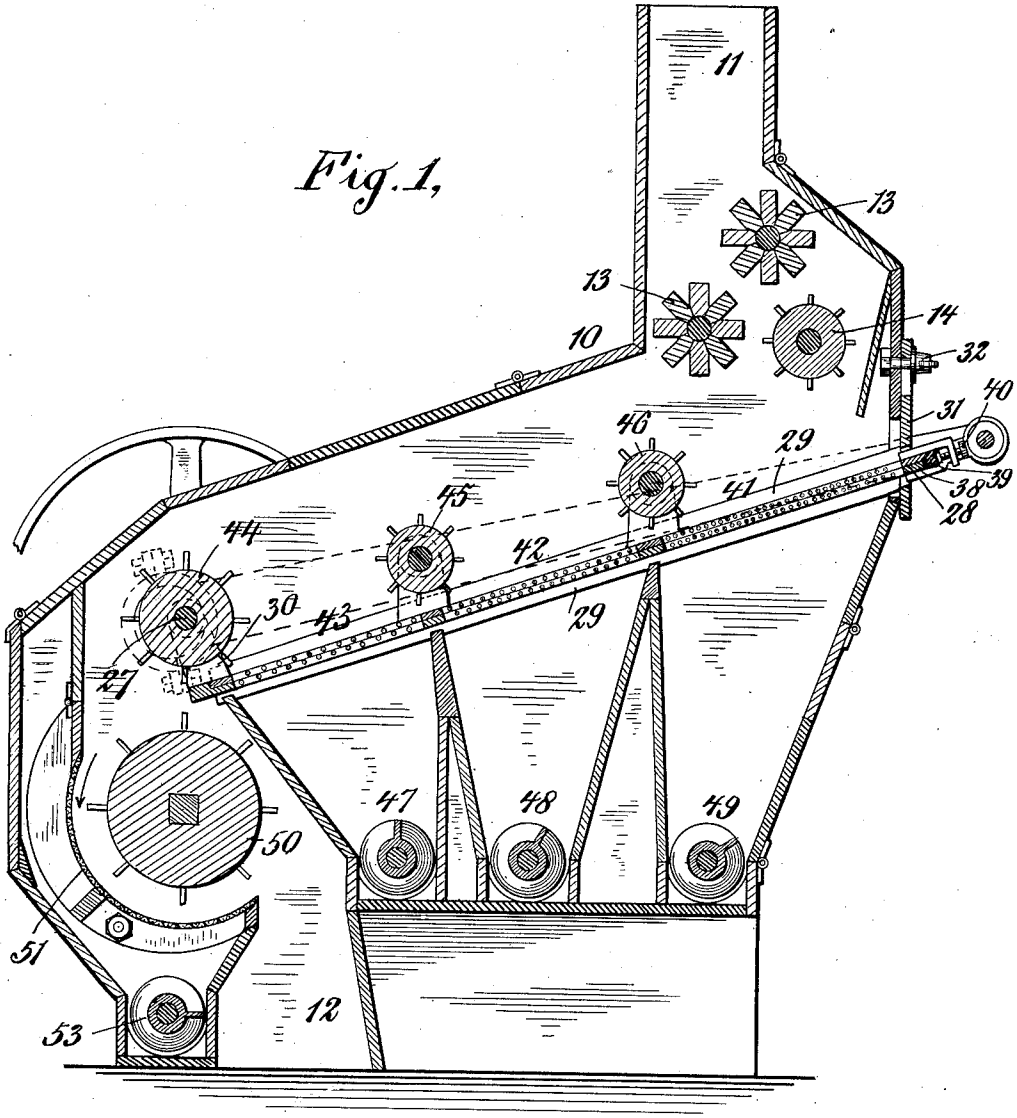


Fig. 4,

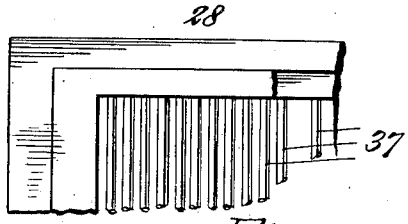
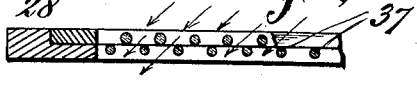


Fig. 5,



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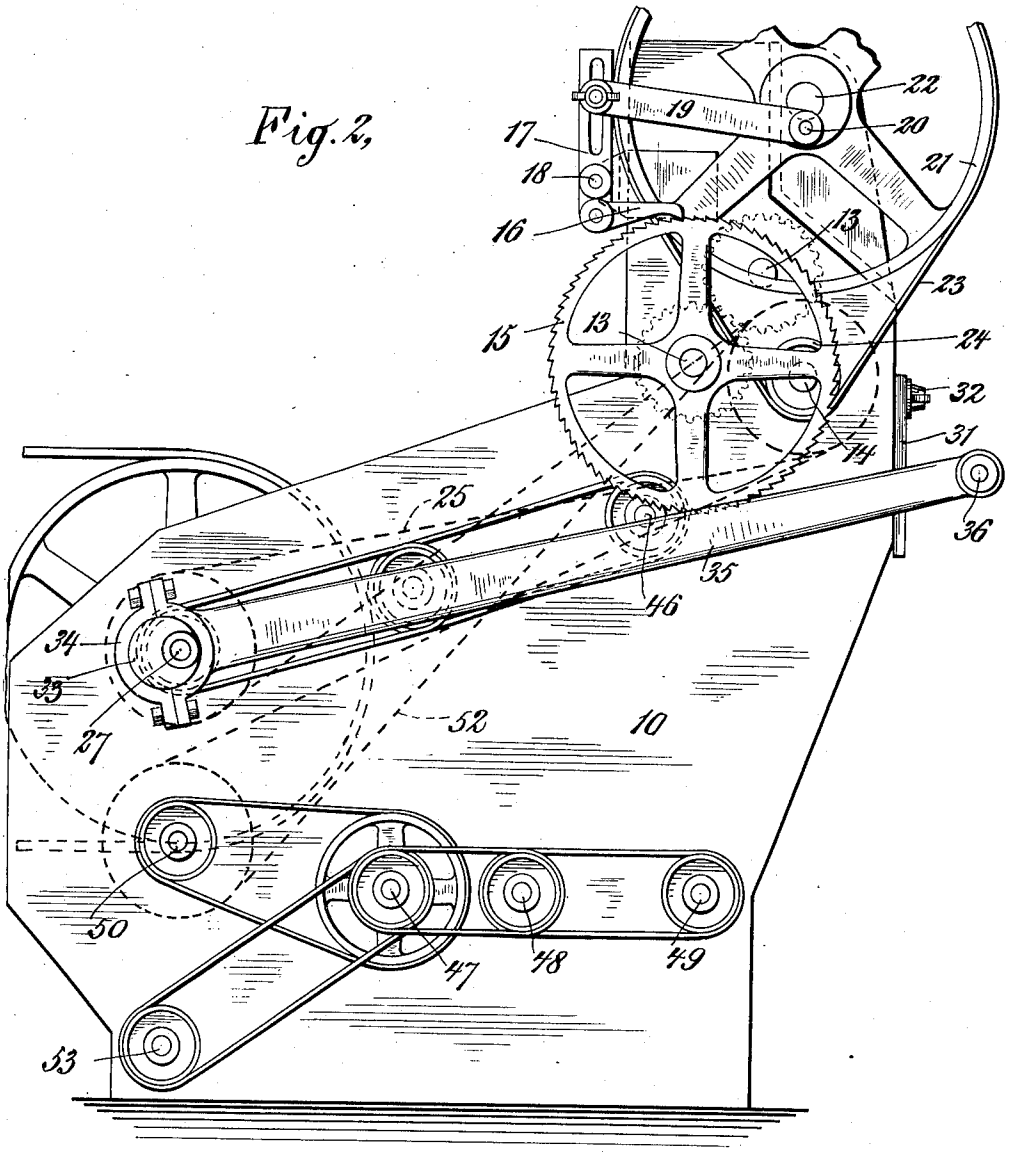
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3 SHEETS—SHEET 2.

Fig. 2.



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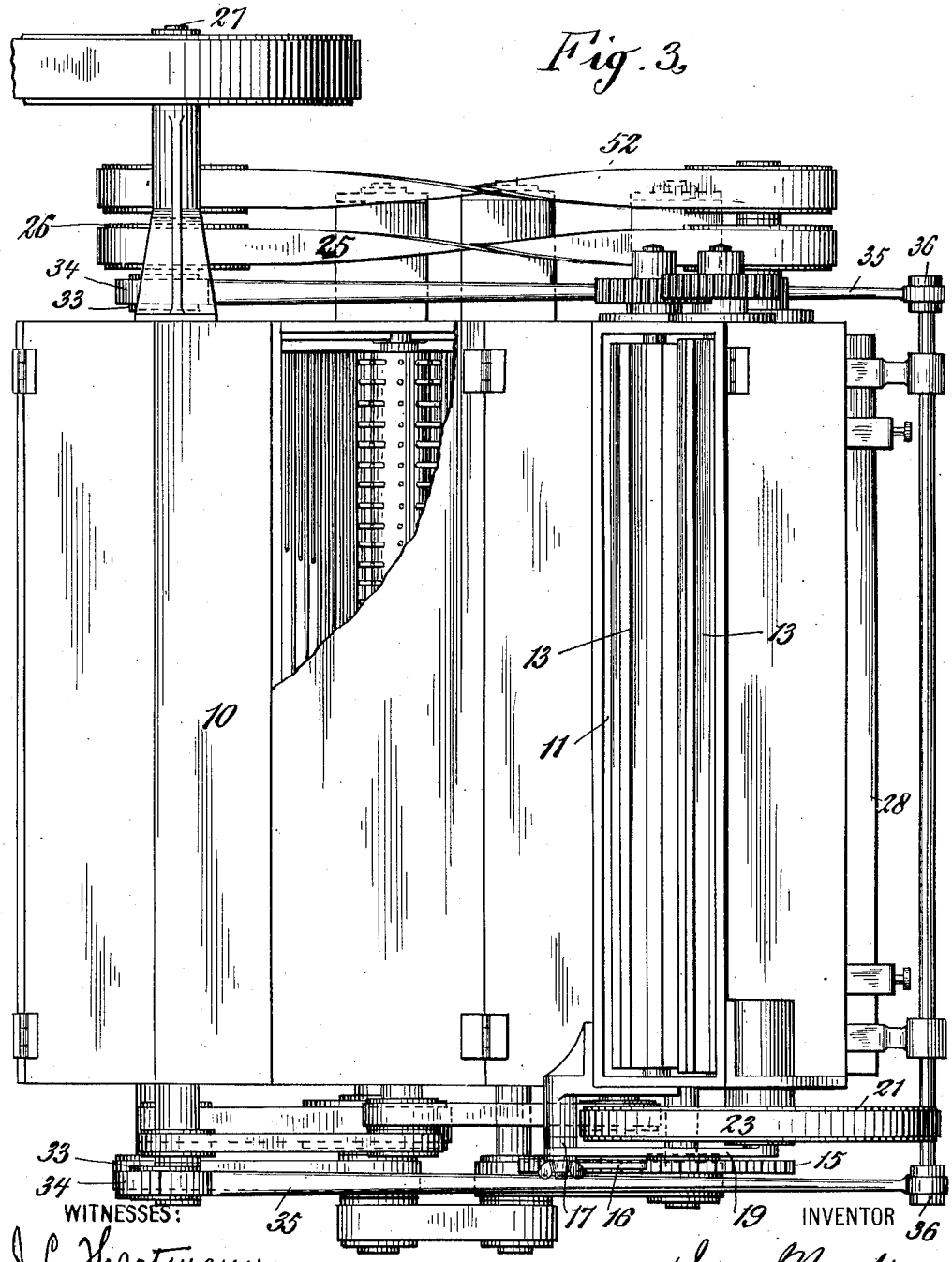
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3 SHEETS—SHEET 3.

Fig. 3.



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UNITED STATES PATENT OFFICE.

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FEEDING, CLEANING, AND SEPARATING DEVICE.

1,100,759. Specification of Letters Patent. **Patented June 23, 1914.**

Application filed May 8, 1909. Serial No. 494,899.

To all whom it may concern:

Be it known that I, IVAR MEURLING, a native of Sweden, but having announced my intention to become a citizen of the United States of America, and a resident of Salem, county of Essex, and State of Massachusetts, have invented certain new and useful Improvements in Feeding, Cleaning, and Separating Devices, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

My invention relates particularly to means for preparing cotton in its raw state for a ginning operation. Cotton in its raw state includes mature cotton fibers with seeds attached thereto, immature locks, parts of locks, sand, dust, leafy trash, and other refuse.

In my present invention I propose to first separate the immature locks, parts of locks, and all seed cotton not fully grown and developed, together with certain refuse, from the mature cotton, and thereafter to remove the sand, dust, leafy trash, and the like, such as normally adheres to the mature cotton fibers, and finally to deliver the mature cotton fibers with their seeds attached, to a cotton gin for a ginning operation.

It is a further object of my invention to separate immature locks and other material so separated into various grades for the reason that the fibers of such material have some value and may be treated thereafter.

To the foregoing ends my invention consists in certain novel elements, combinations of parts, and details of construction, such as will be fully set forth hereinafter, and in order that my invention may be thoroughly understood, I will now describe in detail an embodiment thereof, having reference to the accompanying drawings illustrating the same, and will then point out the novel features in claims.

In the drawings: Figure 1 is a view in transverse vertical section through a feeder, cleaner, and separator embodying my invention. Fig. 2 is a view in side elevation thereof. Fig. 3 is a top view of the apparatus, with certain parts broken away. Figs. 4 and 5 are detail views on an enlarged scale of a part of the separating screen.

The apparatus includes an inclosing casing 10, the upper end of which has a receiving mouth 11 for receiving raw cotton, and the lower end of which has a discharge mouth 12 for delivering the cleaned cotton to a gin, or to a collector and distributer, to be later delivered to a gin or gins. A feeding means is provided in the upper end of the casing, the said feeding means comprising, in the present instance, two fluted feed rolls 13 which are mounted in proximity to the receiving mouth, and a picker roll 14, mounted just to the rear of the said feed rolls. The feed rolls are given a step by step movement by means of a ratchet and pawl mechanism comprising a ratchet 15 mounted upon the shaft of the lower feed roll 13 and a pawl 16 mounted upon a vibrating lever 17 pivoted at 18 and to which movements of oscillation are imparted by means of a link 19 which connects one arm of the said lever 17 with a crank pin 20 upon a pulley 21 which is mounted upon a stationary stud 22 upon the side of the casing. Rotary movements are imparted to the pulley 21 by means of a belt connection 23 with a small pulley 24 which is secured to the shaft of the picker roll 14, and rotary movements are imparted to the said picker roll and its shaft by means of a belt connection 25 with a pulley 26 upon the main shaft 27.

Located beneath the feed rolls 13 and the picker roll 14 is a vibratory screen 28. This screen is disposed at an angle to the horizontal, the upper end thereof being located in proximity to the picker roll 14 and the direction of rotation of the picker roll is such as to deliver material directly to the extreme upper end of the screen. The said screen is mounted to vibrate longitudinally in suitable guideways 29, the said guideways being suspended at their lower ends by means of brackets 30 upon the drive shaft 27, and supported at their upper ends by means of a vertically adjustable plate 31 which is held in position against the rear of the casing by means of bolts 32. The holes in the plate 31, through which the bolts 32 pass, are slotted so that the plate may be vertically adjusted to thereby adjust the upper end of the guideways, the said guideways swinging freely from their support upon the shaft 27 for this purpose. Vibratory movements are imparted to the screen 28 by means of an eccentric 33 mounted upon the shaft 27, the said eccentric being provided with a strap 34 and an eccentric

rod 35 which at its free end connects at 36 with the upper extremity of the screen 28. It will be noted that the arrangement of these parts is such that their operation is in no way affected by the vertical adjustment of the plate 31.

The screen 28 comprises a plurality of transversely arranged rods 37 constituting a grid, (as distinguished from a lattice or mesh,) and every other rod is preferably arranged in a portion of the screen adjustable with respect to the other portion thereof whereby the distance between the said rods may be adjusted. The alternate rods are preferably off-set with respect to each other,—that is to say, they are arranged in two different planes whereby the screen comprises in effect a plurality of pairs of rods, which are in the path of the material as it moves down the screen. Thus the material will have a tendency to fall between each such pair of rods, but not between the rods of adjacent pairs, as will be readily understood by reference to Fig. 5 of the drawings,—it being borne in mind that the screen is disposed at an angle to the horizontal, and that there is a constant movement of the material forwardly over the screen. The tendency of this forward movement, coupled with the force of gravity, projects the material through the screen substantially in the direction shown by the arrows in Fig. 5. Thus by adjusting the rods of each pair with respect to each other the desired adjustment is obtained, the reverse adjustment of the rods of adjacent pairs thus effected at the same time being substantially immaterial in the operation of the device, because of the fact just above stated, that substantially no material passes down between them. I have provided the frame members of the screen with portions 38—39 and adjusting screws 40 between them by which the aforesaid adjustment may be effected.

The screen may be conveniently divided up into two or more sections, and in the present example of my invention I have shown the said screen as divided up into three sections 41—42—43, the section 41 comprising rods which are quite close together, the portion 42 comprising rods which are somewhat wider apart, and the section 43 comprising rods which are still farther apart. Thus the section 41 constitutes a fine screen, the section 42 a medium screen, and the section 43 a coarse screen.

Mounted upon the main shaft 27 in proximity to the lower end of the screen is a picker roll 44, the said screen being arranged substantially tangent to the circumferential edges of the pins of the said roller. The direction of rotation of the drive shaft and hence of the said picker roll is in the direction of the arrow shown against the said roll in Fig. 1,—in other words, in a direction to constantly throw material which is working down upon the screen upward thereon. It may be here noted that the belt 25, from which driving movements are imparted to the first mentioned picker roll 14, is crossed, whereby to impart movements in the proper direction to the said picker roll. If desired other picker rolls 45—46 may be employed in connection with the screen 28, the said picker rollers being arranged respectively at the lower ends of the sections 42 and 41, but either or both of these rolls may be omitted, if desired. Where used the bearings for the said rolls 45 and 46 will be mounted on a part movable with the guideways 29 so that they will partake of the angular adjustment of the slide, and they may be driven by suitable belt connections with the main picker roll shaft 27. Beneath the screen I provide conveyers 47—48—49, one for each section of the screen employed, for the purpose of conveying away material which passes through the said screen.

Beneath the picker roll 44, I provide a fan roll 50, and in conjunction therewith I provide a screen 51 conveniently of the wire mesh variety, the said screen being curved concentrically with the axis of the rotation of the fan roll 50 and extending for some distance around the periphery thereof. The fan roll 50 is driven by means of a belt connection 52.

Beneath the screen 51 is a screw conveyer 53 for carrying away the material delivered through the said screen, and I have provided suitable belt connections from the shaft of the fan roll 50 to the said screw conveyer 53 and to the screw conveyers 47—48—49 for driving the same.

The operation of the device is as follows: Raw cotton including mature cotton fibers with seeds attached, immature locks, sand, dust, leafy trash, and other refuse, is received within the mouth 11 and fed forward gradually by the feed rollers 13 to the picker roll 14. The picker roll 14, which revolves quite rapidly, delivers all the material thus fed to it, to the extreme upper end of the screen 28. The screen is being rapidly vibrated, and the material thus delivered to the screen will be tumbled gradually down the screen until it reaches the first picker roll. If a picker roll 46 is employed this picker roll will tend to throw the material back upon the upper portion of the section 41 of the screen so as to cause the same to be repeatedly acted upon by the screen, the material rejected by the said screen section, being, however, carried over little by little by the said picker roll and delivered upon the section 42 at the opposite side thereof. The material will then work down the section 42 until it reaches the end thereof, and if a roller 45 be provided, the material will be treated in the

same way as it was treated by the roller 46. Thereafter the material will work down the section 43 until it reaches the picker roll 44. The section of the screen 41 is designed to be so fine as to only permit sand, dust, leafy trash, and the like to pass through it, whereby the cotton will be cleaned of the free refuse which has been carried therewith, but the undeveloped cotton will be carried with the mature fibers to the section 42. The material carried away by the conveyer 49 is therefore waste material. In passing over the screen sections 42—43 the immature locks, parts of locks, and other undeveloped seed cotton will be delivered through the screens, being divided by the said screen sections 42 and 43 into two grades and carried away in this graded and classified condition by the conveyers 47 and 48. The fluffy mature seed cotton with the seeds attached will now be delivered by the picker roll 44 to the fan roll 50, and the fan roll in its rotation will rub the same against the screen 41 to thereby free the same from sand, dust, and leafy trash, such as has adhered so closely thereto as to have resisted the beforementioned screening operation. It will be realized that the screening operation performed upon the screen 28 is a tumbling operation only, such as is produced by the rapid reciprocation of the angularly arranged screen. It is necessary to be careful that no violent action take place until after the immature locks have been separated from the mature cotton, because otherwise the immature locks might readily be opened and the partially mature cotton freed therefrom whereby it might become so mixed with the mature fibers as to be carried over therewith. After the immature cotton has, however, been separated from the mature fibers a more severe screening action may readily be imparted thereto and it is such an action which is imparted by the coaction of the fan roller 50 with the screen 51 whereby dust, sand, leafy trash, and other fine refuse is cleared therefrom and forced through the screen 51 to be carried away by the conveyer 53. The immature cotton fibers with the seeds attached are delivered through the mouth 12 and are then ready to be received by a gin for a ginning operation to remove the seeds. The material delivered by the conveyers 47 and 48 is also received for further treatment, while the material delivered by the conveyers 49 and 53 is thrown away.

What I claim is:

1. Apparatus of the class described comprising an inclined screen composed of a plurality of transverse bars constituting a grid, said screen being divided into a plurality of sections, the bars of which are arranged at progressively greater distances apart, and being spaced apart a distance sufficient to permit immature locks to pass between them, means for feeding raw cotton to the screen, and means for vibrating said screen, in a direction transverse with respect of said bars.

2. Apparatus of the class described comprising an inclined screen composed of a plurality of transverse bars constituting a grid, said screen being divided into a plurality of sections, the bars of which are arranged at progressively greater distances apart, means for relatively adjusting alternate bars with respect to the bars between them, means for feeding raw cotton to the screen, and means for vibrating said screen, in a direction transverse with respect of said bars.

3. Apparatus of the class described comprising a feeding means, a vibratory screen section for cleaning the material of fine loose waste matter, another vibratory screen section for separating immature locks and parts of locks from the developed fibers, a fixed screen, and means moving in proximity to said fixed screen to rub the mature cotton fibers against the same to force fine waste matter through the screen.

4. Apparatus of the class described comprising a feeding means, a vibratory screen section for cleaning the material of fine loose waste matter, a plurality of vibratory screen sections in advance of the first said section for separating immature locks from mature cotton fibers, said screen sections being progressively coarser whereby the matter removed is graded and classified; a fixed screen, and means moving in proximity to said fixed screen to rub the mature cotton fibers against the same to force fine waste matter through said screen.

5. Apparatus of the class described comprising a feeding means, an inclined vibratory screen comprising a section for cleaning the material of fine loose waste matter, a plurality of other sections for separating immature locks from mature cotton fibers, said screen sections being progressively coarser whereby the matter removed is graded and classified, a rotary picker roll located near the lower end of said vibratory screen, a fine wire mesh screen arranged beyond said picker roller and a fan roller arranged to rotate in close proximity to said wire mesh screen and to carry material fed thereto by the picker roll between itself and the screen.

6. Apparatus of the class described comprising an inclined screen having a plurality of progressively coarser sections, picker rolls arranged to rotate in proximity to the face of said screen, located at substantially the lower end of each section, means for feeding raw cotton to the upper end of the first section, and means for vibrating said screen.

7. Apparatus of the class described com-

prising an inclined screen having a plurality of progressively coarser sections, picker rolls arranged to rotate in proximity to the face of said screen, located at substantially the lower end of each section, means for feeding raw cotton to the upper end of the first section, means for vibrating said screen, and means for adjusting the angular position of said screen.

8. Apparatus of the class described comprising an inclined screen having a plurality of progressively coarser sections, picker rolls arranged to rotate in proximity to the face of said screen located at substantially the lower end of each section, means for feeding raw cotton to the upper end of the first section, means for vibrating said screen, a fine stationary wire mesh screen arranged beyond said picker rolls, and a roller arranged to rotate in close proximity to said wire mesh screen and to carry material fed thereto by the lowermost picker roll, between itself and the screen.

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."