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No. 822,864.

PATENTED JUNE 5, 1906.

W. A. PATTERSON.
COTTON SEPARATOR.
APPLICATION FILED MAY 22, 1905.

4 SHEETS—SHEET 1.

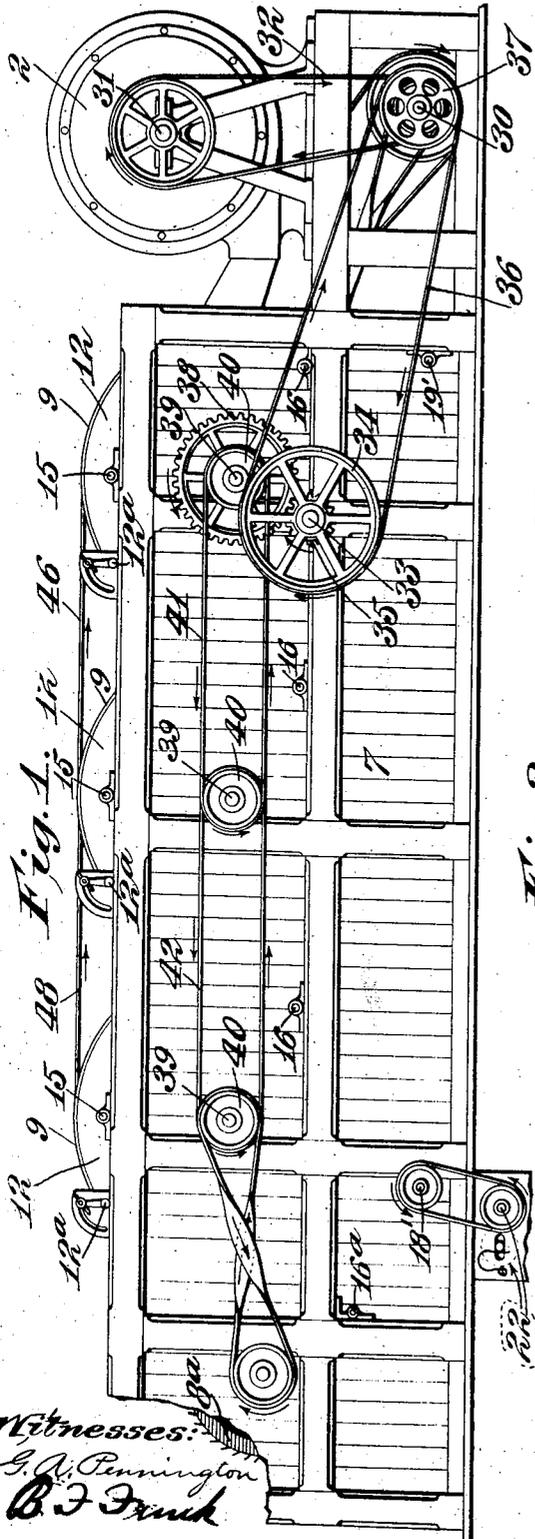


Fig. 1.

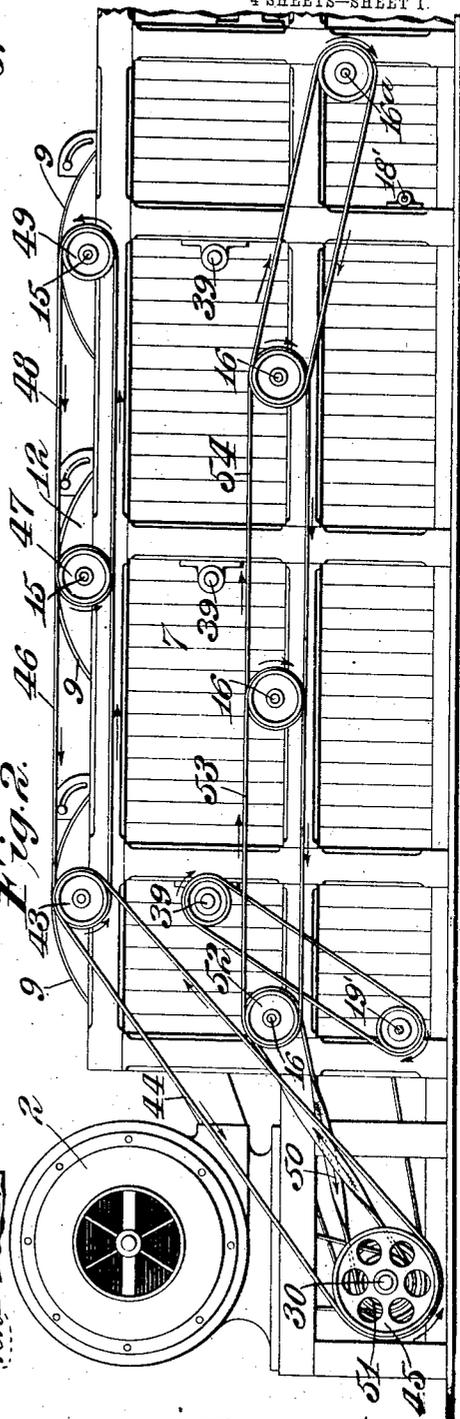


Fig. 2.

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C. J. Frank

Inventor:
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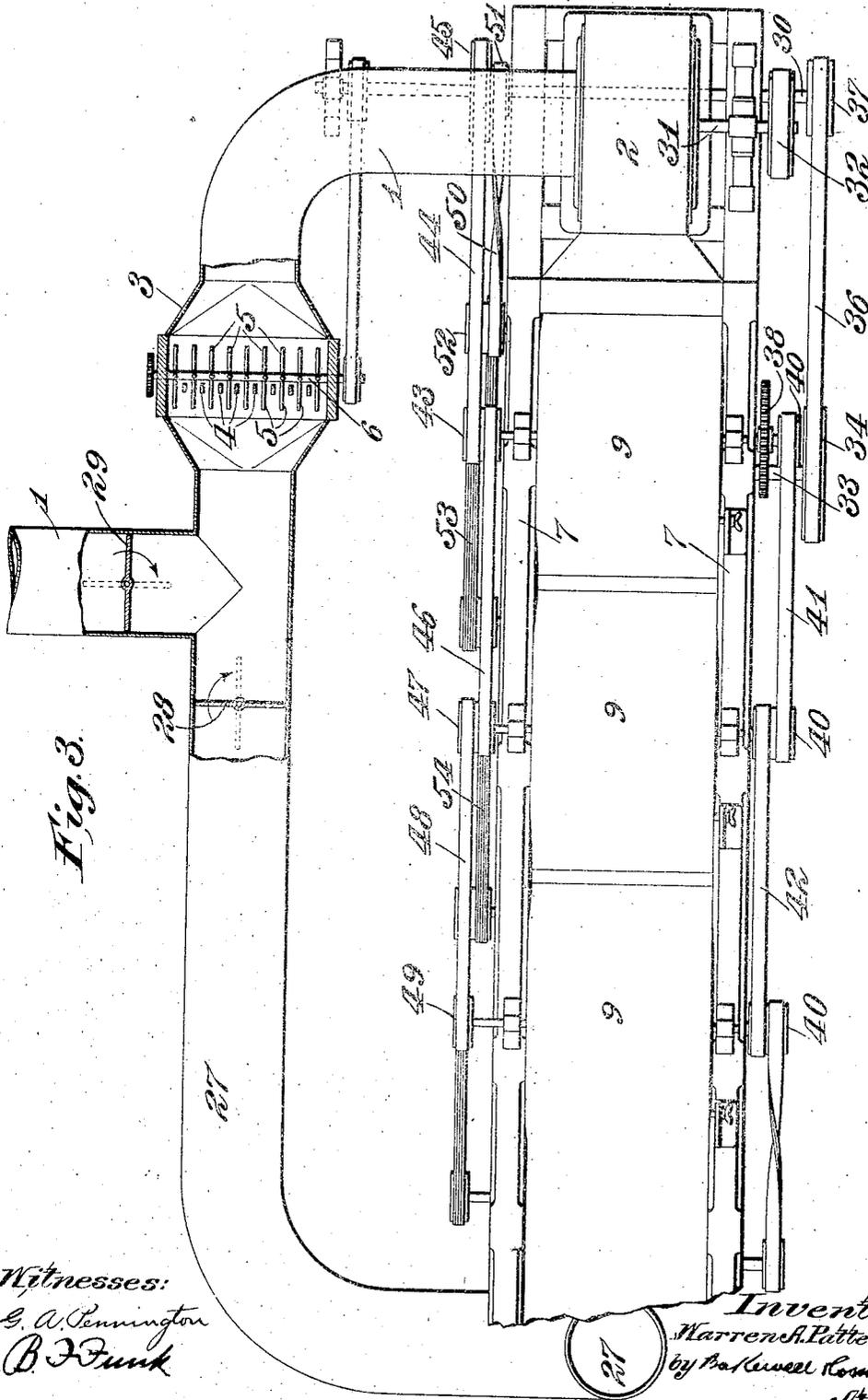


Fig. 3.

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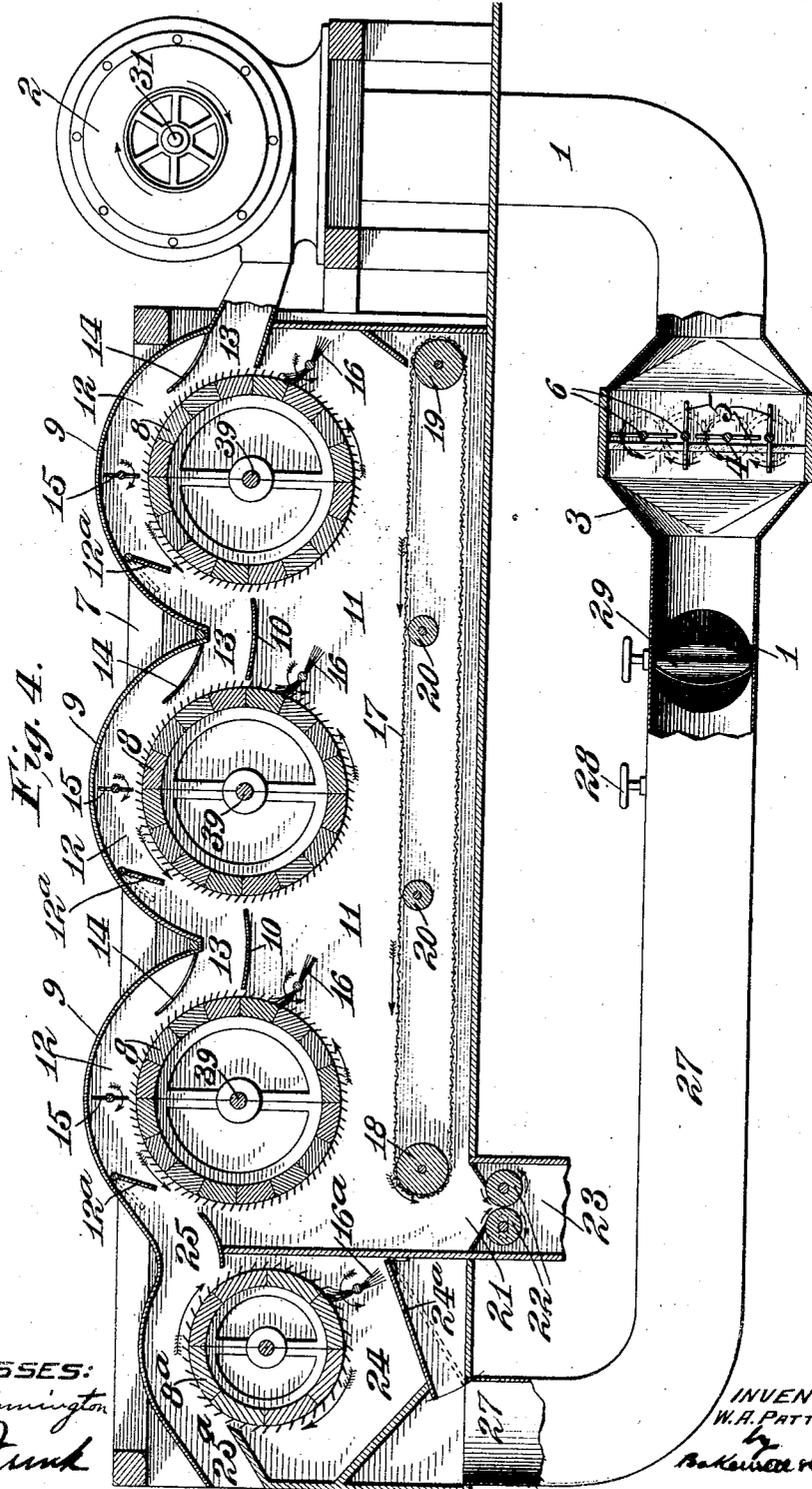


Fig. 4.

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4 SHEETS—SHEET 4.

Fig. 5.

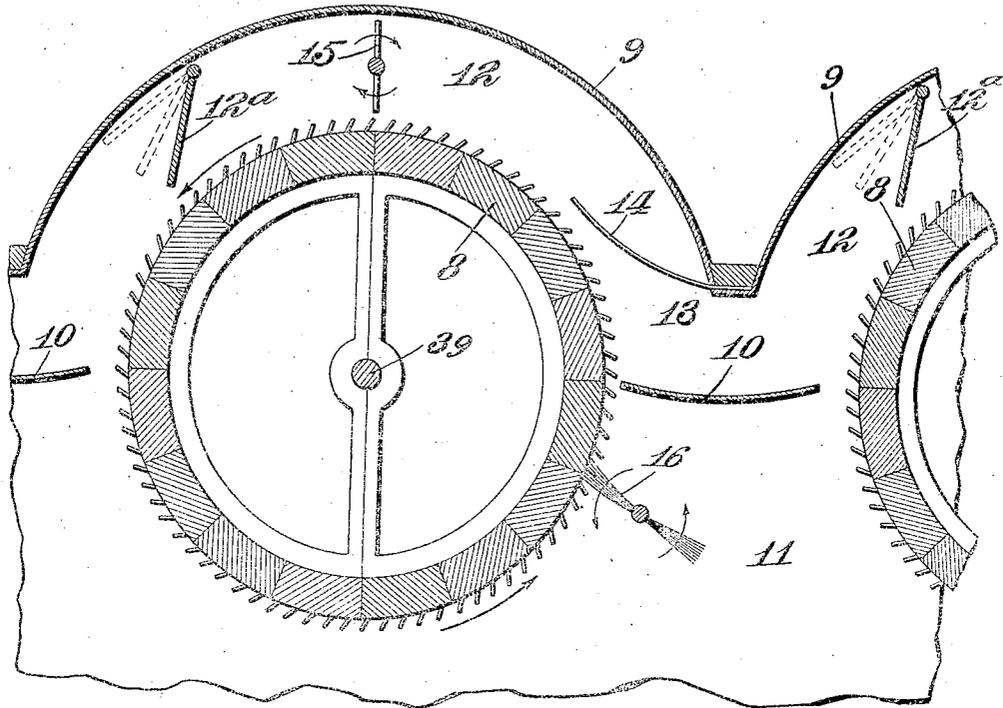


Fig. 6.

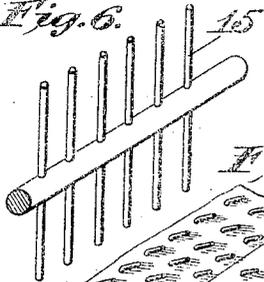


Fig. 7.

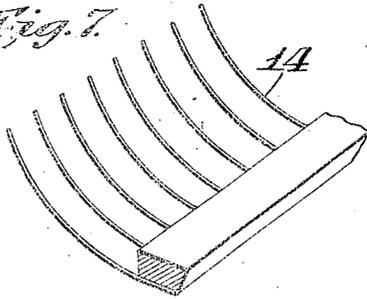


Fig. 8.

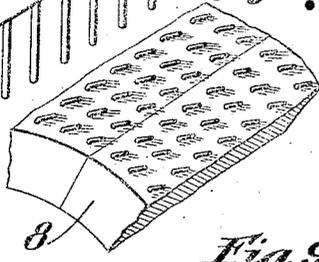
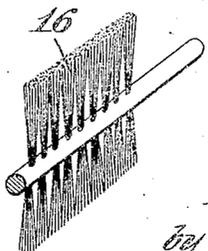


Fig. 9.



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UNITED STATES PATENT OFFICE.

WARREN A. PATTERSON, OF ST. LOUIS, MISSOURI, ASSIGNOR TO AMERICAN COTTON SEPARATOR COMPANY, OF ST. LOUIS, MISSOURI, A CORPORATION OF OKLAHOMA TERRITORY.

COTTON-SEPARATOR.

No. 822,884.

Specification of Letters Patent.

Patented June 5, 1906.

Application filed May 23, 1906. Serial No. 261,726.

To all whom it may concern:

Be it known that I, WARREN A. PATTERSON, a citizen of the United States, residing at St. Louis, Missouri, have invented a certain new and useful Improvement in Cotton-Separators, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a side elevational view of a cotton-separator constructed in accordance with my invention. Fig. 2 is a side elevational view of the cotton-separator, the view being taken on the side opposite to the side illustrated in Fig. 1. Fig. 3 is a top plan view of the separator, partly in section. Fig. 4 is a vertical longitudinal sectional view through the separator, part of the pneumatic conveyer mechanism being shown in elevation. Fig. 5 is an enlarged fragmentary sectional view through the casing, showing the comb, the carrying-cylinder, and the brush. Fig. 6 is a fragmentary perspective view of one of the boll-agitators. Fig. 7 is a fragmentary view of one of the combs. Fig. 8 is a fragmentary view of a part of one of the carrier-cylinders, and Fig. 9 is a detail perspective view of one of the brushes.

This invention relates to an improvement in removing cotton from the bolls preparatory to ginning it. In the process of picking cotton by hand the cotton is usually removed from the pod or boll in the field. This is a tedious and slow method, and it is the purpose of my invention to provide a machine which is capable of mechanically removing the cotton from the pod, it being understood that the cotton may be picked from the plant with the pods thereon.

It is also the purpose of my invention to provide means whereby the pods, leaf trash, notes, and other foreign matter may be worked over, so as to save all of the lint.

Other objects and advantages, as well as the novel details of construction, of this invention, will be specifically described hereinafter, it being understood that changes in form, proportion, and minor details of construction may be resorted to without departing from the spirit of the invention or sacrificing any of the advantages thereof.

In order to convey a definite idea of the structure of the preferred form of my machine, I will describe the various steps of the process carried out thereby in their proper order of sequence, and the mechanism whereby the steps are accomplished.

The cotton is first picked from the plants with the pods and introduced into the open end of a pneumatic conveyer-tube 1, in the path of which is a suction fan or blower 2. In the path of the tube is an agitator-casing 3, communicating with said tube and having therein a grid comprising spaced bars 4, between which pass a plurality of oppositely-rotatable fingers 5 on agitator-shafts 6. The fingers are so arranged that the arcs of rotation of the free ends of one set of fingers overlap the arcs of rotation of the fingers on the adjacent agitator-shaft. This boll-agitator may or may not be employed, but where employed the bolls will be forced against the grid in such a manner that the fingers will subject them to a severe threshing, whereby the outside covering or boll-pod will be loosened from around the cotton. The blower 2 communicates with a casing 7, in which are a plurality of separator-cylinders 8, spaced suitable distances apart in the casing 7 and arranged transversely thereof, the peripheries of said cylinders being preferably parallel with the top 9 of said casing.

Between the respective cylinders are partitions 10, constituting mote-boards, which partitions serve a dual purpose. They not only act as mote-boards to receive the leaf trash, dust, bolls, and such like foreign substances which have been removed from the cotton, but they also serve the purpose of partitioning off the air-blast, so as to provide a "dead-chamber" 11 within the casing 7 and below the cylinders. The separator-cylinders 8 are provided with a number of rearwardly-disposed pins or teeth. In actual practice I prefer to have approximately eleven thousand teeth on each cylinder; but the number may be varied, if desired. Inasmuch as the top of the casing is parallel with the peripheries of each of the separator-cylinders, separating-chambers 12 are formed adjacent to each of the cylinders, and each separating-chamber has an inlet-opening 13. At the inlet-opening of each separating-chamber is a comb having upwardly-directed teeth 14,

which terminate adjacent to the teeth on the cylinders 8. Immediately above each cylinder 8 is a beater 15, comprising a shaft having a plurality of diametrically oppositely disposed teeth, and below the partitions 10 and within the dead-chamber are cotton-removing devices, illustrated as brushes 16, which are secured to shafts driven by appropriate means. Below the respective cylinders and within the dead-chamber is a conveyer comprising an endless belt 17, passing over the rollers 18 and 19, mounted on shafts 18' and 19' at the respective ends of the conveyer and over the intermediate idlers 20. At the discharge end of the conveyer 17 is a hopper 21, the bottom of which is closed by yielding rollers 22, which have a tendency to rest one against the other, but which may be separated by the cotton as it passes through said hopper into a chute 23, where the cotton will be conveyed to suitable premises provided for its reception.

24 designates an accumulator-receptacle at the end of the casing 7 remote from the blower 2, which receptacle 24 has communication with said casing 7 through an opening 25. The floor of the receptacle is provided with a hinged portion comprising a valve 24^a, which may be dropped in the position indicated in dotted lines to permit the accumulated cotton to pass into the conveyer-tube 1 through the branch tube 27, which branch tube 27 is provided with a valve 28, similar to the valve 29 in the tube 1. Within the receptacle 24 is a rotatable separator-cylinder 8^a, having teeth thereon, which receives the cotton as it is blown through the opening 25 by the blast which exhausts through the exhaust-opening 25^a. As the cotton passes onto the teeth of the roller 8^a it will be removed by the brush 16^a, and in actual practice I prefer to have the first and last cylinders provided with comparatively short teeth, while the intermediate cylinders are provided with comparatively long teeth. The reason for this is that I desire to have the cotton acted upon by all of the cylinders in the machine.

The draft through the separating-chamber 12 may be regulated by the valves 12^a.

30 designates a drive-shaft which may receive its power from any suitable source, and 31 is the drive-shaft of the blower. A belt 32 passes over pulleys on the drive-shafts 30 and 31, whereby the blower-fan will be rotated. On a stub-shaft 33 is a pulley 34 and a pinion 35. A belt 36 passes over the pulley 34 and over a pulley 37 on the drive-shaft 30, so that the rotation of the drive-shaft 30 will impart rotation to the shaft 33. The pinion 35 will impart motion to a gear 38 in mesh therewith, which gear is on one of the shafts 39 of the cylinders 8. Each shaft 39 of each cylinder 8 projects through the casing and carries a pulley 40, the intermediate shaft

carrying two of these. A belt 41 passes over a pulley on the first shaft and over a pulley on the intermediate shaft. A belt 42 passes over a pulley on the intermediate shaft and over a pulley on the last shaft, so that the rotation of the gear-wheel 38 will, through the medium of the belts 41 and 42, impart motion to all of the shafts 39.

43 designates a pulley on the shaft of the first beater 15, around which pulley 43 passes a belt 44, also passing around a pulley 45 on the drive-shaft 30. A belt 46 passes over a pulley 43 and over a pulley 47 on the intermediate beater-shaft, and a belt 48 passes over a pulley 47 and over a pulley 49 on the end beater-shaft, so that all of the beaters will be driven by the belt 44. A belt 50 passes over a pulley 51 on the shaft 30 and over a pulley 52 on the shaft of the first rotary brush 16, and as the shaft of each brush projects through the side of the casing 7 and as each brush-shaft carries a pulley similar to the one designated by the reference-numeral 52 the brushes may be driven from the pulley 52 through the medium of the belts 53 and 54, respectively.

The beaters in the agitating-casing 3 may be driven in any suitable manner, and in order to avoid confusion no detail arrangement of gearing is here illustrated.

It being assumed that all of the parts are properly assembled for proper operation, the steps carried out by the machine for cleaning the cotton will be substantially as follows: The valve 28 will be closed and the valve 29 open. By rotating the shaft 30 all of the co-operating parts of the machine will be started in operation and the blower will suck in the cotton through the tube 1, and in the event that the agitator is utilized the bolls will strike against the grid comprising the bars 4, and, it being understood that the agitators will be driven by appropriate mechanism, the bolls will be agitated by the revolving beaters, so as to loosen the pod-covering or bolls, which will then be drawn in through the blower and introduced into the casing 7. The force of the blower will cause the cotton to intimately contact with the teeth on the first cylinder 8, which cotton will be pressed and combed by the first comb 14, and as the first cylinder continues to rotate the first beater 15 will come in contact with the mass of cotton and foreign matter, and as it is intended to rotate the beaters at a comparatively greater speed than the rotation of the cylinders 8 the threshing action will be exerted against the mass. The speed at which the beaters rotate compared to the speed of rotation of the cylinders 8 is about thirty to one—that is, the cylinders will preferably be arranged to rotate at about fifty revolutions per minute, while the speed of rotation of the beaters will be about fifteen hundred per minute. As the mass is subjected to the action

of the first beater most of the foreign substances will be removed therefrom and pass onto the partition and mote-board 10. The cotton which is held fast to the teeth on the first cylinder 8 will be carried past the mote-board 10 into the dead-chamber 11, where it will be removed by the first brush 16 and dropped onto the constantly-moving conveyer 17. A succession of these operations will be continued, depending upon the number of the cylinders 8 and the complementary parts arranged within the casing 7, until the leaf trash, motes, and other foreign substances are discharged through the opening 25 into the trash-receptacle 24. In each instance some of the cotton will adhere to the cylinder 8 and be removed by one of the brushes 16.

By reference to Fig. 4 it will be observed that a tortuous passage is provided through which the cotton may be blown and that the cleaning action of the cotton takes place as it passes through this tortuous passage. As soon as the cotton has been deposited upon the conveyer 17 it will be carried off and be deposited in the hopper 21 and discharged through the bottom thereof, normally closed by the yielding rollers 22. If for any reason it is found desirable to work over the leaf trash so as to save any of the cotton contained therein, the valve 29 will be closed and the valve 28 opened without disturbing any of the other mechanism of the machine, and the manipulations of the valves thus described will cause the leaf trash to pass through the branch 27 around into the machine and then through the tube 1, where it may be reworked any number of times, so as to save all of the cotton.

The beaters 15 are so disposed with relation to the cylinders that any bolls, motes, &c., which adhere to the teeth of the cylinder 8 and become intermixed with the cotton will be separated from the cotton or so loosened on the cylinder that they will pass therefrom through the tortuous passage heretofore described. In the several figures in which the cylinder 8 appears the teeth are illustrated as being of uniform cross-sectional area.

Attention is called to the fact that the bolls from which all of the cotton has been removed will be forced out through the opening 25^a, and the trash containing particles of lint only will be introduced into the receptacle 24. Thus a large percentage of the leaf trash, bolls, hulls, &c., which enter the machine will be forced out through the opening 25^a, as it will not be necessary or desirable to rework this material.

Having thus described the invention, what is claimed as new, and desired to be secured by Letters Patent, is—

1. A cotton-separator comprising a casing, toothed cylinders in said casing and spaced

apart, partitions between the cylinders and providing upper and lower chambers, means for introducing an air-blast into the upper chamber of the casing, a conveyer beneath the cylinders, and separating devices above the cylinders and in the upper chamber of the casing; substantially as described.

2. A cotton-separator comprising a casing, cylinders in said casing, teeth on said cylinders, the teeth on all of the cylinders being inclined in the same direction, combs above the cylinders, and agitators above the cylinders and in vertical alinement with their axes; substantially as described.

3. A cotton-separator comprising a casing having an air-chamber therein, a chamber beneath the air-chamber and having a conveyer, cylinders working in the said chambers and receiving cotton from one of them and delivering it into the other, and means for receiving the cotton from one end of one of the chambers and introducing it into the other end of said chamber; substantially as described.

4. In a cotton-separator, the combination with a casing having a plurality of cylinders therein for separating cotton from leaf trash, of a conveyer within the casing, a hopper at one end of the casing, a cylinder at one end of the casing and separate from the other cylinders, a receptacle in which said last-named cylinder operates, a valved bottom for the receptacle, and a pipe in communication with the valved receptacle and the casing.

5. A cotton-separator comprising a casing, cylinders in the casing, a cover for the casing parallel with portions of the peripheries of the cylinders, teeth carried by the cylinders, horizontal partitions between the cylinders, combs adjacent said cylinders, a fan in communication with the casing and directing an air-blast between the peripheries of the cylinders and the cover of the casing, and a conveyer beneath the cylinders; substantially as described.

6. In a cotton-separator, the combination with a casing having a plurality of cylinders therein for separating cotton from leaf trash, of a conveyer within the casing and immediately below all of the cylinders, means for removing cotton from the cylinders and permitting it to gravitate onto the conveyer, and a hopper in communication with the casing and at the delivery end of the conveyer; substantially as described.

7. In a cotton-separator, the combination with a casing having a plurality of parallel cylinders therein for separating cotton from leaf trash, a cylinder at one end of the casing and separate from the remaining cylinders, a receptacle in which the cylinder operates, a valved bottom for the receptacle, and a pipe in communication with the valved receptacle for removing cotton therefrom; substantially as described.

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8. In a cotton-separator, the combination with a casing having an entrance-opening, of a plurality of cylinders in said casing for separating cotton from leaf trash, a cylinder separate from the remaining cylinders, a receptacle in which said cylinder operates, said receptacle being in communication with the portion of the casing containing the first-named cylinders, a valved bottom for the receptacle, and a tubular connection between the valved receptacle and the entrance-opening to the casing; substantially as described.

9. In a cotton-separator, the combination with a casing having an entrance-opening and a plurality of cylinders in said casing for separating cotton from leaf trash, a receptacle at one end of the casing for receiving cotton which has not been thoroughly acted upon by the cylinders, and a pipe in communication with said receptacle and the en-

trance-opening to the casing; substantially as described.

10. A cotton-separator comprising a casing, cotton-lint-accumulating cylinders in said casing and spaced apart, partitions between the cylinders and providing upper and lower chambers, means for introducing an air-blast into the upper chamber of the casing, a conveyer beneath the cylinders, and means above the cylinders for contact with the pods to loosen the lint therein as the pods are passed through the casing; substantially as described.

In testimony whereof I hereunto affix my signature, in the presence of two witnesses, this 19th day of May, 1905.

WARREN A. PATTERSON.

Witnesses:

B. F. FRENCH,

GEORGE BAKEWELL.