

No. 645,288.

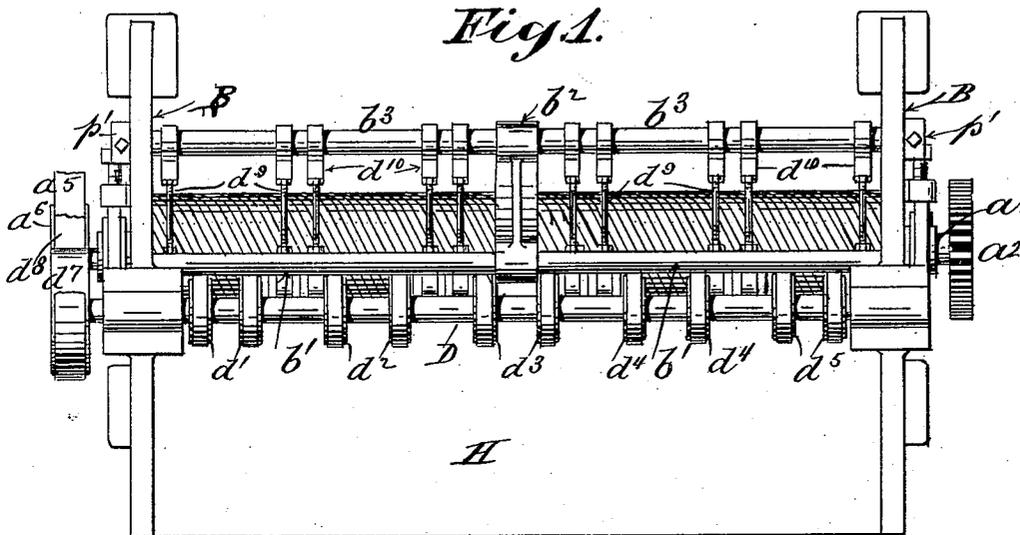
Patented Mar. 13, 1900.

J. E. CHEESMAN.
ROLLER COTTON GIN.

(Application filed Sept. 3, 1898.)

(No Model.)

5 Sheets—Sheet 1.



Witnesses:

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Myra B. Martin
Isaac Sargent

Inventor:

James E. Cheesman
By his attorney
Dallin O. Clark

No. 645,288.

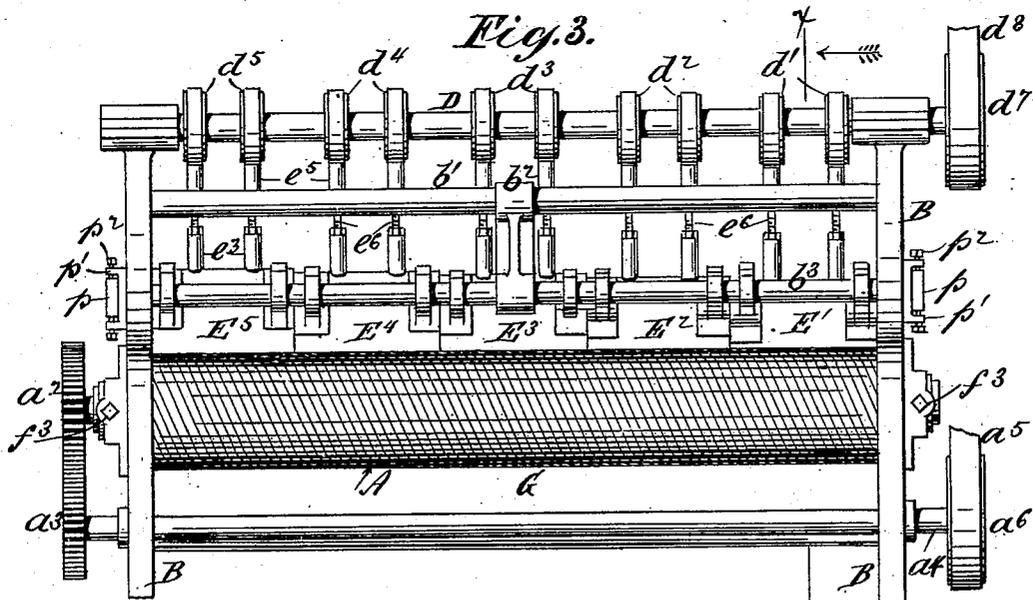
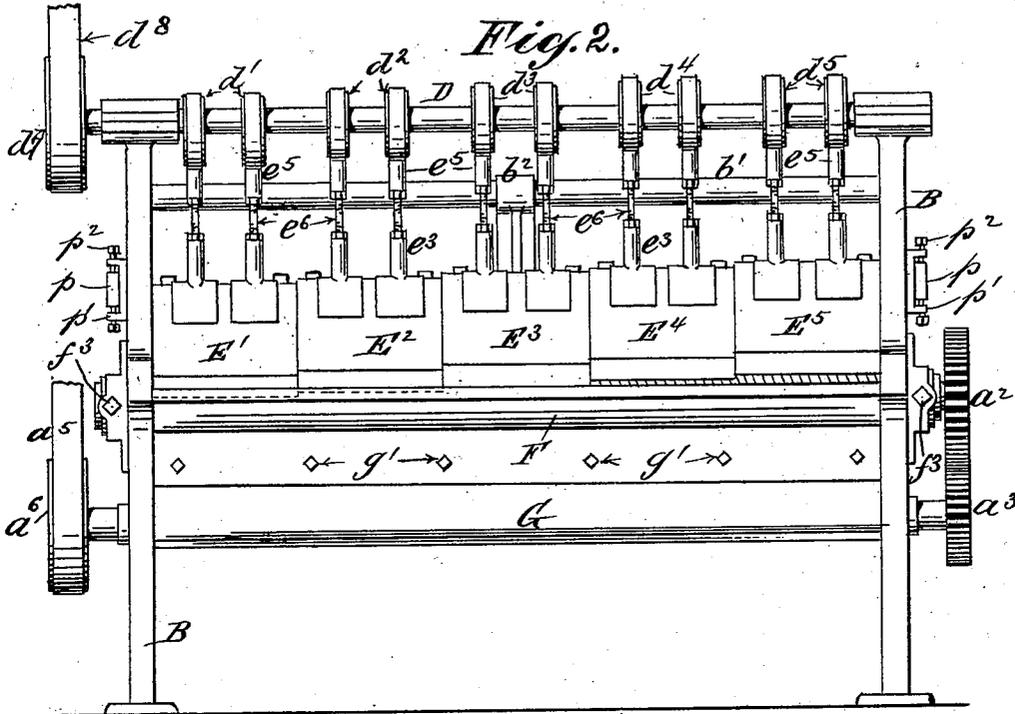
Patented Mar. 13, 1900.

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(Application filed Sept. 3, 1898.)

(No Model.)

5 Sheets—Sheet 2.



Witnesses:

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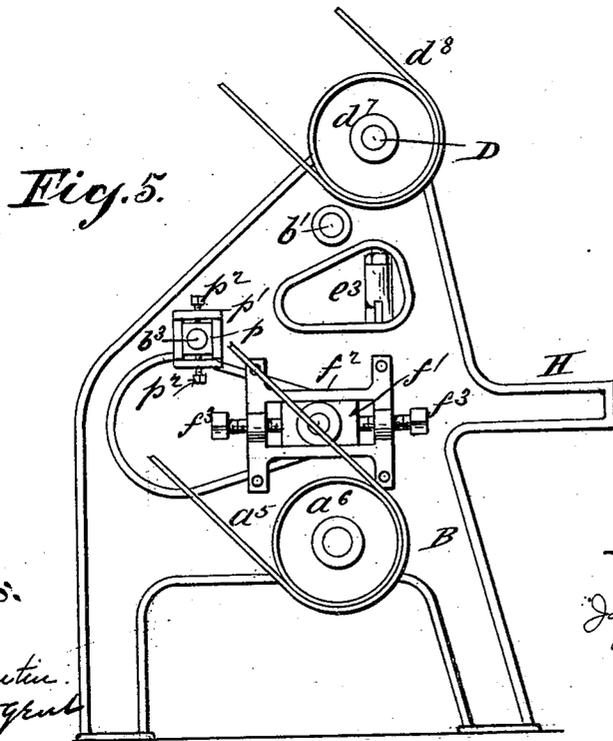
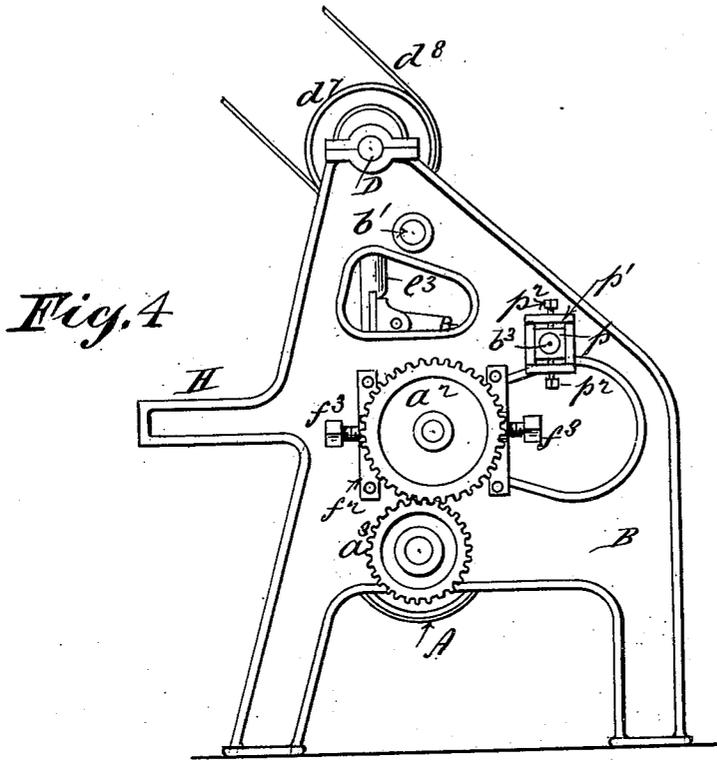
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J. E. CHEESMAN.
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(No Model.)

5 Sheets—Sheet 3.



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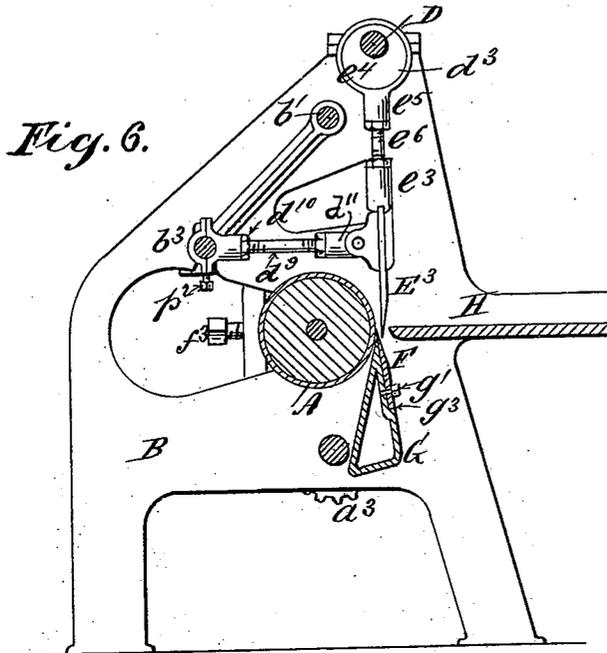
Patented Mar. 13, 1900.

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ROLLER COTTON GIN.

(Application filed Sept. 3, 1898.)

(No Model.)

5 Sheets—Sheet 4.



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No. 645,288.

Patented Mar. 13, 1900.

J. E. CHEESMAN.
ROLLER COTTON GIN.

(Application filed Sept. 3, 1898.)

(No Model.)

5 Sheets—Sheet 5.

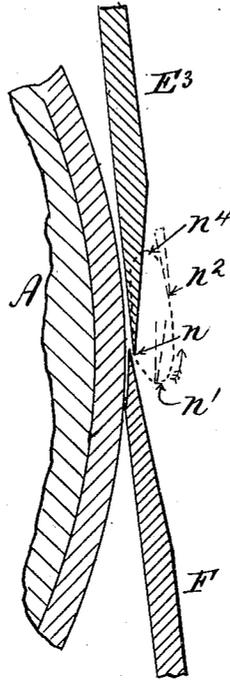
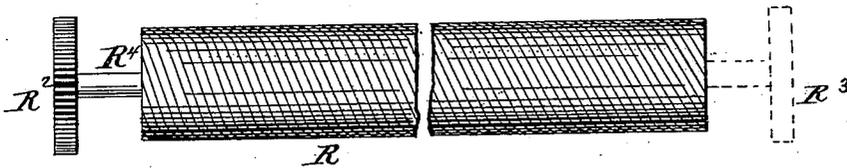


Fig. 7.

Fig. 8.



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Inventor:

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UNITED STATES PATENT OFFICE.

JAMES E. CHEESMAN, OF NEW YORK, N. Y., ASSIGNOR TO THE CHEESMAN COTTON GIN COMPANY.

ROLLER COTTON-GIN.

SPECIFICATION forming part of Letters Patent No. 645,288, dated March 13, 1900.

Application filed September 3, 1898. Serial No. 690,246. (No model.)

To all whom it may concern:

Be it known that I, JAMES E. CHEESMAN, a citizen of the United States, residing in the city, county, and State of New York, have invented certain new and useful Improvements in Roller Cotton-Gins, of which the following, taken with the accompanying drawings on six sheets, is a description.

My invention relates to that class of machine which consists of three main parts—a ginning-roller, a guard, and a stripper—the ginning-roller having a surface more or less roughened, by means of which it draws the fibers of cotton down between itself and the surface of the guard against which it rotates, usually in close frictional contact, and the stripper being driven at high speed and striking the seed-cotton near the point of contact of the ginning-roller and the guard in order to push back the seeds therefrom and change their position, so as to allow the ginning-roller to draw down more of the fiber until the seeds are entirely stripped thereof.

The general objects of my invention are increase in capacity of the machine by allowing of much faster running than has been heretofore obtained, better quality of work done by affording a better cleaning of the cotton both from seeds and foreign matter, and avoidance of the danger of breaking the stripper or guard and of striking fire. The particular objects secured which lead to these results are decrease in vibration of the machine, lightness and rigidity in the stripper, means to guide the edge of the stripper absolutely in its path when in motion, means for holding the guard rigidly in a fixed place, means to give the stripper edge a certain outward motion after passing the edge of the guard, and means to vary the path of the stripper edge and to vary its adjustment with reference to the guard for different kinds of work.

Figure 1 is a top view of the entire machine. Fig. 2 is a front elevation, and Fig. 3 a rear elevation, thereof. Fig. 4 is a side elevation of the same looking toward the right hand of Fig. 3. Fig. 5 is a side elevation of the same looking toward the left hand of Fig. 3. Fig. 6 is a vertical section on the line $x x$ of Fig. 3

looking in the direction of the arrow. Fig. 7 is an enlarged sectional view showing the path of the stripper edge. Fig. 8 is a view of the ginning-roller made so as to be reversible in the machine.

A is the ginning-roller, rigidly affixed to its shaft a , Fig. 1. It is operated by the gear-wheel a^2 , gearing with the gear-wheel a^3 , whose shaft a^4 is in turn operated by the pulley a^6 and the belt a^5 . (See Figs. 1, 2, and 3.) The shafts a and a^4 are journaled in the frame B.

The ginning-roller A is adjustable within the frame B at each end by means of the journal-boxes f^1 , frames f^2 , and set-screws f^3 . The frames f^2 are rigidly attached to the frame B of the machine, and the boxes f^1 , in which the ends of the axles of the ginning-roller a are journaled, are adjustable to right and left therein, so as to allow the ginning-roller A to be adjusted more or less closely to the guard F, and also to allow the ginning-roller A to be removed from the frame B and reversed end for end. The part b^2 , Figs. 1, 2, and 3, is a brace put in to hold the parts b^1 and b^3 rigid.

G is a bridge passing from end to end of the machine near the ginning-roller, Figs. 2 and 6. To the bridge G is bolted the guard F by means of a series of bolts g^1 . The bridge G is formed with a recess along the front, (see g^3 , Fig. 6,) and the guard F sets within this recess throughout its length. A difficulty heretofore has been that the guard of roller cotton-gins has not had sufficient rigidity. The vibration of the machine or some foreign substance passing between the guard and the ginning-roller, especially where the guard has been made adjustable, has frequently caused the guard to spring out, allowing it to be struck by the stripper, and thus injuring one or both of them. The result has been that for want of rigidity in the guard it has been impossible to adjust the guard and stripper sufficiently close to expel foreign substances and impossible to run the machine at a rate sufficient to yield the capacity desired. The construction hereinafter described gives a guard which is absolutely rigid. The necessary tension between ginning roller and guard is obtained by the ad-

justability of the roller itself, f^3 , Fig. 5. The guard F is placed in close contact with the ginning-roller A throughout its length and for about one inch in width. It is hollowed out to correspond to the convexity of the ginning-roller in the usual way to afford a grasping-surface. (See Fig. 7.)

A special feature of my invention is its stripper divided into a series of separate parts run from separate eccentrics on the same shaft. As is well-known, an increase of capacity has been the great desideratum with roller cotton-gins. The principal limiting cause has been inability to run the machine fast, and the principal cause of that has been the stripper and the manner of bracing it. The stripper must be adjusted so that its edge passes the edge of the guard at a distance less than one-half the diameter of the smallest seed in order to push away the seed and at the same time avoid crushing it—that is, not over one-sixteenth of an inch. The lower edge of the stripper must also be made thin, coming almost to a sharp edge, in order to press out the seeds, and this of course gives a limit to its strength. The ginning-roller must be at least four feet in width to work at all effectively; but it has been found impossible to make a stripper four feet long which would not break or bend and strike the guard if run at speed, the vibration of the machine, with the other necessary qualities of the stripper in that form, being too much for it. Making the stripper heavier does not avoid the difficulty, but increases it by increasing the vibration more than proportionally. In my machine I divide the stripper longitudinally into a series of comparatively-small parts, each part being run by separate eccentrics, but all upon the same shaft. This principle of a stripper divided into a series of small parts gives lightness in the stripper, and in combination with other devices which guide with exactness the motion of each of the stripper parts, reduces to the minimum the vibration of the machine and allows of very fast running at the close adjustment to the guard necessary to expel the seeds and all foreign substances. $E^1, E^2, E^3, E^4,$ and E^5 make up the stripper, divided into five equal portions longitudinally. All of these portions are operated separately by the eccentrics $d^1, d^2, d^3, d^4,$ and d^5 in pairs. (See Figs. 2 and 3.) A description of one of these strippers, with its actuating rod and eccentric, will do for all. The eccentrics $d^1,$ &c., are fastened upon the shaft D, which is journaled in the frame B and is driven by the pulley d^7 and the belt d^8 . The eccentrics are so placed upon the shaft that the five strippers $E^1,$ &c., shall operate at equal intervals in the form shown. The following is the manner of attachment of the strippers to their eccentrics: The stripper (E^3 , for example) has two similar projections e^2 , interiorly threaded, Figs. 6 and 2. The two eccentric-collars e^1 have also corresponding projections e^5 , also

interiorly threaded. The threaded bars e^6 rigidly connect the eccentric-collars e^4 and the stripper E^3 . These threaded bars e^6 are threaded right and left on opposite ends, so that the stripper E^3 may be adjusted perpendicularly to any point by simply turning the screw-bars e^6 . It will be seen that each stripper part $E^1,$ &c., can be made much more than one-fifth as light as if the stripper were all made in one piece longitudinally. The eccentrics, being placed at different angles upon the power-shaft, reduce the vibration, so that it practically disappears. Each stripper part also from its lower edge to the eccentric-collar consists of a rigid piece, or rather of parts rigidly connected—that is, without any joints or connecting-links. This is an important feature.

The bracing of a stripper in a roller cotton-gin is one of its most important points. Heretofore the work of the roller cotton-gin has been limited by the fact that the stripper has not been braced so as to allow of close adjustment to the guard and at the same time of fast operation. The capacity of the machine has thus been practically limited by the speed up to which it was possible to run the stripper without breaking the machine or injuring the quality of the work. If adjusted closely to the guard heretofore, it could not be operated sufficiently fast without danger of breaking or striking the guard. If, on the other hand, it was not adjusted close to the guard it broke the seeds, and thus limited the capacity and decreased the quality of the work. Thus the capacity for close adjustment of the stripper, combined with the capacity for running at high speed, is the crucial point with a roller cotton-gin. In the machine herewith shown I have two braces for each of the stripper parts, such braces running back to the frame of the machine, upon which they are pivoted, and being pivoted at their forward ends upon the stripper itself at a point near the edge of the stripper. A description of one brace will serve for all. Forming part of the frame of the machine is a rod b^3 , Figs. 3 and 6. Pivoted upon this rod b^3 is a bar d^{10} , interiorly threaded. Pivoted upon the stripper E^3 at its rear is a bar d^{11} , also interiorly threaded. The screw-rod d^9 connects the two parts d^{10} and d^{11} . This bar d^9 is threaded right and left, the same as in the eccentric connections, to allow of the adjustment of the stripper forward and back. Perfect rigidity of the stripper is essential, and I know of no other adjustable connection which allows of such rigidity as the connections here described.

Another most important result of the close adjustment of stripper and guard and the certainty that they will always work at such close adjustment is the fact that all foreign substances are thoroughly expelled at whatever speed the machine is run. There are many substances—such as a match, small nails, &c.—which it has been difficult here-

tofore to exclude and which have frequently been the cause of fire, for the reason that the stripper could not be adjusted close enough to the guard to get behind them; but they would lodge on the line of contact between the guard and the ginning-roller and be struck by the stripper in its descent, this although they would not pass between the guard and roller.

10 Fire, as is well known, is one of the greatest dangers in cotton-ginning. With the combination of parts hereinabove described everything is expelled by the stripper, owing to its steady work at close adjustment.

15 The separate parts into which the whole stripper is divided— E' , E^2 , E^3 , E^4 , and E^5 —are placed in the machine edge to edge; but owing to the different positions of the eccentrics the edges do not touch during the entire revolution, and this allows of a certain side vibration, which must be provided against. This is done by means of surfaces, which on adjoining strippers are placed near the respective edges, so as to form rubbing-plates, which, in connection with the rear braces, take up or rather prevent a side vibration, but are not placed so close together as to produce any retarding friction.

30 I know that strippers have been heretofore made in two parts. I do not therefore claim in its broad form the principle of dividing a stripper; but a stripper divided into only two parts does not accomplish the same results nor perform the same functions as mine; but, besides that, it does not show the principle which, in combination with the other parts of my invention, allows of close adjustment and fast running. A division of the stripper into two parts decreases vibration to a certain extent; but it does not avoid the bending of the stripper under fast motion and so does not admit of close adjustment to the guard. The machine should be at least four feet long. A stripper as much as two feet long cannot be made so as to admit of a sufficiently-close adjustment to expel all foreign matter and work at speed without breaking or striking the guard. The division must be into a series, such as five, as herein shown; certainly not less than three.

50 Another feature of my invention is the resulting motion of the stripper edge when the machine is in operation. As is well known, the special merit of a roller cotton-gin over a saw-gin is that it does not injure the staple as much; but it has been found, nevertheless, that the staple has not been kept entirely from injury in roller-gins, but that the ends of the fibers have been cut off to a greater or less extent. In machines as heretofore made the stripper has been practically in contact with the guard for a certain portion of its motion, the two overlapping and binding the cotton between them. This pull being contrary to the pull of the ginning-roller has necessarily caused certain of the fibers to break. Another disadvantage of this

overlapping of the stripper and the guard in contact with each other is that the feed of cotton is thereby entirely shut off until the stripper is withdrawn. This means that not only can no new fibers come within the grasp of the ginning-roller during that time, but also that the ginning-roller continuing to revolve it loses its grasp upon the cotton which it had already grasped, either by the fibers which it has grasped pulling away from those which are following or by some of the fibers being broken; but with my invention the combination of the fixed guard F , the strippers E' , &c., and the manner of bracing and pivoting such strippers yields a resulting motion to the stripper edge by which the feed is not shut off at any time. The lower edge of the stripper while passing near enough to the upper edge of the guard to get behind all the seeds is then given a slight outward motion—that is, a motion away from the guard, which motion is also partly downward. The result is that as soon as the stripper edge has passed the edge of the guard it recedes therefrom, and the ginning-roller not only retains its hold upon all the cotton which it has grasped, but there is even room for other cotton to be fed behind the edge of the stripper during the remainder of the downward motion. The outward motion of the stripper edge also tends to draw the seed away from the guard. This is shown in Figs. 6 and 7. Fig. 7 shows the motion of the stripper edge in the dotted line n^4 , the points n , n' , and n^2 showing three successive positions of the stripper edge. It will be noted that this combination of parts yields a motion entirely distinct from that of any combination which results in a back-and-forth motion of the edge of the stripper opposite the edge of the guard. Where the motion is simply back and forth, it makes no difference which way the eccentrics are run; but with this combination of parts the stripper would do no work at all unless run in one direction always.

Another point in my invention is the capability of arranging the stripper and its actuating and guiding parts in such manner (within limits) to give any desired motion to the stripper edge after it passes the edge of the guard, from a motion that is nearly perpendicular to one that is nearly at right angles to the guard. All of the machines that I know of give a certain motion to the stripper, and that motion is invariable. In these prior machines the stripper may be adjustable, so that its edge passes to a greater or less distance below the edge of the guard, or it may be set so as to pass at a greater or less distance away from the guard edge, but the motion itself is invariable; but raw cotton varies greatly in its characteristics, such as length of staple, size of seeds, age of seeds, form of boll, tenacity with which the fiber clings to the seed, &c. The motion of the stripper edge after passing the edge of the guard is particularly important, since the

capacity of the machine depends largely upon the speed with which the seeds can be cleared, and the different kinds of cotton require a different kind of motion there—sometimes a nearly-straight motion and sometimes a motion more nearly at right angles. Thus if the seeds are large and the fiber easily cleaned we can give a greater outward motion to the stripper edge, and thus gain greatly in the capacity by allowing the cotton to feed much more freely under the stripper. If, on the other hand, the seeds are small and the fiber clings very tenaciously to them, we must give a more downward motion to the stripper edge. With this machine, having determined by experiment or otherwise the particular motion required, the parts may be so adjusted as to give that motion, and thus get all the capacity possible, while another machine, correct for some kinds of cotton, would lose greatly on other kinds.

There are three adjustments which alone or in combination may vary the path of the edge of the stripper with reference to the edge of the guard. Two of these—namely, the screw-rods e^6 and d^9 , by which the stripper is adjusted up and down and forward and back, respectively—have been already described. (See Fig. 6.) The third adjustment consists of having the rod b^3 adjustable itself up and down in the frame B of the machine. This is the rod upon which the rear ends of the stripper-braces are pivoted. The adjustment is shown in Figs. 3 and 5. The rod b^3 is enlarged at each end to a square form and is placed within a frame p^1 , within which it is adjustable up and down by means of set-screws p^2 . It is evident also that the exact resulting motion to the edge of the stripper will depend, in combination with the other adjustments, also upon the exact distance from the point of the stripper at which the rear braces are pivoted.

In Fig. 8 the ginning-roller R upon its shaft R^2 is provided with a removable gear-wheel R^3 . When the roller is to be reversed, the gear-wheel R^3 is simply removed to the position R^3 at the other end of the roller. The construction shown in Figs. 4 and 5, by which the ginning-roller is made adjustable within the frame B of the machine, by means of boxes f^1 , sliding in the frames f^2 and held in position by the set-screws f^3 , allow of its being easily reversed. The gear-wheel a^2 being removed and the set-screws f^3 loosened, the boxes f^1 can be slid to right or left out of the frames f^2 and the roller then reversed and reinserted end for end. The gear-wheel a^2 , Fig. 4, (corresponding to R^3 , Fig. 8,) is put back on the other end of the roller-shaft at the same end of the machine as before.

The part H, Figs. 1 and 6, is merely a table upon which the cotton is placed to be fed to the machine.

I claim as my invention—

1. In a roller cotton-gin, a stripper divided longitudinally into a series of parts, in com-

70 bination with mechanism by which the changes in the reciprocating motions of the separate stripper parts are made successively and not simultaneously.

2. In a roller cotton-gin, a stripper divided longitudinally into a series of parts, each part being rigid from driving end to operating edge, in combination with mechanism by which the changes in the reciprocating motions of the separate stripper parts are made successively and not simultaneously.

3. In a roller cotton-gin, the combination of a stripper divided longitudinally into separate parts, such parts operating independently of each other and each part being rigid from the driving end to the operating edge, with rear braces for such parts pivoted at one end upon the frame of the machine and at the other end upon the stripper.

4. In a roller cotton-gin, the combination of a stripper rigid from the driving end to the operating edge, and rear braces for the same, pivoted at one end upon the frame of the machine and at the other end upon the stripper.

5. In a roller cotton-gin, the combination of a stripper, rigid from driving end to operating edge, eccentrics to operate the same, and braces for the same, pivoted at one end upon the frame of the machine, and at the other end pivoted upon the stripper, at such a distance from the stripper edge, that the combined motion of the eccentrics and pivoted braces causes the stripper edge to take an elliptical course.

6. In a roller cotton-gin, the combination of a stripper divided longitudinally into separate parts operating independently of each other, each part rigid from driving end to operating edge, and rear braces for the same, pivoted at one end upon the frame of the machine, and at the other end pivoted upon the stripper parts at such a distance from the stripper edge, that the combined motion of the eccentrics and pivoted braces causes the stripper edge to take an elliptical course.

7. In a roller cotton-gin, the combination of a stripper divided longitudinally into separate parts, such parts operating independently of each other, rear braces for each of such parts pivoted at one end upon the frame of the machine and at the other end upon the stripper, and rubbing-plates for each of such stripper parts attached thereto at their adjoining edges near the operating edge thereof.

8. In a roller cotton-gin, the combination of a ginning-roller, a stripper rigid from driving end to operating edge, braces for the same pivoted at one end upon the frame of the machine, and at the other end pivoted upon the stripper, and a guard so rigid from end to end and so supported in the frame, that it will not recede from the roller.

9. In a roller cotton-gin, the combination of a ginning-roller, a stripper rigid from driving end to operating edge, eccentrics to operate the same, braces for the same pivoted at one end upon the frame of the machine, and at

the other end pivoted upon the stripper at such a distance from the stripper edge, that the combined motion of the eccentrics and pivoted braces causes the stripper edge to take an elliptical course, and a guard so rigid from end to end and so supported in the frame that it will not recede from the roller.

10. In a roller cotton-gin, the combination of a ginning-roller, a stripper, braces for the same pivoted at one end upon the frame of the machine, and at the other end upon the stripper, and a guard so rigid from end to end and so supported in the frame that it will not recede from the roller.

11. In a roller cotton-gin, the combination of a stripper adjustable up and down with reference to the edge of the guard and rear braces therefor, pivoted at one end upon the frame of the machine and at the other end upon the stripper, such rear braces being adjustable to and fro with reference to the edge of the guard.

12. In a roller cotton-gin, the combination of a stripper adjustable up and down with reference to the edge of the guard, rear braces for the same pivoted at one end upon the frame of the machine and at the other end upon the stripper, the ends pivoted upon the frame of the machine, being in boxes adjustable up and down.

13. In a roller cotton-gin, the combination of a stripper and rear braces for the same pivoted at one end upon the frame of the machine in boxes which are adjustable up and

down within such frame, the braces themselves being adjustable to and fro with reference to the edge of the guard.

14. In a roller cotton-gin, the combination of a stripper adjustable up and down with reference to the edge of the guard, rear braces for the same pivoted at one end upon the frame of the machine and at the other end upon the stripper, such braces having their rear ends in boxes which are adjustable up and down within the frame of the machine, and such braces being themselves adjustable to and fro with reference to the edge of the guard.

15. In a roller cotton-gin, the combination of a stripper, and braces for the same pivoted at one end upon the frame of the machine, and at the other end upon the stripper, such braces having their rear ends adjustable up and down within the frame of the machine.

16. In a roller cotton-gin, the combination of a stripper divided longitudinally into separate parts operating independently of each other, braces for the separate parts pivoted at one end upon the stripper parts, and at the other end pivoted upon a longitudinal piece whose ends are adjustable up and down in the frame of the machine.

In witness whereof I have set my hand this 30th day of August, 1898.

JAMES E. CHEESMAN.

Witnesses:

MYRA B. MARTIN,
SALTER STORRS CLARK.