

(No Model.)

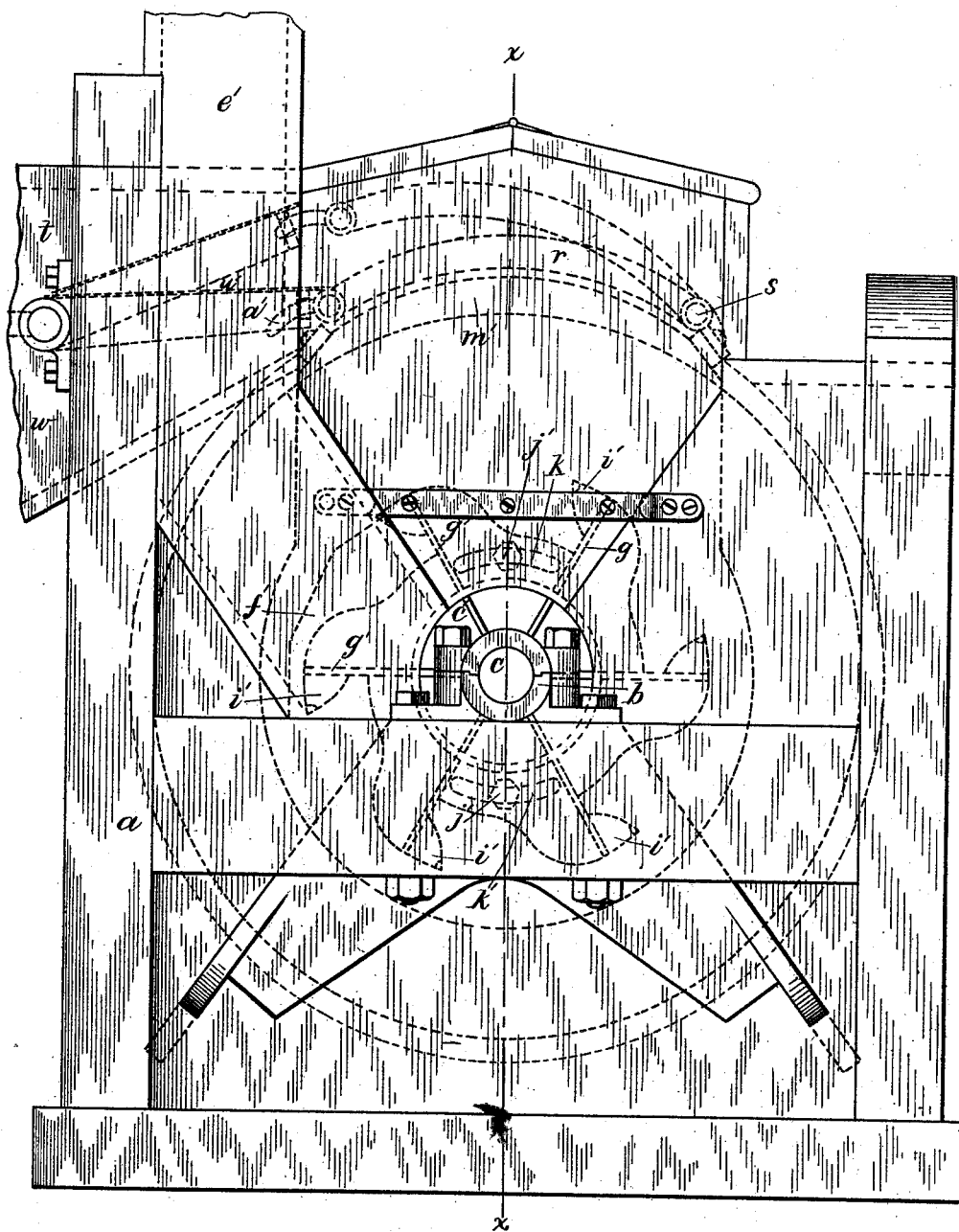
4 Sheets—Sheet 1.

C. A. CHANDLER.

MACHINE FOR SEPARATING LINT FROM COTTON SEED.

No. 422,916.

Patented Mar. 11, 1890.



WITNESSES.

Albert D. Grant
H. Brown

FIG. 1.

INVENTOR.

C. A. Chandler
by Wright, Brown & Connelley
Atty

(No Model.)

4 Sheets—Sheet 2.

C. A. CHANDLER.

MACHINE FOR SEPARATING LINT FROM COTTON SEED.

No. 422,916.

Patented Mar. 11, 1890.

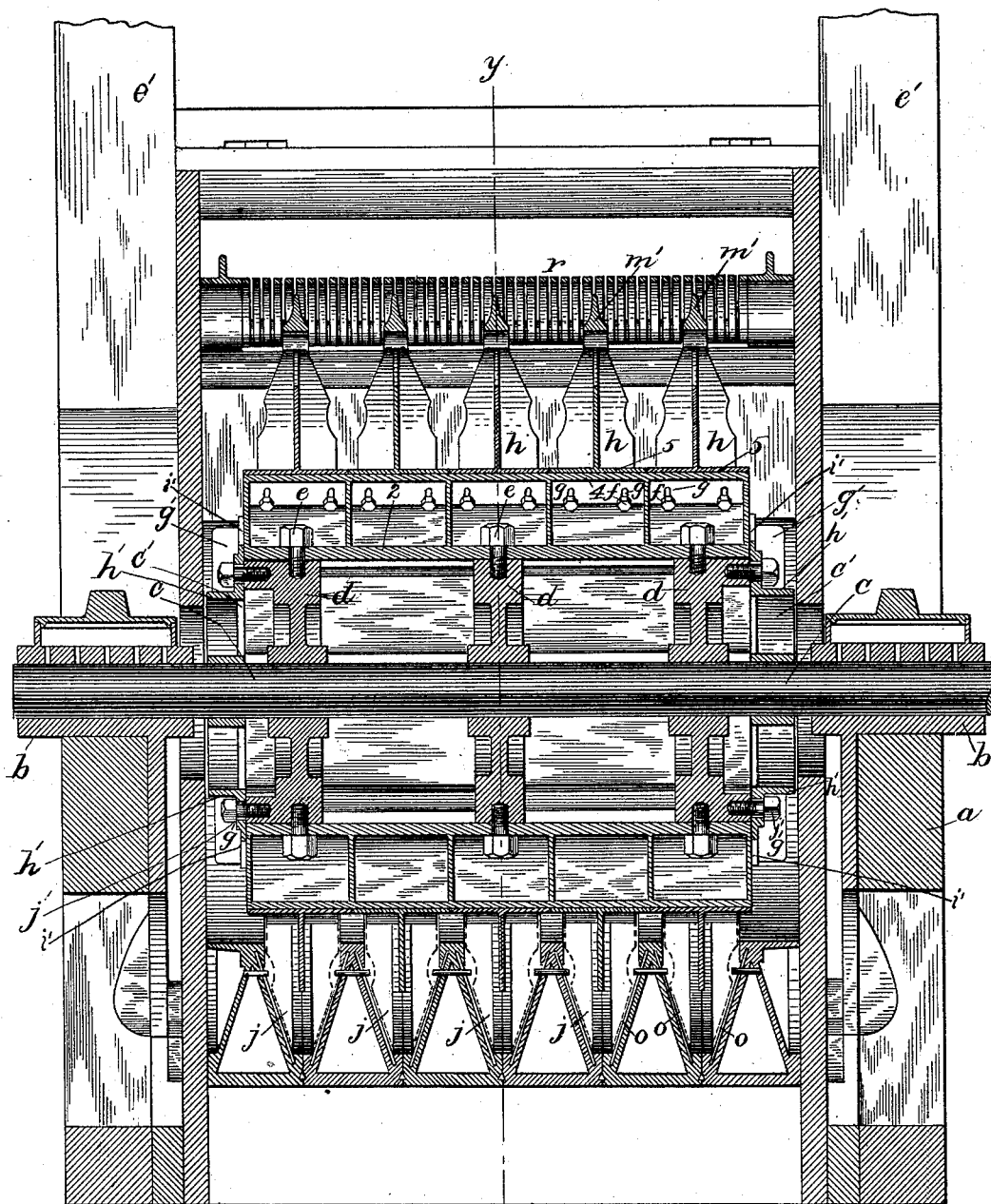


Fig. 2.

WITNESSES.

Albert D. Grant.
H. Brown.

INVENTOR.

C. A. Chandler
by *Myrtle B. Conely*
Atty.

(No Model.)

4 Sheets—Sheet 3

C. A. CHANDLER.

MACHINE FOR SEPARATING LINT FROM COTTON SEED.

No. 422,916.

Patented Mar. 11, 1890.

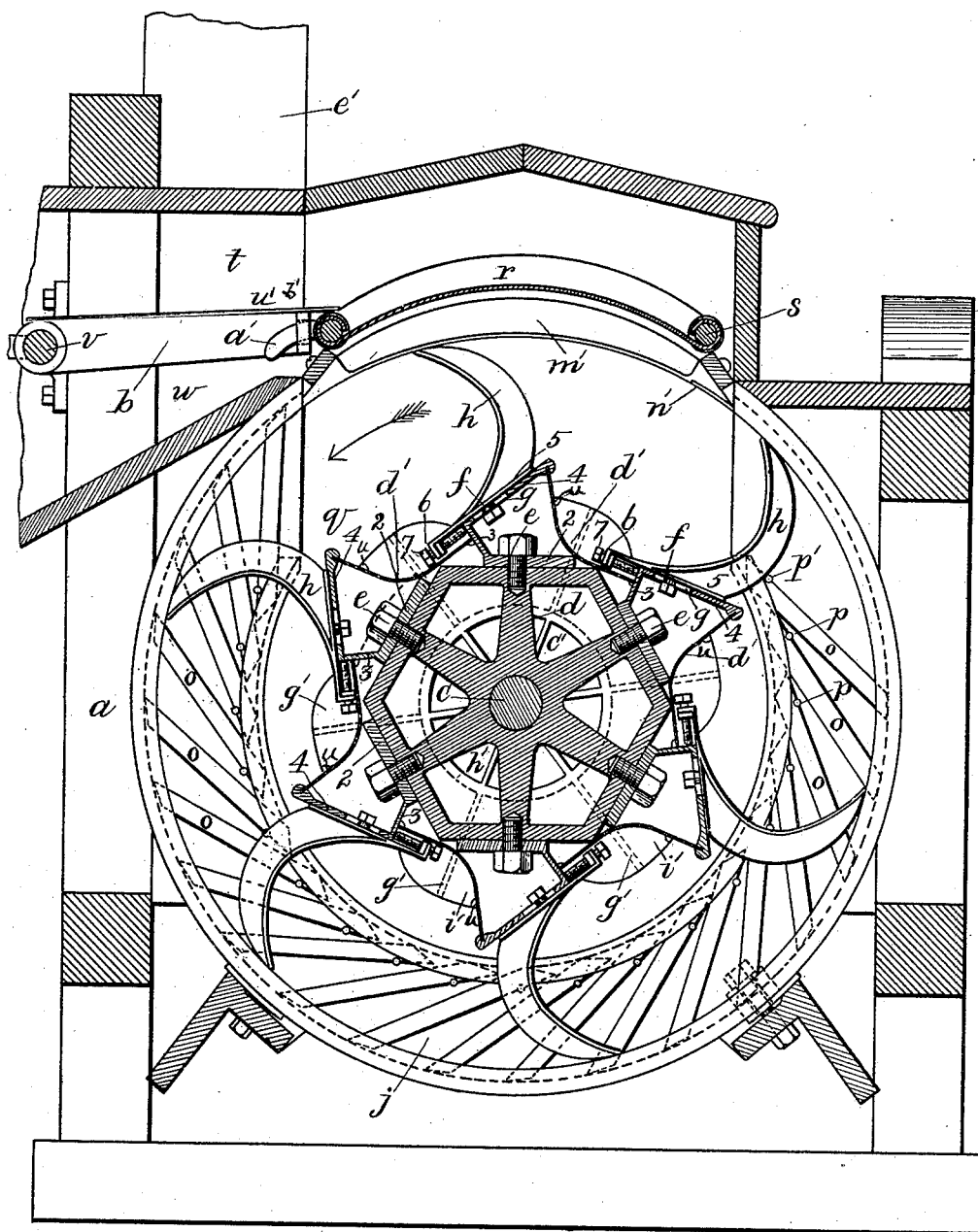


FIG. 3.

WITNESSES.

Albert D. Gove
H. Brown

INVENTOR.

C. A. Chandler
Knight, Brown & Co.
Atty.

(No Model.)

4 Sheets—Sheet 4.

C. A. CHANDLER.

MACHINE FOR SEPARATING LINT FROM COTTON SEED.

No. 422,916.

Patented Mar. 11, 1890.

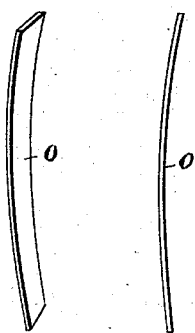
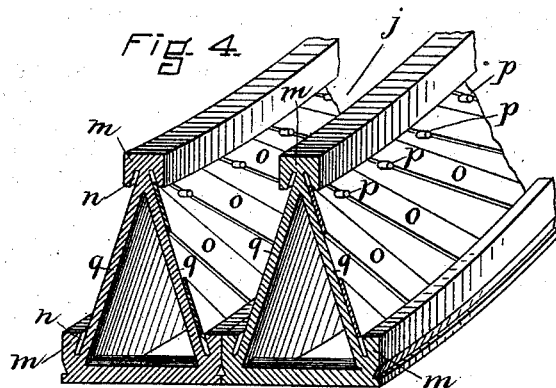
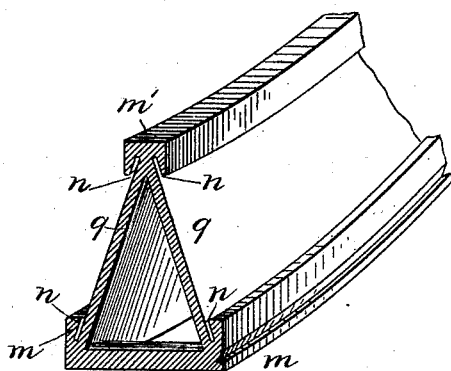


Fig. 7 Fig. 8.

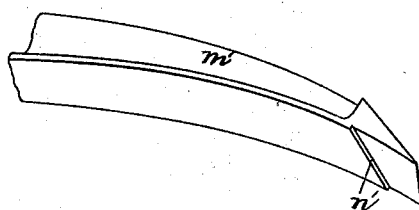


Fig. 6.

WITNESSES.

Albert D. Grover.
H. Brown

INVENTOR.

C. A. Chandler
Wm. H. Brown & Co.
Atty.

UNITED STATES PATENT OFFICE.

CLARENCE A. CHANDLER, OF EAST BRIDGEWATER, MASSACHUSETTS.

MACHINE FOR SEPARATING LINT FROM COTTON-SEED.

SPECIFICATION forming part of Letters Patent No. 422,916, dated March 11, 1890.

Application filed February 23, 1887. Renewed August 1, 1889. Serial No. 319,406. (No model.)

To all whom it may concern:

Be it known that I, CLARENCE A. CHANDLER, of East Bridgewater, in the county of Plymouth and State of Massachusetts, have invented certain new and useful Improvements in Machines for Separating Lint from Cotton-Seed, of which the following is a specification.

This invention has for its object to provide an improved machine for separating lint from cotton-seed by attrition; and it consists in the combinations and improvements which I will now proceed to describe and claim.

Of the accompanying drawings, forming a part of this specification, Figure 1 represents an end view of a machine embodying my invention. Fig. 2 represents a vertical section on line *x x*, Fig. 1. Fig. 3 represents a vertical section on line *y y*, Fig. 2. Figs. 4, 5, and 6 represent detail views. Figs. 7 and 8 represent, respectively, a perspective and an edge view of one of the cutters detached.

In the drawings, *a* represents the supporting-frame, having bearings *b b*, in which is journaled the shaft *c*, which is driven by power suitably applied. To the shaft *c* are affixed frames or spiders *d*, having polygonal perimeters, (in this instance hexagonal.) To the sides or faces of the spiders *d* are affixed by bolts *e* a series of plates or brackets extending parallel with the shaft, each bracket being composed of a base-piece 2, through which the attaching-bolts pass, a flange 3, formed on the base-piece at an angle thereto, and another flange 4, formed on the flange 3 and about at a right angle therewith. To the flanges 4 are affixed by bolts *f*, passing through slots *g* in said flanges, a series of fans or wings *h*, each of which is curved longitudinally, as shown in Fig. 3. Each fan has a base-plate 5 resting on the flange 4 and receiving the connecting-screw *f*. Said base-plate has at its forward edge a lug 6, through which passes an adjusting-screw 7, bearing at its inner end against the flange 3. The slots in the flange 4, through which the fan-attaching screws *f* pass, permit the fans to be adjusted crosswise of said flanges, the fans being thus caused to project more or less from the shaft *c*. The screws 7 support the fans *h* at any point to which they may be adjusted, and prevent them

from being forced backwardly by the resistance they experience in the operation of the machine, the fans rotating in the direction indicated by the arrow in Fig. 3.

It will be seen by reference to Fig. 2 that each bracket has a series of fans *h*, there being five on each bracket in the present instance. The fans on each bracket are in line with the corresponding fans on the other brackets, so that the fans are arranged in circular series.

j j j represent V-shaped segmental troughs secured to the supporting-frame, said troughs being composed of the sections formed, as shown in Figs. 2, 3, 4, and 5, each section being composed of two sides 9 9, arranged in V shape, shoulders *m* at the meeting edges of the sides 9 9, and shoulders *m* at the opposite edges of said sides. When the sections are placed side by side, as shown in Fig. 5, the adjacent sides of two sections constitute the V-shaped troughs. The shoulders *m* are provided with grooves *n*, in which are inserted cutters *o*, which are thin square-edged blades of steel of uniform thickness, inserted at their ends in the grooves *n* and extending diagonally across the inclined sides 9 9 of the troughs, as shown in Figs. 3 and 5. Pins *p* are here shown as locking each cutter, said pins being inserted in the sides of the troughs and bearing against the rear edges of the cutters, so as to resist pressure exerted on the cutters by the cotton-seed impelled by the fans in the direction of the rotation of the latter. In practice, however, it is not necessary to lock each cutter by a separate pin, as they are in contact with each other at their inner ends, as shown in Fig. 3; hence it is only necessary to secure the cutters at the ends of the series, the inner ends of the cutters being all locked between a shoulder *q*, Fig. 3, at one end of the series and a single pin *p'* at the other end of the series.

The cutters *o* are, as before stated, strips of steel of uniform thickness, and to each is imparted a longitudinal curvature, as shown in Figs. 7 and 8, so that when the ends of the cutters are inserted in the grooves at the sides of the troughs the cutters will be sprung from their normal shape, and will therefore be caused to bear closely against the sides of the

troughs, the sides of the cutters that are convex when the cutters are detached being placed in contact with the sides of the trough.

The thickness of each cutter *o* is equal to not more than one-half of the diameter of a cotton-seed. The fans *h* in revolving pass through the troughs, their edges being in close proximity to the cutters *o*, as indicated at the lower portion of Fig. 2, where the dotted lines within the troughs indicate the relation of the margins of the fans to the cutters on the sides of the troughs. The space between the margin of each fan and the sides of the trough through which it travels is somewhat less than the diameter of a cotton-seed, so that the seeds are impelled through the troughs by the fans and forced in contact with the successive cutters, the angular edges of which act to rapidly remove the lint from the seeds, the latter being given a rolling motion by the combined action of the revolving fans and the fixed cutters. The fans are curved, so that their front surfaces are concave, their acting portions that enter the troughs standing at an opposite angle or inclination to that of the cutters. This form insures a better lint-removing action than if the fans were approximately parallel with the cutters.

The sections comprising the V-shaped troughs are firmly bolted to suitable parts of the supporting-frame *a*, and they constitute a close casing partly surrounding the fans and their supporting and operating devices. The continuity of said troughs is interrupted, however, by a space over the shaft *c* and fans *h*. Over said space is a grating *r*, which is pivoted or hinged at *s* to the supporting-frame and is adapted to be raised at its opposite end.

The lint removed from the cotton-seed is carried by the outward current of air, caused by the action of the fans, through the spaces of the grating *r*, and passes out through a passage *t* to a receptacle outside the casing. The grating does not permit the escape of the seeds, however, its spaces being too narrow. When the lint has been removed from a batch of seeds, the swinging end of the grating is raised, and raises with it a movable plate *u'*, constituting the bottom of the lint-conducting passage *t*, said plate being pivoted at *v* to the supporting-frame, and constituting when raised the top of a passage *w*, through which the seeds are expelled by the centrifugal action of the fans when the passage is open. The swinging end of the grate has an arm *a'*, which enters an orifice in an arm *b'*, supporting the plate, and raises said arm and plate when the grate is raised. The seeds slide down the inclined bottom of the passage *w* to another receptacle.

Air is admitted through apertures *c'* *c'*, Figs. 1 and 2, in the ends of the casing of the machine to the space or chamber surrounding the shaft *c*, and passes outwardly from thence through perforated sheet-metal plates *d'*, which are attached to the rear edges of the inclined flanges 4, supporting the fans,

and extend across the intervening spaces to the front edges of the flanges 3, which support the flanges 4, said plates being curved to accommodate the forward ends of the bases of the fans and their adjusting-screws 7, as shown in Fig. 3.

The plates *d'* are in contact with or close to the sides of the heads of the screws 7, and prevent said screws from being accidentally turned, the plates being capable of removal to permit the turning of said screws when the fans are to be adjusted. The plates *d'* prevent the cotton-seed from lodging in the spaces between the fans and are curved to facilitate the movement of the seeds. Said plates also prevent the seeds and lint from entering the air-receiving chamber around the shaft within the fans.

It will be seen that the rotation of the fans creates a strong draft, causing the external air to rush into the space around the shaft *c*, and from thence into the fan-containing space or chamber and to carry the lint and dust out through the grate *r* and passage *t*, and also to assist in ejecting the cleaned seeds when the grate is raised.

The acting portions of the fans, or those portions that enter the troughs, are curved or inclined, so as to stand substantially at right angles to the cutters *o*, as shown in Fig. 3, so that the point of intersection of each fan with each cutter commences at one end of each and progresses gradually to the other end. This arrangement insures a steady and uniform action of the machine, and also causes the movement of the fans over the cutters to remove or wipe off any lint that may have a tendency to adhere to said edges.

The front sides of the fans are concave, this form adapting them to form the seeds into balls or rolls which are kept rolling in their passage through the troughs.

As before stated, the thickness of each cutter is less than one-half of the diameter of a cotton-seed, so that the seeds lodging against the sides of the V-shaped trough between the cutters cannot be crushed by the fans and cutters, as they might be if the cutters were thicker, but are forced by the fans out of the spaces between the cutters, and in moving across the edges of the cutters are subjected to the shearing or scraping action thereof.

It will be seen that the described means of adjusting the fans enables the latter to be brought as close to the cutters and to the bottoms of the troughs as may be desired. The seed to be cleaned is supplied to the machine by trunks or passages *e'* *e'*, which deliver the seed to the fan-containing chamber and are arranged to deliver the seed through orifices at *f'*, Fig. 1, in the ends of the casing. To the shaft *c*, close to the orifices where the seed enters the casing, are affixed two fan-wheels having radial blades *g'*, which strike the entering seeds and scatter or distribute them through the fan-containing chamber.

The distributing-blades *g'* are located out-

side of circular flanges h' , which are formed on the fan-wheels and project outwardly therefrom toward the end of the casing as a means for preventing the seed as it enters the casing from passing into the chamber around the shaft c . Outside of said circular flanges and beside the distributing-blades are webs i' on the fan-wheels. Said webs project radially and have depressions between them, and said webs have also lugs u , which bear against the outer sides of the perforated plates d' and keep the same from springing outwardly. The webs bear against the ends of the perforated plates d' and keep them from moving endwise. The fan-wheels are attached to the end spiders d by screws j' , passing through segmental slots k' in the webs. (See dotted lines, Fig. 1.) When said screws are loosened, the segmental slots permit the fan-wheels to be turned until the webs i' are moved away from the ends of the perforated plates, thus permitting said plates to be drawn out endwise.

The seed is supplied in charges, the supplying-passage being preferably closed after the introduction of each charge, so that the lint and cleaned seeds can escape only through the passages. After a charge has been sufficiently cleaned, the lint having been expelled, as already described, the grate r is opened and the seeds are ejected through the passage t . Another charge is then inserted, and so on. It is not absolutely essential, however, that the supplying-passages be closed during the cleaning operation, as said passages deliver the seeds so near the axis about which the fans rotate that the current of air created by the rotation of the fans does not escape to any material extent through said passages.

m' represents curved bars which extend across the space over the fans immediately under the grate r . Said bars are continuations of the bottoms of the troughs j , and constitute guards to prevent seeds from being crushed between the points of the fans and the bottoms of the troughs when the fans are entering the troughs. Each bar m' is cut away on its under side at the end next the end of the trough from which fans emerge, the cut-away portion terminating in a diagonal shoulder n' , Fig. 6. This cut-away portion enables any masses of lint that may have lodged on the points of the teeth to drop off as the teeth emerge from the troughs j' , the diagonal shoulders facilitating the passage of such lint into the open spaces beside the bars m' . Heating by continued rubbing of accumulations of lint against the bottoms of the troughs is thus obviated.

I do not limit myself to the details of construction nor to the exact form of parts shown and described, but may modify the same in various ways. For instance, the troughs j' may be rectangular in cross-section, or of other than the V form shown, without departing from the spirit of my invention.

I claim—

1. The combination, substantially as set forth, of a series of concave troughs having cutters attached to their sides, and a series of fans supported by a rotary shaft and formed to approximately fit said troughs.

2. The combination of a series of concave troughs having cutters attached to their sides, and a series of fans supported by a rotary shaft and with those portions of the fans proximate to the cutters substantially at right angles with said cutters, as set forth.

3. The combination of a series of concave troughs having cutters affixed to their sides, and a series of fans supported by a rotary shaft and having concave front sides formed to roll the seeds into ball form, the portions of the fans proximate to the cutters being substantially at right angles with said cutters, as set forth.

4. A concave trough having a series of metal strips attached to its sides, said strips constituting cutters, as set forth.

5. A concave trough having grooves at the opposite edges of its sides, combined with metal strips of uniform thickness inserted at their ends in said grooves and extending across the sides of the troughs, as set forth.

6. A concave trough having grooves at the opposite edges of its sides, combined with metal strips of uniform thickness inserted at their ends in said grooves and extending diagonally across the sides of the trough, the inner ends of said strips being in contact with each other, and locking devices, substantially as described, for said strips.

7. The combination of the fixed concave troughs having cutters, the rotary shaft having the heads or spiders, the brackets attached to said heads and provided with inclined flanges, as 4, the fans supported by said flanges, and means, substantially as described, for adjusting the fans upon the flanges and positively securing them in any position to which they may be adjusted.

8. The combination of a rotary shaft, the brackets supported by heads or spiders on said shaft, the fans supported by said brackets, and the perforated plates extending across the spaces between the brackets to prevent the seeds from passing into the space around the shaft and to permit the passage of air from said space, as set forth.

9. The combination of a series of fans, a rotary shaft supporting said fans and having a frame-work inclosing an air space or chamber within the chamber in which the fans revolve, said chambers communicating with each other, a series of segmental troughs armed with cutters and arranged to receive said fans, a casing inclosing said shaft, fans, and troughs and having passages to admit air to the space around which the fans revolve, and a discharge passage or passages for the materials operated upon, substantially as described.

10. A series of fans, a rotary shaft supporting said fans and having a frame-work inclosing an air space or chamber within the cham-

ber in which the fans revolve, said chambers communicating with each other, a series of troughs proximate to the fans, as described, a casing inclosing said shaft, fans, and troughs and having air inlet and outlet passages, means for admitting cotton-seeds to the fan-containing chamber at the ends of the casing, and distributing-fans on the shaft, all in combination, substantially as described, whereby the entering seeds are scattered or distributed, as set forth.

11. The combination, substantially as set forth, of the casing having an outlet-passage, as *t*, the concave troughs having cutters along their sides, the rotary fans supported by a frame which receives air through apertures in the casing of the machine and permits the passage of the air to the chamber in which the fans work, and the grate *r*, interposed between the fan-chamber and the outlet-passage, as set forth.

12. The combination of the casing, the shaft rotating therein and having the fans and fan-supporting devices and the perforated plates *d'*, the concave troughs having cutters, the casing having the lint-escape passage *t* and

the seed-escape passage *w*, the movable plate *u'*, separating said passages, and the hinged grate engaged at its swinging end with said plate, and thereby adapted to raise and lower the same, as set forth.

13. The combination, with the concave troughs and the rotary fans working therein, of the curved bars extending across the space between the ends of the troughs in continuation of the bottoms of said troughs, whereby the fans are prevented from catching seeds in entering said troughs, as set forth.

14. The combination, with the concave troughs and the rotary fans, of the curved bars *m'*, arranged as shown, and cut away at *n'* to permit the escape of accumulations of lint from the points of the fans, as set forth.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 18th day of February, 1887.

CLARENCE A. CHANDLER.

Witnesses:

C. F. BROWN,

ARTHUR W. CROSSLEY.