

No. 753,488.

PATENTED MAR. 1, 1904

E. W. HAYS.
COTTON GIN AND CONDENSER.

APPLICATION FILED AUG. 28, 1902.

NO MODEL.

2 SHEETS—SHEET 1.

Fig. 2.

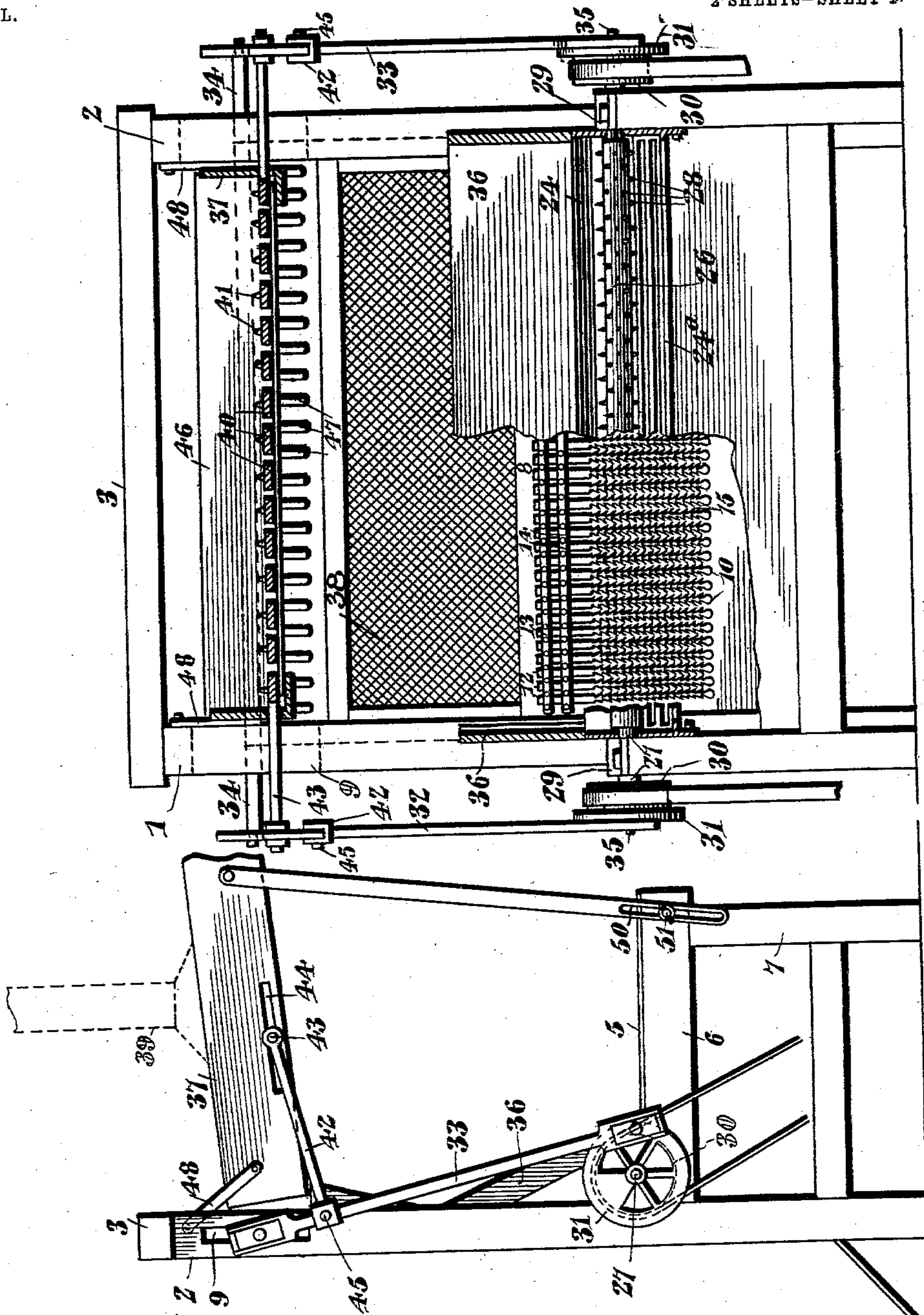


Fig. 1.

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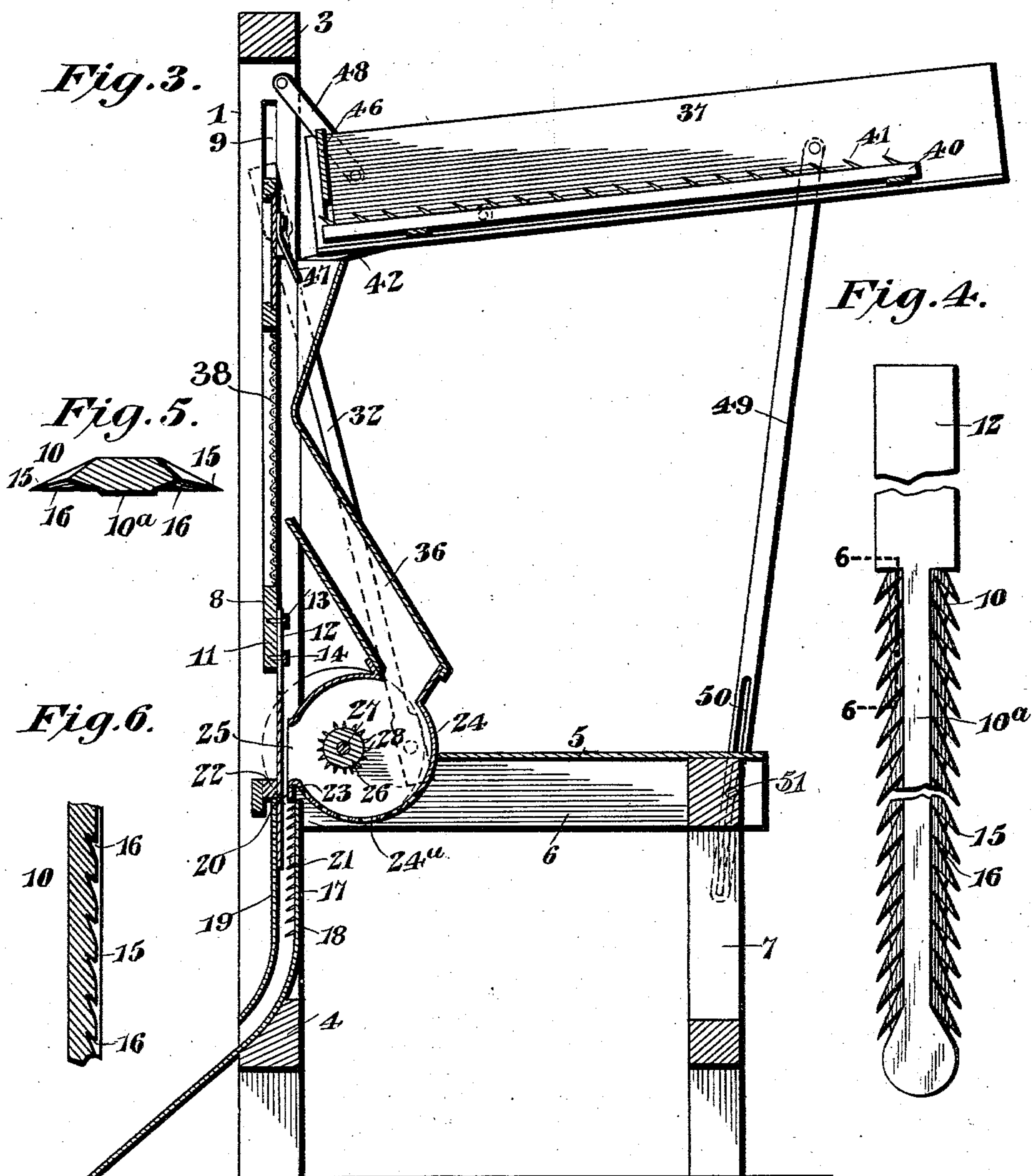
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UNITED STATES PATENT OFFICE.

EDWARD WARD HAYS, OF BIRMINGHAM, ALABAMA, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, OF ONE-HALF TO J. W. HAWKINS AND W. J. HOLLAND, OF BIRMINGHAM, ALABAMA, AND HARRY HAWKINS, OF NEW YORK, N. Y.

COTTON GIN AND CONDENSER.

SPECIFICATION forming part of Letters Patent No. 753,488, dated March 1, 1904.

Application filed August 28, 1902. Serial No. 121,366. (No model.)

To all whom it may concern:

Be it known that I, EDWARD WARD HAYS, a citizen of the United States, residing at Birmingham, in the county of Jefferson and State of Alabama, have invented a new and useful Cotton Gin and Condenser, of which the following is a specification.

This invention relates to a combined cotton gin and condenser, and has for its object to provide a simple machine involving an inexpensive construction and an economical expenditure of power and capable of effecting the complete ginning or delinting of the ordinary or short-staple cotton-seed and the simultaneous condensing of the cotton, so that the latter will be fed from the gin in the form of a bat ready for baling.

Another object of the invention is to so organize the ginning mechanism that the staple or fiber will not be broken, but will be removed from the seeds and fed from the gin in natural lengths.

Further objects of the invention are the provision of ginning blades or saws any one of which may be readily removed and replaced without disturbing the others in the case of derangement or mutilation and the provision of a novel and readily-adjustable automatic feeder for feeding the seed-cotton to the ginning apparatus at a speed corresponding to that at which the gin is operated.

In addition to these objects are others subordinate thereto, as will appear during the course of the succeeding description of the illustrated embodiment of the invention.

In the accompanying drawings, Figure 1 is a side elevation of my combined gin and condenser. Fig. 2 is a front elevation thereof with parts broken away. Fig. 3 is a vertical sectional view. Fig. 4 is an elevation of one of the delinting blades or saws, and Fig. 5 is a transverse section thereof. Fig. 6 is a sectional view on the line 6 6 of Fig. 4, showing the undercut biting edges or projections on the front face of the blade.

Like numerals of reference are employed to

designate corresponding parts throughout the views.

The frame of the machine comprises a pair of standards 1 and 2, connected by horizontal beams 3 and 4, and a table 5, having side beams 6, connected at their rear ends to the standards 1 and 2 and supported at their front ends by suitable supports 7.

The most distinctive feature of the apparatus considered as a departure from usual gin constructions is a reciprocating blade or saw frame 8, engaging suitable guide-grooves 9 in the opposed faces of the standards 1 and 2 and carrying a series of vertically-disposed delinting blades or saws 10. The saw-frame 8 is of open form and comprises at its lower end a transverse slat 11, against which the flat shanks 12 of the saws 10 are clamped by a pair of clamping-strips 13 and 14, screwed to the slat 11. This character of retaining means permits the ready removal of any individual saw in the event of its mutilation or derangement without necessitating the removal of the remaining saws of the series, this latter feature being of considerable importance, since it is well understood by those skilled in the art that the replacement of a saw in ordinary forms of gins is accomplished only by the disorganization of the entire gang of saws associated with the injured member. The saws or blades 10 are of peculiar construction. As shown more clearly in Fig. 2, they are disposed edge to edge with an interval sufficiently small to prevent the passage of cotton-seeds between them, and their edges are formed with downwardly-pointing teeth 15, the under edges 16 of which are extended upon the front face of the saw and are undercut, so as to form biting edges or corrugations extending upon the front faces of the saws and constituting continuations of the lower edges of the teeth. It will therefore appear that the staple presented to the flat front faces of the saws will be engaged not only by the teeth of the latter, but also by these biting edges, which materially assist the teeth in retaining the sta-

ple or lint during the downward movement of the saws.

The cotton, presented to the saws in a manner to be hereinafter described, is carried
5 down into what may be termed a "condensing-chamber" 17, the front and back walls 18 and 19 of which are separated by an interval corresponding to the thickness of the bat desired. This condensing-chamber 17 extends continu-
10 ously the full width of the frame and at its upper end is formed with a constricted throat 20, through which the lint is forced as the saws move downwardly, each charge of cotton being retained within the condensing-chamber
15 by engagement with teeth or projections 21, extending, for instance, from the front wall 18 and having a slight downward inclination, so that the upward or retractile movement of the saws will effect their complete dis-
20 engagement from the cotton previously delivered to the chamber. The manner of producing the constricted throat 20 of the condensing-chamber is immaterial; but said throat is preferably defined between a pair of parallel
25 horizontal metallic bars 22 and 23, having their opposite ends rigidly secured in the framework. The bar 22 at the rear side of the throat constitutes a backing for the blades, the lower ends of which never move above this
30 bar, and the space between the front faces of the blades and the front bar 23 of the throat is sufficiently narrow to prevent the seeds from being carried down into the condensing-chamber with the staple. As the front bar 23 of
35 the throat is disposed close to the front faces of the blades, I provide each of said blades with a longitudinal rib 10^a, extending along the middle of its front face and designed to prevent the teeth or biting edges of the saws from
40 being brought into contact with the bar 23 when the pressure of the cotton against the saws is insufficient to hold them back against the bar 22.

We have now seen that the device compre-
45 hends the employment of a series of reciprocatory gin saws or blades arranged to carry the cotton or staple into a narrow condensing-chamber in successive charges, so that the action of the ginning or delinting mechanism
50 will simultaneously effect the delinting of the cotton-seeds and the formation of a bat which as it is delivered from the gin is ready for baling.

I will now proceed to describe the mechanism by means of which the seed-cotton is fed
55 to the gin-saws in a manner to insure the complete delinting of the seeds without danger of breaking the staple. Immediately in front of the gin-saws is mounted a roll-casing 24,
60 extending the full width of the frame, or at least the full width of the series of saws, and having its open rear side 25 disposed in close proximity to the saws and preferably supported by the front bar 23 of the throat.

The bottom of the casing 24 is of open-work 65 form to permit dirt carried into the casing with the cotton to be discharged and is provided with an enlarged discharge-opening 24^a, through which the cotton-seeds are delivered
70 after having been delinted in a manner to be explained. Within this roll-casing is mounted at an eccentric point, so as to bring it nearer the saws, a feed-roller 26, mounted upon a
75 shaft 27 and provided with projections or spikes 28. The shaft 27 is mounted in suitable bearings 29, carried by the frame, and is provided with suitable power-pulleys 30 and crank-wheels 31. The pulleys 30 are intend-
80 ed to be belted to a suitable source of power, (not illustrated,) and the crank-wheels are designed to transmit motion to the saw-frame 8 through the medium of pitmen 32 and 33, con-
85 nected at their upper ends to horizontally-disposed trunnions 34, projecting from the upper end of the saw-frame 8, and at their lower
90 ends to the wrist-pins 35 of the wheels 31. It will now be observed that since the saw or blade frame derives its motion from the shaft 27, which also operates the feed-roller 26, the
95 speed of the feeding and delinting mechanisms will be maintained in proper ratio, it being impossible to increase the speed of one without increasing the speed of the other pro-
100 portionately. The seed-cotton is fed into the roll-casing 24 through a hopper 36, opening
95 into the upper side of the casing in rear of the feed-roller 26. The hopper, being necessarily of some length in order to convey cotton from an overhead feed-box 37, has its
100 open rear side closed by wire-netting 38, stretched across the saw-frame 8 and designed to assist in the feeding of the cotton through the hopper, as will hereinafter appear.

The feed-box 37 is designed to receive the
105 cotton, for instance, from a pneumatic conveyor 39, and is provided with a reciprocatory slatted bottom or feed-slide 40, having
110 rearwardly-inclined teeth 41 and arranged to be reciprocated by the pitmen 32 and 33 through the medium of links 42, pivotally
115 connected at their front ends to trunnions 43, extending through slats 44 in the sides of the box and having adjustable connection at their
120 rear ends with the pitmen, as indicated at 45. Obviously the throw or movement of the feed-slide 40 within the feed-box may be regulated by adjusting the rear ends of the links
125 42 upon the pitmen, the throw being increased as the connection 45 is moved farther away from the trunnions 34, from which the
120 pitmen swing. The slatted construction of the feed-slide will permit any debris held by the cotton to drop through the open bottom of the box.

At the front end of the feed-box is arranged
125 a sliding feed-gate 46 for regulating the quantity of cotton fed out of the feed-box by each movement of the feed-slide. As cotton is fed

out of the feed-box it is forcibly carried into the upper end of the hopper by a series of flexible feeding-fingers 47, extending from the front face of the saw-frame 8 adjacent to its upper end and preferably constructed of rubber or other flexible material and having a slight forward inclination, as shown. In order that the inclination of the feed-box 37 may be varied, the latter is supported at its front end by links 48, swung from the upper end of the frame, and the rear end of the box is pivotally connected to the upper ends of a pair of longitudinally-adjustable supports 49, provided at their lower ends with elongated slots 50, engaged by set-screws 51, screwed into the sides of the table.

The operation of the device is as follows: The inclination of the feed-box 37 and the stroke of the feed-slide 40 having been properly adjusted, motion is communicated to the shaft 27 to cause the rotation of the feed-roller 26 and the reciprocation of the saw-frame and saws and of the slide 40. The seed-cotton deposited in the feed-box from the pneumatic conveyer 39 will be fed from the front end of the box and will be carried down into the upper end of the hopper 36 by the feeding-fingers 47, projecting from the saw-frame. The feeding of the cotton through the hopper will be assisted by the netting 38, and as the cotton is delivered to the roll-casing 24 it will be engaged by the spiked roller 26 and wound into a rapidly-rotating roll. By reason of the eccentric location of the roller within the casing the cotton will be urged against the front faces of the blades or saws, and the downward movement of the latter will cause them to engage the staple or lint and carry it down through the constricted throat 20 and into the condensing-chamber 17, where it will be retained, as stated. The teeth of the saws and the biting or delinting edges upon the front faces thereof will engage the lint, and as the latter is carried down the individual locks of cotton will be revolved to present the different sides of the irregularly-formed seeds to the saws. This action, which is both novel and effective, is increased by reason of the fact that that side of the roll of seed-cotton next to the saws moves upwardly, carrying the seeds up along the front faces of the descending saws and turning them over and over to insure the complete removal of the lint. If, however, the seeds should be carried back by the revolving roll of cotton before all of the lint has been detached, said seeds will be carried around by the roll and again presented to the saws until they are completely denuded of fiber. When the seed has been completely stripped, it will cease to adhere to the roll of seed-cotton revolving within the roll-casing and will therefore drop through a discharge-opening 24^a in the bottom of the latter. By reason of the fact that the saws are presented flatwise to the seed-cotton and not edgewise,

as usual, the staple will not be broken, but will be detached in natural lengths and fed into the condensing-chamber 17, from the lower end of which it will issue at the rear side of the gin in the form of a condensed bat ready for baling without subsequent manipulation.

It is thought that from the foregoing the construction and operation of my combined gin and condenser will be clearly apparent; but while the present embodiment of the invention is thought at this time to be preferable I do not wish to limit myself to the structural details defined, as, on the contrary, I reserve the right to effect such changes, modifications, and variations of the illustrated structure as may be properly embraced within the scope of the protection prayed.

What I claim is—

1. In a cotton-gin, the combination with a throat, of a series of delinting-blades to carry the lint through the throat, the intervals between the blades and between the front side of the throat and the blades being too small to permit the passage of a cotton-seed between the blades or into the throat.
2. In a cotton-gin, the combination with a throat, of a series of reciprocatory delinting-blades arranged to carry the lint through the throat, and means for presenting a rotating roll of seed-cotton to said blades.
3. In a cotton-gin, the combination with a throat, of a series of reciprocatory delinting-blades disposed to prevent seeds from passing between the same and arranged to carry the lint through the throat, and means for presenting a rotating roll of seed-cotton to the blades.
4. In a cotton-gin, the combination with a throat, of a series of reciprocatory delinting-blades arranged to carry the lint through the throat, a roll-casing having an opening arranged opposite the blades, and means for rotating a roll of seed-cotton within the roll-casing and in contact with the blades.
5. In a cotton-gin, the combination with a throat, of a series of reciprocatory delinting-blades disposed to prevent the seeds from passing between the same and arranged to carry the lint through the throat, and a feed-roller disposed adjacent to the blades and designed to rotate a roll of seed-cotton in contact with said blades.
6. In a cotton-gin, the combination with a throat, of a series of reciprocatory delinting-blades arranged to carry the lint through the throat, a roll-casing having an opening disposed opposite the blades, and a feed-roller located within the casing and designed to rotate a roll of seed-cotton in contact with the blades.
7. In a cotton-gin, the combination with a throat, of a series of reciprocatory delinting-blades arranged to carry the lint through the throat, a roll-casing having an opening dis-

posed opposite the blades, and a feed-roller mounted eccentrically within the roll-casing and designed to rotate a roll of seed-cotton in contact with the blades.

5 8. In a cotton-gin, the combination with a throat, of a series of reciprocatory delinting-blades arranged to carry the lint through the throat, a roll-casing having an opening disposed opposite the blades and also provided
10 with a discharge-opening in its bottom, and means for rotating a roll of seed-cotton within the roll-casing.

9. In a cotton-gin, the combination with a throat, of a series of reciprocatory delinting-
15 blades arranged to carry the lint through the throat, a roll-casing having an open-work bottom through which the dirt and seeds may escape, and also having an opening disposed opposite the blades, and means for rotating a
20 roll of seed-cotton within the roll-casing.

10. In a cotton-gin, the combination with a throat, of a series of reciprocatory delinting-blades arranged to carry the lint through the throat, means for rotating a roll of seed-cot-
25 ton in contact with the blades, and means for feeding seed-cotton to the roll.

11. In a cotton-gin, the combination with a throat, of a series of reciprocatory delinting-blades arranged to carry the lint through the
30 throat, a feed-roller disposed to rotate a roll of seed-cotton in contact with the blades, and means for feeding seed-cotton to the roller.

12. In a cotton-gin, the combination with a throat, of a series of reciprocatory delinting-
35 blades arranged to carry the lint through the throat, a roll-casing having an opening disposed opposite the blades, means for feeding seed-cotton to the roll-casing, and means for forming and rotating a roll of seed-cotton
40 within the roll-casing and in contact with the blades.

13. In a cotton-gin, the combination with a throat, of a series of reciprocatory delinting-blades arranged to carry the lint through the
45 throat, a roll-casing, a hopper disposed to deliver seed-cotton to the casing, and a feed-roller rotatable within the casing to form and rotate a roll of seed-cotton in contact with the blades.

50 14. In a cotton-gin, the combination with a throat, of a series of reciprocatory delinting-blades arranged to carry the lint through the throat, means for rotating a roll of seed-cotton in contact with the blades, a hopper for
55 delivering seed-cotton to the roll, and feeding mechanism for delivering seed-cotton to the hopper.

15. In a cotton-gin, the combination with a throat, of a series of reciprocatory delinting-
60 blades arranged to carry the lint through the throat, means for rotating a roll of seed-cotton in contact with the blades, a hopper for delivering seed-cotton to the roll, feeding mechanism for delivering seed-cotton to the
65 hopper, and means for regulating the feed.

16. In a cotton-gin, the combination with a throat, of a series of reciprocatory delinting-blades arranged to carry the lint through the throat, means for rotating a roll of seed-cotton in contact with the blades, a hopper for
70 delivering seed-cotton to the roll, a movable feeder for feeding cotton to the hopper, and means for regulating the movement of the feeder.

17. In a cotton-gin, the combination with a throat, of a series of reciprocatory delinting-blades arranged to carry the lint through the throat, means for rotating a roll of seed-cotton in contact with the blades, a hopper dis-
75 posed to deliver seed-cotton to the roll, a feed-box disposed above the hopper, a feed-slide within the box, and means for operating the slide.

18. In a cotton-gin, the combination with a throat, of a series of reciprocatory delinting-
85 blades arranged to carry the lint through the throat, means for rotating a roll of seed-cotton in contact with the blades, a hopper delivering cotton to the roll, a feed-box delivering to the hopper, a feed-slide within the box,
90 means for operating the slide, and means for adjusting the position of the box.

19. In a cotton-gin, the combination with a throat, of a series of reciprocatory delinting-blades arranged to carry the lint through the
95 throat, a reciprocatory blade-frame carrying said blades, and means operated by the frame for feeding seed-cotton toward the blades.

20. In a cotton-gin, the combination with a throat, of a series of reciprocatory delinting-
100 blades arranged to carry the lint through the throat, a reciprocatory blade-frame carrying the blades, means for rotating a roll of seed-cotton in contact with the blades, and means operated by the blade-frame for feeding seed-
105 cotton toward the roll.

21. In a cotton-gin, the combination with a throat, of a series of reciprocatory delinting-blades arranged to carry the lint through the
110 throat, a blade-frame carrying the blades, a roll-casing, means within the roll-casing for forming and rotating a roll of seed-cotton in contact with the blades, and means operated by the blade-frame for feeding seed-cotton to
115 the roll-casing.

22. In a cotton-gin, the combination with a throat, of a series of reciprocatory delinting-blades arranged to carry the lint through the throat, a blade-frame carrying said blades, a
120 roll-casing, means for rotating a roll of seed-cotton within the casing and in contact with the blades, a hopper leading to the roll-casing, and means operated by the blade-frame for feeding seed-cotton through the hopper.

23. In a cotton-gin, the combination with a throat, of a series of reciprocatory delinting-
125 blades arranged to carry the lint through the throat, a blade-frame carrying said blades, a roll-casing, means for rotating a roll of seed-cotton within the casing and in contact with
130

the blades, a hopper delivering to the roll-casing, and feeding-fingers carried by the blade-frame and disposed to assist the movement of the cotton through the hopper to the roll-casing.

24. In a cotton-gin, the combination with a throat, of a series of reciprocatory delinting-blades arranged to carry the lint through the throat, a blade-frame carrying said blades, means for rotating a roll of seed-cotton in contact with the blades, a hopper disposed to deliver seed-cotton to said roll, a feed-box disposed to deliver to the hopper, and feeding-fingers extending from the blade-frame and disposed to insure the delivery of cotton from the feed-box to the hopper.

25. In a cotton-gin, the combination with a throat, of a series of reciprocatory delinting-blades arranged to carry the lint through the throat, a blade-frame carrying said blades and having a panel of wire-netting, means for rotating a roll of seed-cotton in contact with the blades, and a hopper disposed to deliver seed-cotton to the roll and having an open side closed by the netting of the blade-frame.

26. In a cotton-gin, the combination with a throat, of a series of reciprocatory delinting-blades arranged to carry the lint through the throat, a blade-frame carrying said blades and provided with flexible feeding-fingers, a hopper for delivering seed-cotton to the blades, and a feed-box delivering to the hopper and disposed within the range of action of the flexible feeding-fingers.

27. In a cotton-gin, the combination with a throat, of a series of reciprocatory delinting-blades arranged to carry the lint through the throat, a blade-frame carrying said blades and provided with feeding-fingers, a roll-casing, a feed-roller within the roll-casing designed to rotate a roll of seed-cotton in contact with the blades, a hopper leading to the roll-casing, a feed-box arranged to deliver cotton to the hopper, a feed-slide within the feed-box, and operating means common to the blade-frame and feed-slide.

28. In a cotton-gin, the combination with a throat, of a series of reciprocatory delinting-blades arranged to carry the lint through the throat, a vertically-reciprocatory blade-frame carrying the blades and provided with feeding-fingers, a roll-casing disposed opposite the blades, a feed-roller within the roll-casing, a vertically-disposed hopper delivering to the roll-casing, a horizontal feed-box disposed above the hopper, a horizontally-reciprocatory feed-slide within the feed-box, operating mechanism common to the feed-roller, blade-frame and feed-slide, and means for regulating the throw of the feed-slide.

29. In a cotton-gin, the combination with a throat, of a series of reciprocatory delinting-blades arranged to carry the lint through the throat, a reciprocatory blade-frame carrying the blades, a shaft, a feed-roller mounted on

the shaft and disposed to rotate a roll of seed-cotton in contact with the blades, a pitman operatively connecting the shaft with the blade-frame, a hopper arranged to deliver seed-cotton to the roller, a feed-slide arranged to deliver cotton to the hopper, and a link pivotally connected to the feed-slide and adjustably connected to the pitman.

30. In a combined cotton gin and condenser, the combination with a condensing-chamber having a constricted throat, of a series of reciprocatory delinting-blades arranged to deliver the lint through the throat and into the condensing-chamber, and means for presenting seed-cotton to the blades.

31. In a combined cotton gin and condenser, the combination with a condensing-chamber having a constricted throat, of a series of reciprocatory delinting-blades disposed to carry the lint through the throat and into the chamber, means within the condensing-chamber for stripping the lint from the blades, and means for presenting seed-cotton to the blades.

32. In a combined cotton gin and condenser, the combination with a condensing-chamber of a width corresponding to the thickness of the bat to be formed and having a constricted throat, of a series of reciprocatory delinting-blades arranged to carry the lint through the throat and into the condensing-chamber, projections located within the condensing-chamber to engage the lint for the purpose of stripping the same from the blades, and means for presenting seed-cotton to the blades.

33. In a combined cotton gin and condenser, the combination with a condensing-chamber having a constricted throat, of a series of reciprocatory delinting-blades disposed to carry the lint through the throat and into the chamber, and means for presenting a rotating roll of seed-cotton to the blades.

34. In a combined cotton gin and condenser, the combination with a condensing-chamber having a constricted throat at its upper end, of a series of reciprocatory delinting-blades disposed to carry the lint through the throat and into the chamber, a roll-casing disposed above the throat and having an opening opposite the blades, and means for rotating a roll of seed-cotton within the roll-casing and in contact with the blades.

35. In a cotton-gin, the combination with a throat, of a series of reciprocatory delinting-blades arranged to carry the lint through the throat, said blades having toothed edges and projections upon their front faces.

36. In a cotton-gin, the combination with a throat, of a series of reciprocatory delinting-blades arranged to carry the lint through the throat, each blade having downwardly-directed teeth and undercut biting edges extended upon its front face.

37. In a cotton-gin, the combination with a throat, of a series of reciprocatory delinting-blades arranged to carry the lint through the

throat, each blade having downwardly-directed teeth and undercut biting edges extended upon its front face, said biting edges constituting continuations of the under edges of the teeth.

38. In a cotton-gin, the combination with a throat, of a series of reciprocatory delinting-blades arranged to carry the lint through the throat, each blade being formed at its opposite edges with downwardly-disposed teeth, undercut biting edges extending upon the front face of the blade and constituting continuations of the under edges of the teeth, and a rib or projection extending lengthwise of the blade upon the front face thereof to protect the teeth and biting edges.

39. In a cotton-gin, the combination with a series of movable delinting-blades, of means for moving a body of seed-cotton in a direction opposite to the movement of the blades and in contact therewith.

40. In a cotton-gin, the combination with a series of movable delinting-blades, of means for presenting a rotating roll of seed-cotton to said blades.

41. In a combined cotton gin and condenser, the combination with a condensing-chamber having the form of the bat to be produced, of a series of delinting-blades disposed to remove the lint from the cotton-seeds and to pass said

lint into the condensing-chamber, and means for presenting seed-cotton to the blades.

42. In a combined cotton gin and condenser, the combination with ginning mechanism, of a condensing-chamber of a size substantially corresponding to that of the bat to be formed and disposed to receive the lint directly from the ginning mechanism.

43. In a cotton-gin, the combination with a throat, of a series of reciprocatory delinting-blades to carry the lint through the throat, the intervals between the blades and between the front side of the throat and the blades being too small to permit the passage of a cotton-seed between the blades or into the throat, and means for presenting and re-presenting seed-cotton to the blades until substantially denuded of lint.

44. In a cotton-gin, the combination with a throat, of a series of reciprocatory delinting-blades to carry lint through the throat and having projections on their front faces, and means for presenting seed-cotton to the blades.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

EDWARD WARD HAYS.

Witnesses:

W. J. HOLLAND,

J. F. LYNCH.