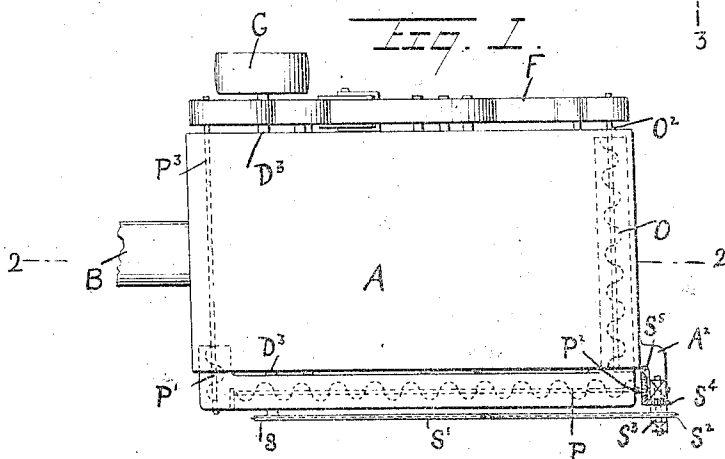
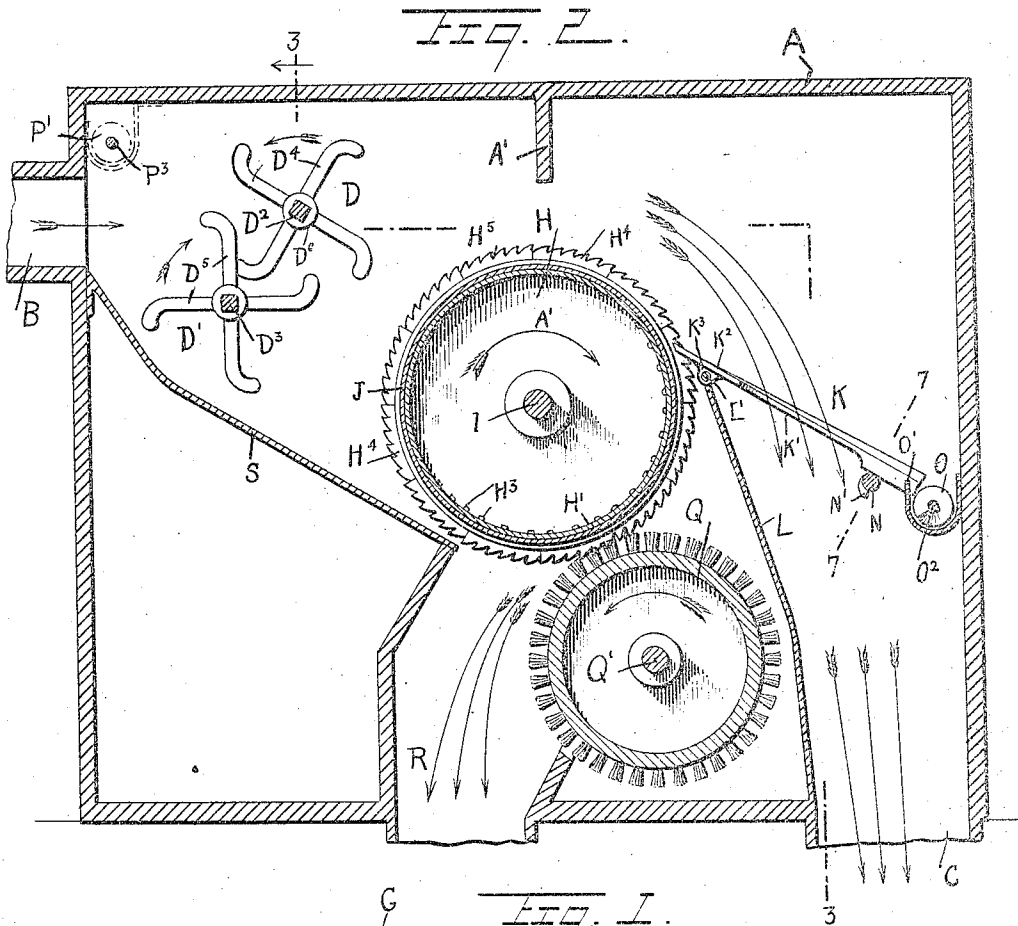


S. F. KRUPP.
 COTTON CLEANER AND SEPARATOR.
 APPLICATION FILED JULY 20, 1912.

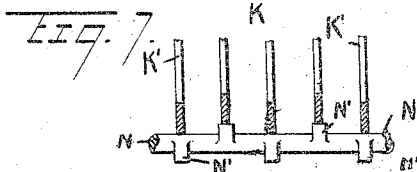
1,069,708.

Patented Aug. 12, 1913.

3 SHEETS-SHEET 1.



WITNESSES
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R. J. Hester



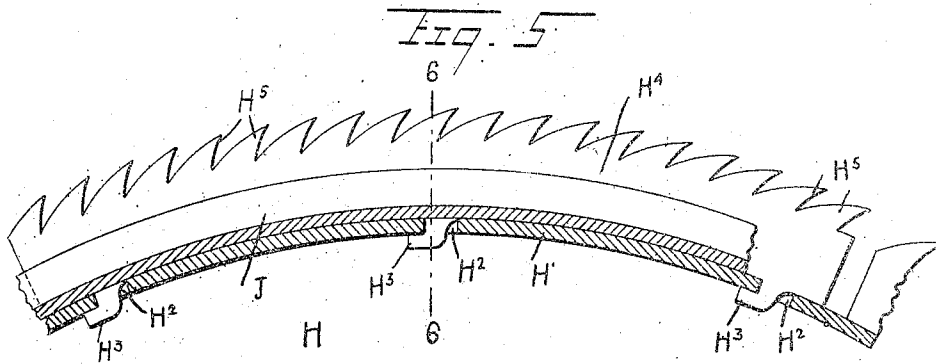
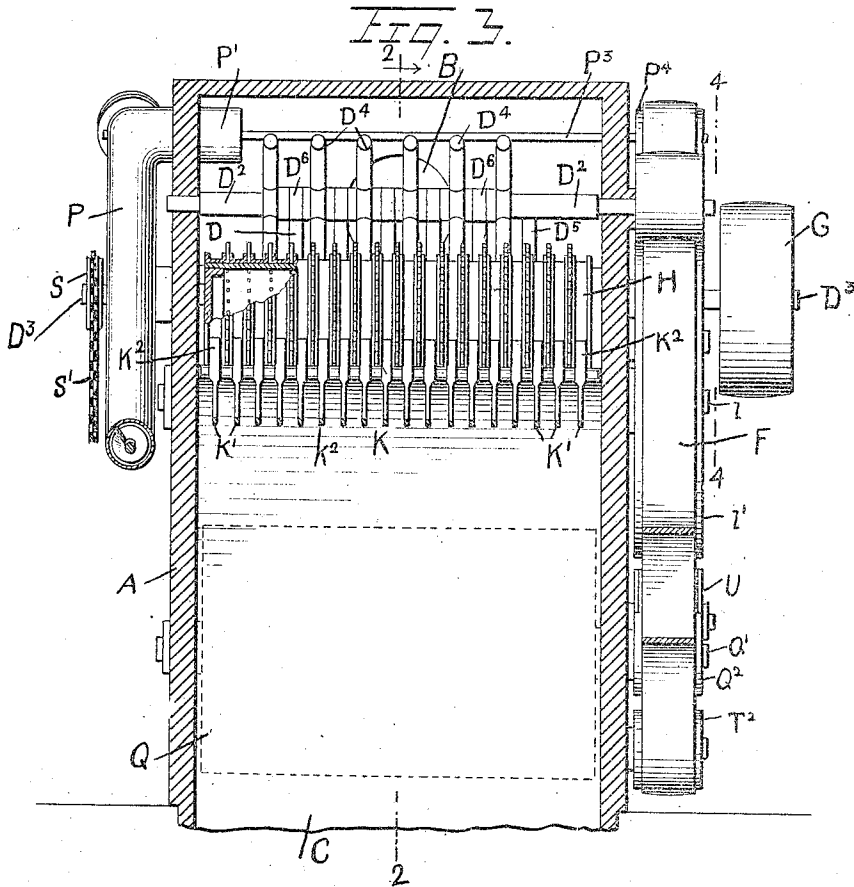
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3 SHEETS—SHEET 2.



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 3 SHEETS—SHEET 3.

Fig. 4.

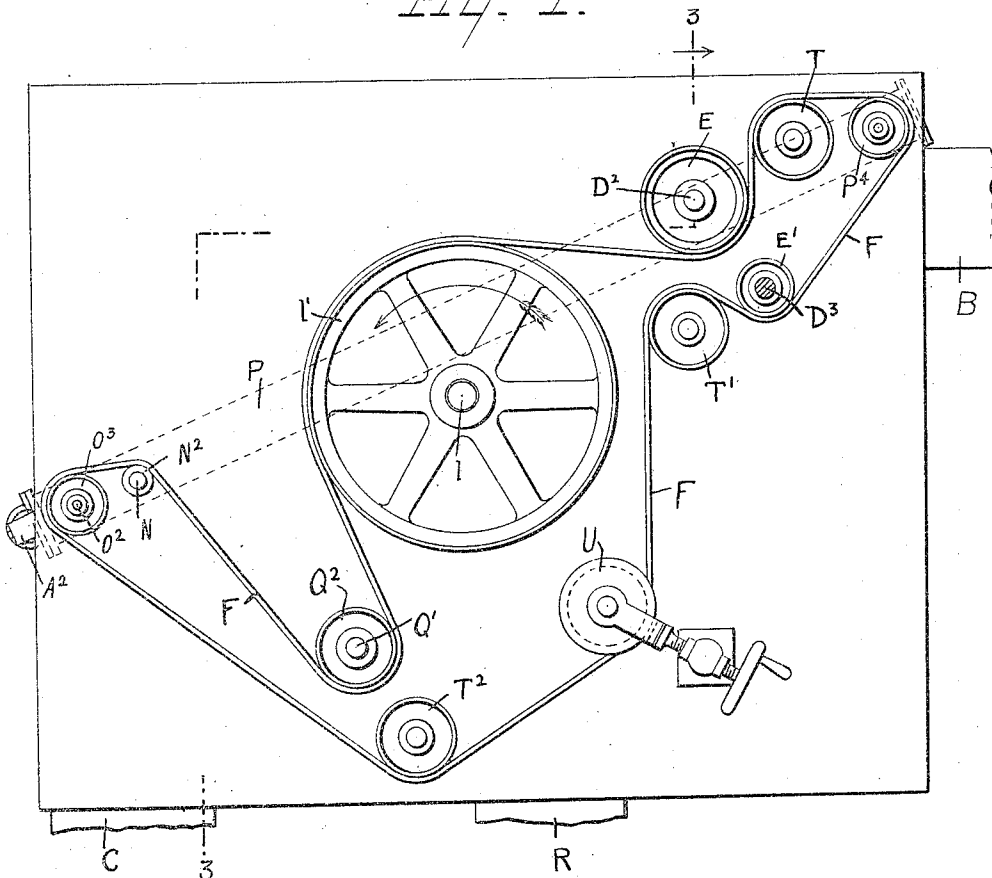
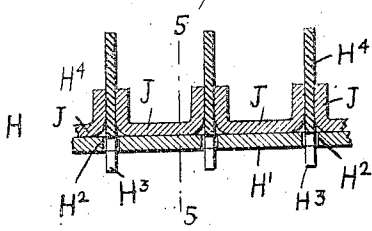


Fig. 6.



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UNITED STATES PATENT OFFICE.

SMITH FREDERICK KRUPP, OF MEMPHIS, TENNESSEE.

COTTON CLEANER AND SEPARATOR.

1,069,708.

Specification of Letters Patent.

Patented Aug. 12, 1913.

Application filed July 20, 1912. Serial No. 710,701.

To all whom it may concern:

Be it known that I, SMITH F. KRUPP, a citizen of the United States, and a resident of Memphis, in the county of Shelby and State of Tennessee, have invented a new and improved Cotton Cleaner and Separator, of which the following is a full, clear, and exact description.

The invention relates to brakes and gins, and its object is to provide a new and improved cotton cleaner and separator, more especially, designed for completely opening bolls of cotton, for detaching and separately discharging the cotton fibers from the hulls and dirt, and for re-passing the unopened bolls through the machine.

For the purpose mentioned, use is made of a suction chamber within which is arranged a means for breaking the bolls of cotton, means for separating the hulls and the fibers and separately discharging the hulls and fibers, and means for re-passing the unopened bolls to the said breaking means.

A practical embodiment of the invention is represented in the accompanying drawings forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views.

Figure 1 is a reduced plan view of the cotton cleaner and separator; Fig. 2 is a sectional side elevation of the same on the line 2—2 of Figs. 1 and 3; Fig. 3 is a transverse section of the same on the line 3—3 of Figs. 2 and 4; Fig. 4 is a rear side elevation of the same, with the driving shaft in section on the line 4—4 of Fig. 3; Fig. 5 is an enlarged sectional side elevation of a portion of the separating saw drum, the section being on the line 5—5 of Fig. 6; Fig. 6 is a cross section of the same on the line 6—6 of Fig. 5; and Fig. 7 is a cross section of part of the grate and the means for actuating the same, the section being on the line 7—7 of Fig. 2.

The cotton cleaner and separator is mounted in a casing A provided at one side near the top with an inlet B and provided at the bottom at the opposite end with a duct C connected with a suction fan or other device for producing a suction in the casing A. The cotton bolls are fed through the inlet B into the casing A, and immediately in the rear of the said inlet B is arranged a pair of revoluble beaters D and D' having transverse shafts D², D³ journaled in suitable bearings arranged in the casing A,

and on the shafts D² and D³ are secured beater arms D⁴, D⁵ spaced apart by spacing collars D⁶, as indicated in Fig. 3. The arms D⁴ are arranged relative to the arms D⁵ in such a manner that the arms sweep past one or the other and the outer ends of the arms are preferably curved, as plainly indicated in Figs. 2 and 3.

The outer ends of the shafts D² and D³ are provided with pulleys E and E' around which passes a belt F, and on the shaft D² is secured a pulley G connected by a belt with other machinery for imparting a rotary motion to the beater D' and a traveling motion to the belt F to rotate the beater D in unison with the beater D'. By reference to the arrows in Fig. 2, it will be noticed that the beaters D and D' are rotated simultaneously in opposite directions. The beater arms D⁴ and D⁵ are spaced apart a distance less than the diameter of a half open boll of cotton so that the bolls passing between the beaters D and D' are crushed and opened by the beater arms D⁴, D⁵ and the hulls of the bolls are partly separated and loosened from the cotton fibers.

In the rear of the beaters D and D' is arranged a separating saw drum H provided with a transversely-extending shaft I journaled in a casing A, and on the outer end of the shaft I is secured a pulley I' around which passes the belt F, so that when the machine is running a rotary motion is transmitted to the saw drum H in the direction of the arrow a' shown in Fig. 2. The saw drum H is provided on its rim H' with sets of spaced apertures H² adapted to be engaged by lugs H³ formed on the inner edges of sets of segmental saw blades H⁴ fitted onto the peripheral face of the rim H' each saw blade H⁴ being provided with teeth H⁵ similar to those of ordinary rotary saws. The ends of the blades H⁴ of each set are slightly spaced apart, as plainly indicated in Fig. 5, and each set of blades forms a circular cutter or a saw. The adjacent sets of saw blades H⁴ are held spaced apart by spacing rings J, preferably made U shape in cross section, as plainly indicated in Figs. 5 and 6, so as to hold the sets of blades H⁴ properly spaced at the same time stiffening the blades to prevent the same from bending in a transverse direction. By the arrangement described the sectional saw blades of each circular saw can be readily placed in position on the rim H' of the saw drum H,

so that in case a sectional blade H^4 is damaged or broken it can be readily removed and replaced by a new one without disturbing the rest of the blades of the set.

5 The saw drum H operates in conjunction with a grate K to separate the cotton fibers from the hulls and dirt, and this grate K is arranged rearwardly of the saw drum H and is formed of a plurality of bars K' arranged one alongside the other in a transverse direction and inclined downwardly and rearwardly, as plainly indicated in Fig. 2, the bars being provided with wider portions K^2 at the upper ends. The terminals of the upper ends extend between adjacent circular saws to permit the teeth H^2 of the saws to draw the cotton fibers between the wider portions K^2 of adjacent bars K' while the hulls pass down the wider portions K^2 and finally drop through the spaces between adjacent bars K' . The wider portions K^2 of the bars K' are provided at the under sides with lugs K^3 pivoted on a transverse rod L' held on the upper end of a partition L extending from the bottom of the casing upward to within a short distance of the drum H , as plainly shown in Fig. 2, the partition L forming a portion of the outlet C . The hulls and the dirt drop through the space between the bars K' of the grate K , engaged by a transverse cam shaft N journaled in the casing A and provided with cams N' adapted to engage the under side of the rods K' near the lower ends thereof, and alternate cams N' are arranged diametrically opposite each other, as plainly indicated in Fig. 7, so that when the cam shaft N is rotated the alternate bars K' are swung upward while the remaining bars swing downward owing to the action of the oppositely-disposed sets of cams N' on the shaft N . One outer end of the shaft N is provided with a pulley N^2 over which passes the belt F to impart a turning motion to the cam shaft N when the machine is running.

The lower ends of the bars K' discharge into the casing O' of a screw conveyer O arranged transversely within the casing so that any bolls that are not opened by the beaters D , D' and pass over the grate K drop into the casing O' of the conveyer O to be carried by the latter transversely into a second conveyer P arranged on the outside of the casing A and extending upwardly toward the front thereof to finally discharge the unopened bolls into another conveyer P' which opens into the casing A in front of the beaters D , D' , so that the unopened bolls are again passed through the machine, that is, are again subjected to a beating action by the beaters D and D' to be finally opened. The lower ends of the bars K' engage guide or bearing slots in the front of the conveyer casing O' to hold

the swinging bars K' against lateral movement and to insure a proper delivery of the unopened bolls into the conveyer O .

It is understood that the bars K' are spaced a sufficient distance apart to allow the hulls to drop down between the bars, but the spaces are not large enough to allow the passage of unopened bolls so that the latter roll down the bars K' into the conveyer O to be re-passed through the machine, as previously explained. It is also understood that by imparting an up and down swinging motion to the bars K' and grate K the latter is not liable to be clogged up by the hulls, fibers or the unopened bolls or dirt.

Directly above the saw drum H and depending from the top of the casing A , is a transverse deflector A' to deflect the hulls, fibers and unopened bolls in a downward direction onto the peripheral face of the saw drum H , to insure a proper separation of the cotton fibers from the hulls at the wider upper ends K^2 of the bars K' . The fibers drawn downward by the saw drum H in the front of the partition L are brushed off from the peripheral face of the saw drum H by the use of a revoluble brush Q having a shaft Q' journaled in the casing A . One outer end of the shaft Q' is provided with a pulley Q^2 around which passes the traveling belt F so that when the machine is running the rotary motion given to the brush Q brushes off the cotton fibers from the peripheral face of the saw drum H into an outlet R extending through the bottom of the casing A . A partition S extends from the bottom of the inlet B to within a short distance of the peripheral face of the saw drum H near the lower end thereof so that any material that drops down the partition S is taken hold of by the teeth H^2 of the saw drum H and carried upward and around to the grate K to be acted upon, as previously explained.

The shaft Q^2 of the conveyer O is provided at one outer end with a pulley O^2 around which passes the belt F so that when the machine is running a rotary motion is given to the screw conveyer O for the purpose mentioned. The conveyer P is driven from the shaft D^2 of the beater D' , and for this purpose the shaft is provided outside of the casing A (see Fig. 1) with a sprocket wheel S around which passes a sprocket chain S' also passing around a sprocket wheel S^2 journaled on a shaft S^3 journaled in suitable bearings arranged on a bracket A^2 attached to the casing A . On the shaft S^3 is secured a bevel gear wheel S^4 in mesh with a bevel gear wheel S^2 secured on the lower end of the shaft P^2 of the conveyer P , so that when the machine is running a rotary motion is transmitted from the shaft P^2 to the shaft P^2 by the gearing described. The

shaft P³ of the transverse conveyer P' is provided with a pulley P⁴ (see Fig. 4) around which passes the belt F so that when the machine is running the conveyer P' is actuated to carry the unopened bolls from the conveyer P into the front end of the casing A. In order to provide the desired frictional contact between the belt F and the pulleys E and E' use is made of idler pulleys T and T' journaled on the outside of the casing A adjacent to the pulleys E and E', as plainly indicated in Fig. 4, and in order to provide the desired tension for the belt F use is made of an adjustable pulley U (see Fig. 4) and a guide pulley T² journaled on the outside of the casing A serves to properly guide the belt F from the tension pulley U to the pulley O³.

The operation is as follows: When the machine is running cotton bolls and air pass through the inlet B into the casing A, and the bolls in passing between the arms D⁴, D⁵ of the revoluble beaters D and D' are completely broken open and the cotton fibers are partly detached from the broken hulls. The suction action produced in the casing by the fan connected with the duct C carries the cotton fibers and the hulls rearwardly into contact with the peripheral face of the saw drum H which carries the fibers and hulls around to the grate K on which the fibers are separated from the hulls, as previously explained, that is, the fibers are carried along by the teeth H² of the saw drum H to be finally brushed off by the brush Q while the hulls and the dirt travel over the wider upper portions K² of the bars K' to finally drop through the spaces between adjacent bars K'. The hulls are then drawn through the duct C together with the dirt to a suitable place of discharge and the unopened bolls travel over the grate K into the conveyer O and finally by way of the conveyers P and P' back into the casing A at the front end thereof.

The cotton cleaner and separator shown and described is very simple in construction, effectually breaks the bolls of cotton open, separates the cotton fibers from the hulls, separately discharges the fibers and hulls from the machine, and repasses the unopened bolls through the machine until they are opened by the beaters.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:

1. A machine of the class described, comprising a suction chamber having an inlet at one end for the passage of the cotton bolls into the chamber, means connected with the other end of the suction chamber for producing a suction therein, a pair of revoluble beaters in the said suction chamber in the rear of the said inlet for breaking the cotton bolls open, a saw drum in the rear of the

said beaters and having spaced circular saws, a grate inclined downwardly from the rear of the said saw drum and having pivoted spaced bars widened at the upper ends, the latter extending between adjacent circular saws, and means for imparting a swinging motion to the said grate bars.

2. A machine of the class described, comprising a suction chamber having an inlet at one end for the passage of the cotton bolls into the chamber, means connected with the other end of the suction chamber for producing a suction therein, a pair of revoluble beaters in the said suction chamber in the rear of the said inlet for breaking the cotton bolls open, a saw drum in the rear of the said beaters and having spaced circular saws, a grate inclined downwardly from the rear of the said saw drum and having pivoted spaced bars widened at the upper ends, the latter extending between adjacent circular saws, means for imparting a swinging motion to the said grate bars, and means for repassing unopened bolls to the beaters.

3. A machine of the class described, comprising a suction chamber having an inlet at one end for the passage of the cotton bolls into the chamber, means connected with the other end of the suction chamber for producing a suction therein, a pair of revoluble beaters in the said suction chamber in the rear of the said inlet for breaking the cotton bolls open, a saw drum in the rear of the said beaters and having spaced circular saws, a grate inclined downwardly from the rear of the said saw drum and having pivoted spaced bars widened at the upper ends, the latter extending between adjacent circular saws, means imparting a swinging motion to the said grate bars, a transverse conveyer into which discharges the lower ends of the grate bars, and return conveying means connecting the said transverse conveyer with the entrance end of the casing to return unopened bolls to the beaters.

4. A machine of the class described, comprising a suction chamber having an inlet at one end for the passage of the cotton bolls into the chamber, means connected with the other end of the suction chamber for producing a suction therein, a pair of revoluble beaters in the said suction chamber in the rear of the said inlet for breaking the cotton bolls open, a saw drum in the rear of the said beaters and having spaced circular saws, a grate inclined downwardly from the rear of the said saw drum and having pivoted spaced bars widened at the upper ends, the latter extending between adjacent circular saws, means for imparting a swinging motion to the said grate bars, and a revolving brush in peripheral engagement with the said saw drum for removing the fibers from the drum after the fibers and hulls are separated.

5. A machine of the class described, comprising a suction chamber having an inlet for the passage of the bolls, an outlet for the foreign matter, and an outlet for the fibers, means for breaking the bolls open, a plurality of revoluble saws in rear of the breaking means, an oscillating inclined grate having the free ends of its bars extending between the saws, and a revolving brush in engagement with the saws.

6. A machine of the class described provided with beaters, a revoluble saw drum in the rear of the beaters having spaced circular saws, an inclined grate in the rear of the saw drum and having spaced bars pivoted and widened at the upper ends, the latter extending between adjacent circular saws, the wider upper ends permitting the passage of the fibers between them to the

exclusion of the hulls, and the latter passing between the bars below the widened upper ends to the exclusion of unopened bolls, and means for receiving the unopened bolls from the lower end of the grate and repassing the unopened bolls to the beaters.

7. In a machine of the class described, a plurality of revoluble saws, a pivoted inclined grate formed of a plurality of pivoted bars having their free ends extending between the saws, and means for swinging the alternate bars up and down.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

SMITH FREDERICK KRUPP.

Witnesses:

J. F. HUMPHREY,
D. L. NICHOLS.