

(No Model.)

4 Sheets—Sheet 1.

G. F. BROTT.
COTTON GIN.

No. 434,859.

Patented Aug. 19, 1890.

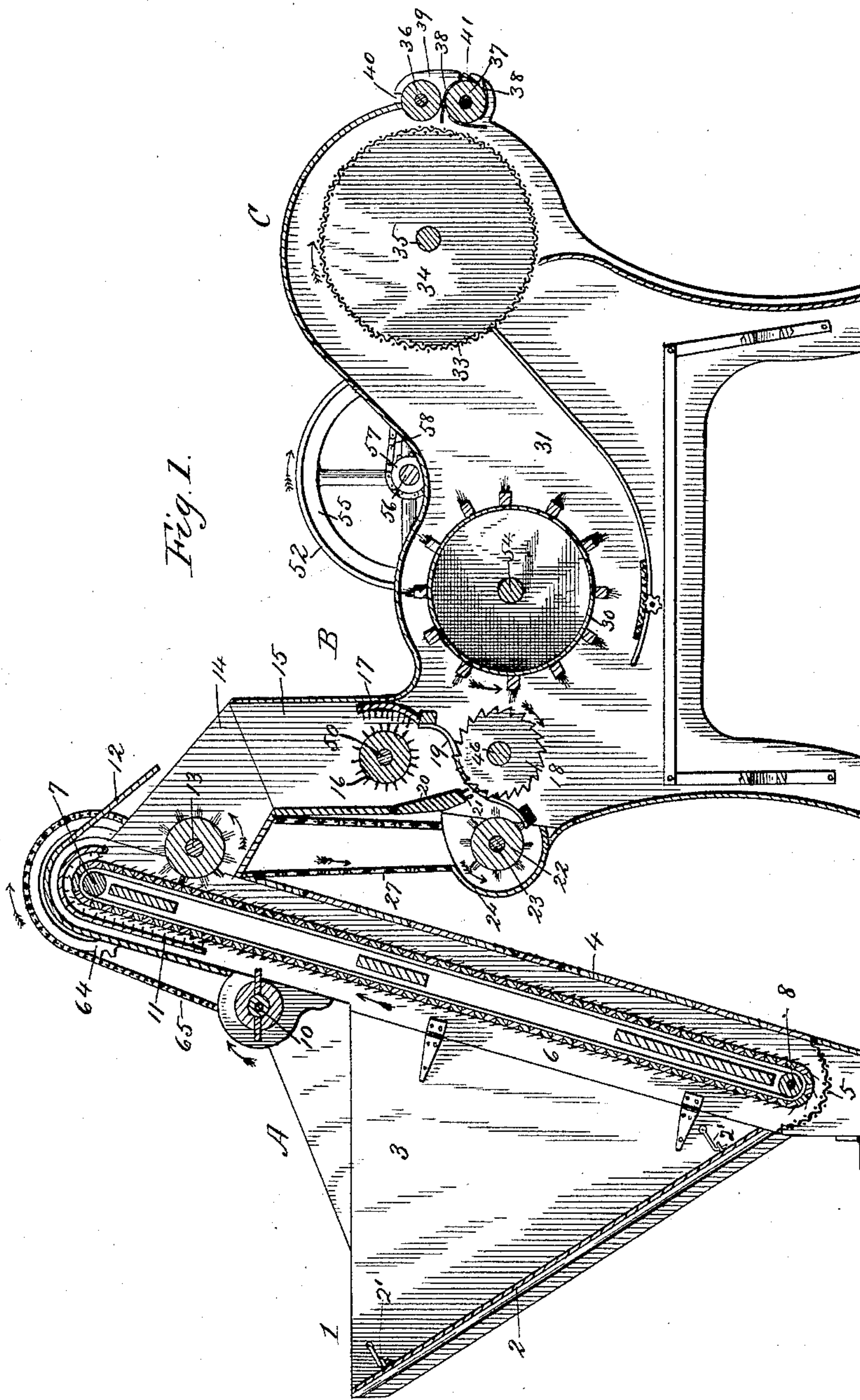


Fig. 1.

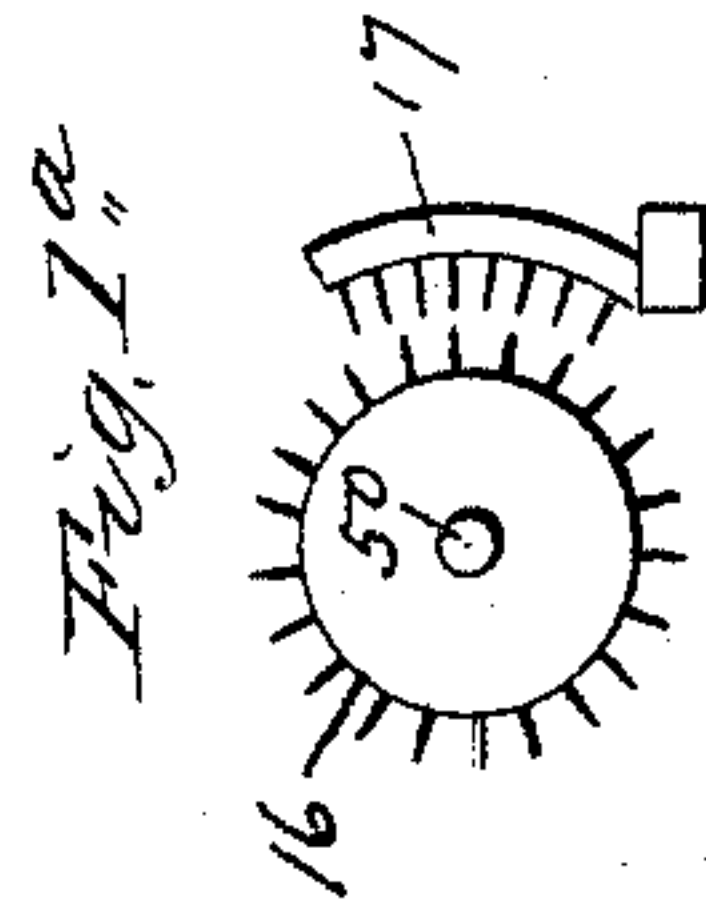


Fig. 1a.

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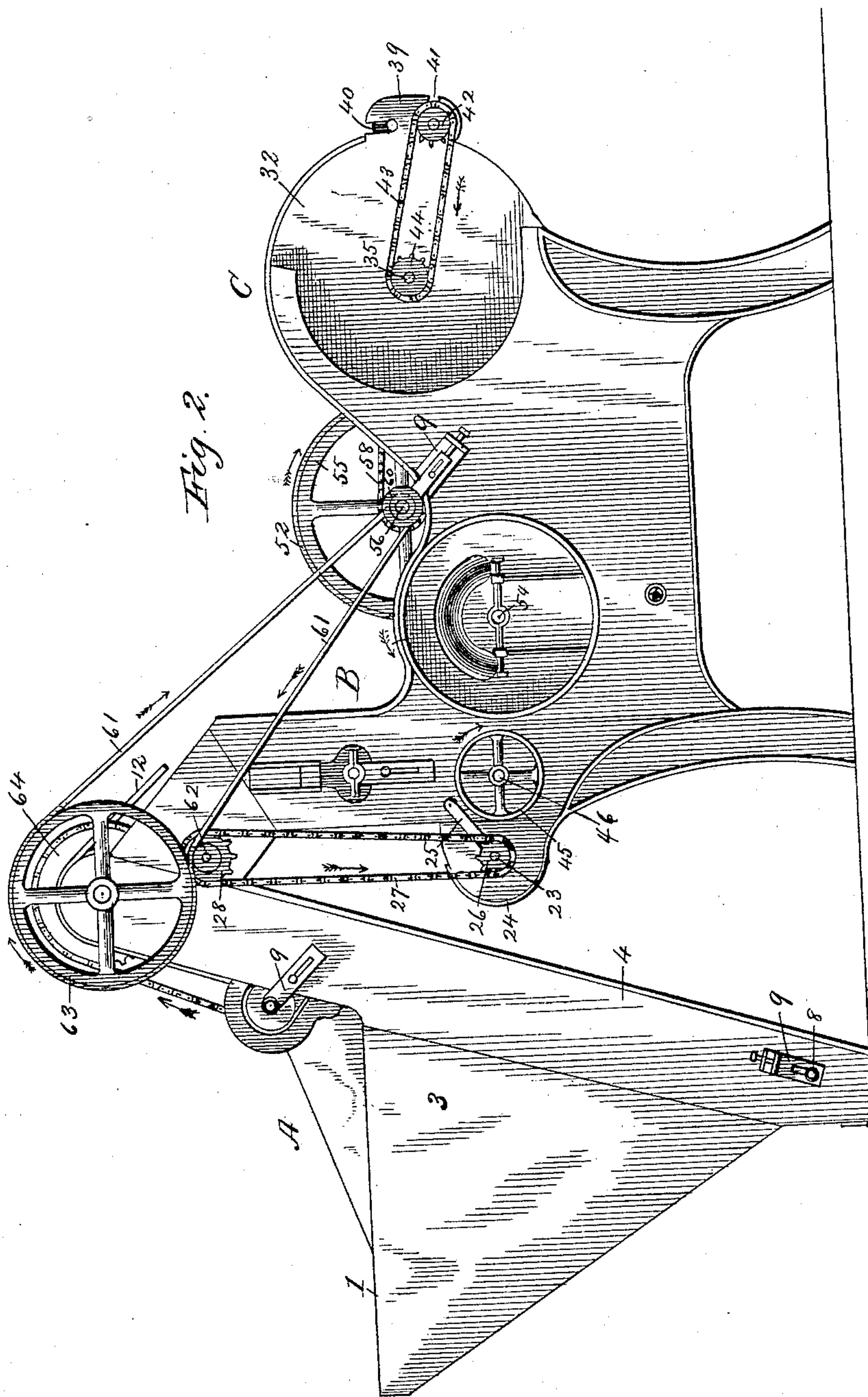
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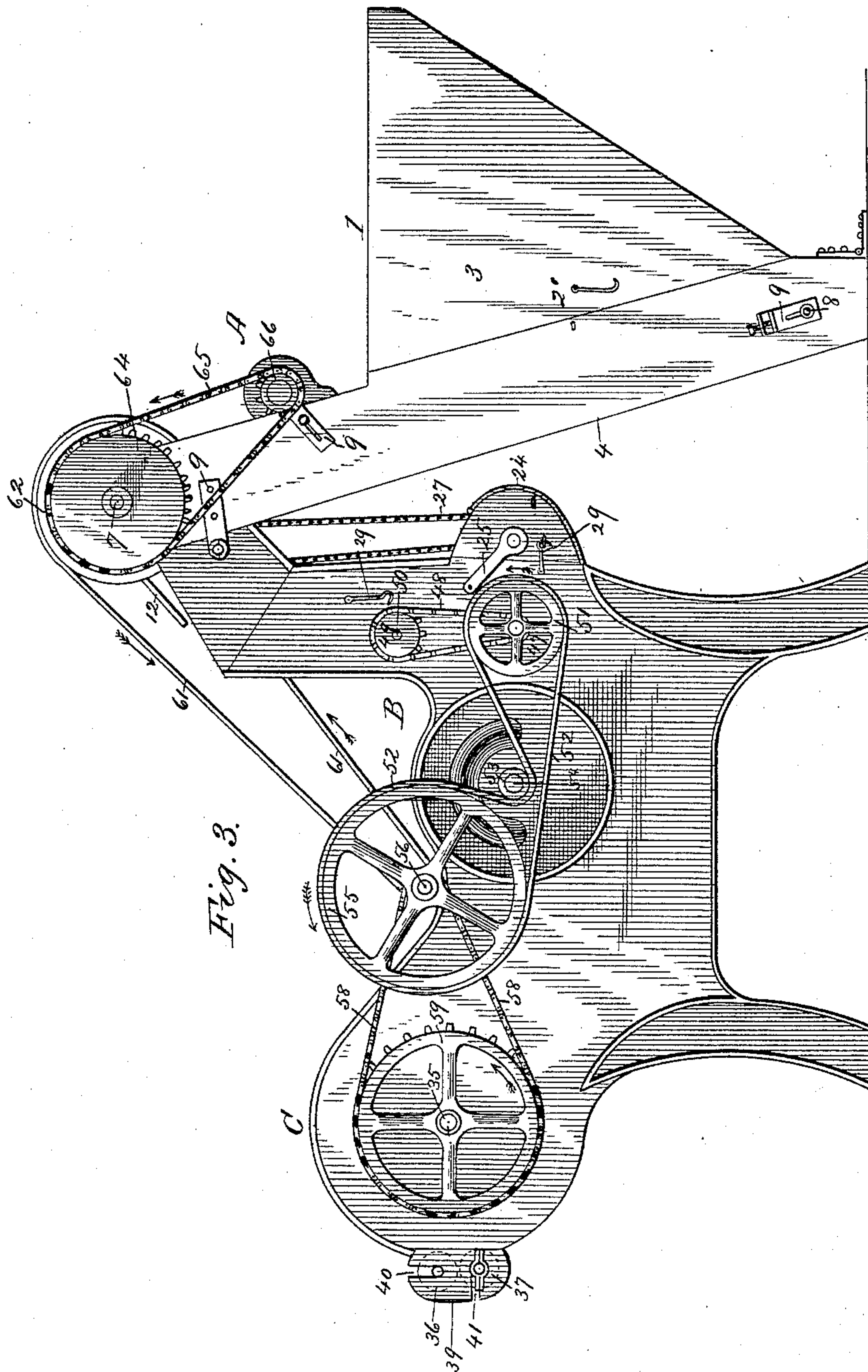
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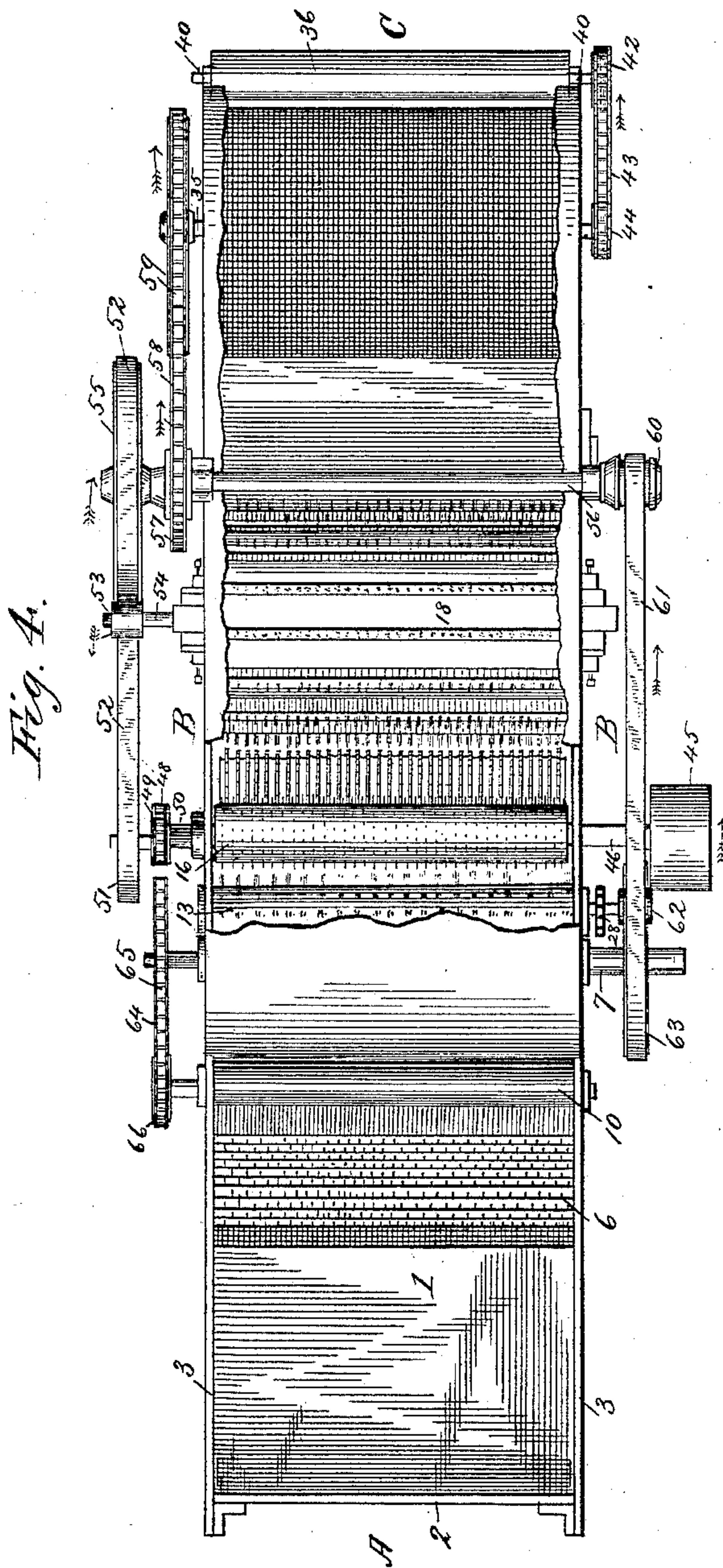
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UNITED STATES PATENT OFFICE.

GEORGE F. BROTT, OF WASHINGTON, DISTRICT OF COLUMBIA.

COTTON-GIN.

SPECIFICATION forming part of Letters Patent No. 434,859, dated August 19, 1890.

Application filed June 4, 1890. Serial No. 354,235. (No model.)

To all whom it may concern:

Be it known that I, GEORGE F. BROTT, a citizen of the United States, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in Cotton-Gins; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates generally to cotton-gins, and particularly to improvements therein which render them peculiarly fitted or constructed for ginning seed-cotton and separating therefrom all hulls, twigs, dirt, and other foreign matters before the ginning operations occur, and at the same time for straightening and loosening the locks and fibers attached to the seed, for removing the fiber from the seed by subjecting the same to both carding and ginning action, the former being similar to that incident to carding wool-fibers, for completely removing the fiber from the seed without cutting, breaking, or otherwise injuring the same, and for ginning long and short staple and dry and damp cotton with equal ease and success; and it consists of the peculiarities of construction and arrangement or combination of parts hereinafter disclosed in the description, drawings, and claims.

The objects of my invention are, first, to provide improved feeding devices for regularly and uniformly delivering seed-cotton to the carding and ginning mechanisms, and also for simultaneously removing all hulls, dirt, and other foreign matters therefrom and straightening and loosening the fiber prior to subjecting the same to the action of said carding and ginning mechanisms; second, to provide improvements in these mechanisms which will subject seed-cotton to both drawing or pulling and ginning action for the removal of the fiber close to the seed and the prevention of the cutting or otherwise injuring of the same; third, to provide an improved condenser which will collect the lint or fiber in light fleecy masses, compact or condense the same into a sheet or bat, dispense with a lint-room, and permit the same to be handled with facility, and which at the same time will not twist or tangle the fiber. These objects are accomplished by the mechanism

herein described, and illustrated in the accompanying drawings, forming part of this specification, in which the same reference letters and numerals indicate the same parts, and in which—

Figure 1 represents a vertical longitudinal section of a cotton-gin constructed in accordance with my invention; Fig. 1^a, a detail end view of the carding-cylinder and concave, which are provided with round, straight, and sharp-pointed teeth and arranged in close proximity to each other; Figs. 2 and 3, side elevations of the opposite sides of the cotton-gin, showing the relative dimensions and arrangements of the pulleys and sprocket-wheels, the belts and sprocket-chains for driving the same, and the tensioning or tightening devices therefor; and Fig. 4, a plan view of the same, the casing being partly broken away to show the upper interior parts.

In the drawings, A indicates the seed-cotton feeding, retarding, cleaning, and fiber straightening and loosening mechanism; B, the carding and ginning mechanisms, and C the condensing mechanism. The first of these mechanisms comprises the hopper 1, which is provided with the removable downwardly and rearwardly inclined front wall 2, which forms its bottom, this wall or bottom being secured in place by the hooks and eyes 2', and with the inwardly-removable triangular end or side walls 3, which are hinged at their rear edges, so as to permit of being folded inwardly into small compass when desired. Communicating with and arranged in rear of this hopper is the upwardly and rearwardly inclined chute 4, which is hinged or pivoted at its lower end and provided with a suitably perforated and curved bottom 5. Within this chute is arranged the toothed and endless feeding-apron 6, which is suspended from and driven by the shaft 7, which is suitably journaled in the upper end of said chute and guided by the tension-shaft 8, which is arranged just above said perforated bottom and journaled at its ends in adjustable bearings 9 of any ordinary construction. At the angle formed by the lower ends of said hopper and chute and for some distance upward therefrom the seed-cotton is seized by the teeth of said endless feeding-apron and carried upward, any surplus quantity thereof

being detached from said teeth and forced backward by the flexibly-winged retarding-roll 10, which is rotated in an opposite direction to and nearly in contact with said apron, whereby a regular and uniform delivery of the seed-cotton to the carding and ginning mechanisms is secured; also, this retarding-roll knocks back into the hopper all stones, nails, twigs, and such other large foreign matters as may be attached to the fiber. At a point just above the retarding-roll 10 and inside of the upper end of the chute 4 is secured the toothed plate 11, which is straight for a portion of its length and then curved rearwardly and over the toothed feeding-apron 6, which in connection therewith operates to straighten and loosen the fiber upon the seed prior to submitting the same to the action of the carding and ginning mechanisms; also, the upper end of said chute is formed or provided with a deflector 12, which extends rearwardly and downwardly and overhangs the brush-roll 13, which is journaled in the sides of the inclined chute 14, leading to the gin-hopper 15. This brush-roll possesses the threefold function of a stripper, a feeder, and a fan, as it strips the seed-cotton from the teeth of said feeding-apron, feeds it into the gin-hopper, and creates an air-blast, which forces all sand, dust, and other small foreign matters released from the fiber at that point back into the chute 4, whence they descend over its rear wall and pass out through its perforated bottom 5. By the use of the devices thus far described perfect feeding and cleaning of the seed-cotton and straightening and loosening of its fibers are effected, and also all possibility of fire occurring from the friction of stones, nails, and the like is avoided, as they are thoroughly removed before coming into contact with the carding and ginning mechanisms.

The second part of my improvements resides in the carding and ginning mechanisms B, which are vertically arranged with respect to each other, the former consisting of the rearwardly-rotating carding-cylinder 16 and the fixed carding-concave 17, both of which are provided with round, straight, and sharp-pointed teeth and arranged in close proximity to each other, the latter consisting of the similarly-rotating ginning-cylinder 18, which is preferably provided with saws having teeth formed with round or curved front faces, which project into the spaces between the curved ribs 19, which are adjustable in the usual manner for regulating the distance to which said teeth shall project beyond them. In front of these carding and ginning mechanisms is arranged the pivoted seed-board 20, which is provided at its lower edge with the rows of downwardly and rearwardly inclined teeth 21, which prevent the discharge of the fiber that has been removed from the seed. As the stripped and occasionally only partially-stripped seed pass down between these teeth, it is found necessary or desirable to

return said partially-stripped seed to the ribs and saws for further treatment and the prevention of all loss or waste of fiber. This is accomplished by the forwardly-revolving brush-roll 22, the shaft 23 of which passes through the ends of the open-topped casing 24, which is supported by the lower ends of the downwardly and forwardly inclined pivoted arms 25. One end of the shaft 23 is provided with the sprocket-wheel 26, which is driven by the chain 27 and the sprocket-wheel 28 on the end of the shaft of the upper brush-roll 13, as shown in Fig. 2. The partially-stripped seed, when they reach the brush-roll 22, are forced back thereby upon the ribs and saws, which again act thereon until they are fully stripped or cleaned of their fiber. These seed, with those previously stripped, are then forced out of the casing 24 through the opening in the top thereof by the revolution of said brush-roll. The object of pivoting this casing and brush-roll to the lower ends of the arms 25 is to permit them to be swung upward and out of the way when it is desired to obtain access to the interior parts of the machine for cleaning and other purposes; also, the pivoted seed-board may be raised for the same purposes, and also suitable fastening devices 29 are used for retaining these movable parts in their changed positions. In rear of the ginning-cylinder 18 is journaled the brush-cylinder 30, which removes the fiber from the teeth of the former in the usual manner, and by the force of the air-blast produced thereby propels said fiber rearwardly through the flue or trunk 31 and against the condenser-cylinder.

The third part of my improvements relates to the condensing mechanism C, which comprises the casing 32, the condenser-cylinder 33, composed of wire-netting secured to the annular heads or disks 34, the central shaft 35, passing therethrough and journaled in the sides of said casing, and the solid stripping and condensing rolls 36 and 37, which are also journaled in the sides of said casing in rear of said condenser-cylinder, and between which the fiber or lint passes as it is stripped from said cylinder in the form of a thin and condensed sheet or bat. The lower roll 37 is covered with narrow overlapping strips or flaps of leather 38 or other suitable flexible material for cleaning or stripping all fiber or lint from said condenser-cylinder. The shafts of these stripping and condensing rolls are journaled in the casing-extensions 39, which are formed with the vertical slots 40, for allowing the upper roll 36 to rise and fall to accord with the amount of fiber passing beneath the same, and with the horizontal slots 41, for permitting the horizontal adjustment of the lower roll 37 to and from the cylinder 33 and for allowing the removal of the same for cleaning or repairs. The upper roll is revolved by friction transmitted from the lower roll through the fiber passing between the same, while the lower roll is revolved by the

sprocket-wheel 42, the sprocket-chain 43, and the sprocket-wheel 44, secured to one end of the shaft 35 of the condenser-cylinder.

For the operation of my improved cotton-gin power is applied to the wide band-pulley 45, mounted upon one end of the shaft 46 of the ginning-cylinder 18, and is transmitted from the other end of said shaft through the sprocket-gearing 47, 48, and 49 to the shaft 50, upon which is mounted the carding-cylinder 16, which thus receives approximately only half as rapid rotation as said ginning-cylinder. (See Figs. 3 and 4.) On the end of the shaft 46 which is opposite the wide band-pulley 45 is secured the pulley 51, by which and the endless belt 52 rotary motion is imparted to the small pulley 53 on the end of the shaft 54 of the brush-cylinder, and also to the large pulley 55 on the end of the power-transmitting shaft 56, from which rotary motion is imparted to the condenser-cylinder 33 to the endless toothed feeding-apron 6 and the brush-roll 13 and to the retarding-roll 10. This is accomplished by the sprocket-gearing 57, 58, and 59, which transmits slow rotation to said condenser-cylinder by the belt-gearing 60, 61, 62, and 63, which operates said feeding-apron and brush-roll, and by the sprocket-gearing 64, 65, and 66, which imparts rotary motion to said retarding-roll. The tensioning and adjustment of the various parts requiring the same may be accomplished by any ordinary adjustable devices placed at 9; also, the directions of movement of the several revolving parts are indicated by arrows in the drawings.

The operation and advantages of the several parts of my improved cotton-gin, in addition to those which are obvious and hereinbefore described, are as follows: The seed-cotton placed in the hopper 1 is carried upward in mass by the teeth of the endless feed-apron 6 until it reaches the downwardly-revolving flexibly-winged retarding-roll 10, which detaches and throws back into said hopper all surplus seed-cotton, and at the same time dislodges all stones, nails, twigs, and such other large foreign matters as may be attached to the fiber; also, this roll knocks out of the fiber a large quantity of the sand and other small particles of dirt which are usually present therein and which are finally discharged through the perforated or wire-netting bottom 5. In this condition a regular and uniform quantity of the seed-cotton is carried on upward by said feed-apron until it reaches the stationary toothed plate 11, which, in connection with the teeth upon said apron, opens out the locks of cotton, straightens and partially loosens the fiber upon the seed, and perfectly prepares the same for, prior to its submission to, the carding and ginning mechanisms. In order to make fully apparent this straightening and loosening action, it may be explained that a cotton-boll opens in four quarters or sections; that the fiber in each section is entirely separate from that in the

others and is called a "lock" of cotton; that the fiber in each lock connects the seed therein, as it extends from one seed to another, and that it is so intimately interlaced that it is difficult to separate the seed from each other. By the preliminary straightening and loosening action of the devices named the interlocked fiber between the seed is drawn around the teeth of the apron, and the progress of the seed is gradually retarded by the stationary toothed plate, the result being that said fiber is straightened, partially loosened upon the seed, and the seed wholly detached from each other. After undergoing this treatment the seed-cotton is carried downwardly by the toothed feeding-apron 6 to the brush-roll 13, over which is arranged the deflector 12, which arrests and delivers back upon said roll any seed-cotton which may be thrown upwardly thereby. This brush-roll operates, as stated, as a combined stripper, feeder, and fan, having the functions, respectively, of stripping the seed-cotton from the teeth of the apron, of feeding it to the carding and ginning mechanisms, and of creating an air-blast for forcing back all dust and other small foreign particles which may have theretofore escaped separation into the chute 4, down the rear wall of which they descend and pass out through its perforated bottom 5. After leaving said brush-roll 13 the seed-cotton passes down the inclined chute 14, thence into the gin-hopper 15, falls upon the carding-cylinder 16, and is carried between the same and the fixed carding-concave 17, which are provided with sharp-pointed teeth arranged closely to each other, so as to effect the first ginning or stripping action upon the seed and to remove a large amount of the fiber therefrom, especially the long fiber. The partially-stripped seed and stripped fiber thence pass down to the ginning-cylinder 18 and the ribs 19, by which the completion of the stripping or ginning of the fiber from the seed is generally effected, the fiber being grasped by the round-faced teeth of said cylinder and drawn upward through the spaces between said ribs, the cleaned and occasionally only partially-cleaned seed passing down or over the ribs and out between the rows of teeth 21 on the lower edge of the pivoted seed-board 20. These teeth prevent the discharge of any fiber with the seed, while the pivoting of said board at its upper edge permits it to yield slightly for the rapid discharge of said seed should any undue accumulation thereof and pressure therefrom occur. Before reaching the lower ends of the ribs the descending seed are arrested by the forwardly-revolving brush-roll 22 and forced back upon the teeth of the saws, which again act thereon until they are fully stripped of all lint or fiber that may remain thereon after they have undergone the first ginning operation. These seed, with those perfectly stripped in the first instance, are then forced out of the casing 24 through the opening in the top thereof by said forwardly-revolving

brush-roll. The lint or fiber is removed from the ginning-cylinder 18 by the brush-cylinder 30, and by the air-blast produced thereby is forced through the flue or trunk 31 upon the
 5 wire-netting condenser-cylinder 33, from which it is passed between the solid stripping and condensing rolls 36 and 37, and is delivered therefrom in a very clean and comparatively perfect and untangled condition and
 10 in the form of a thin sheet or bat, and at the same time it is condensed sufficiently to dispense with a lint-room and avoid the danger incident thereto.

From the foregoing it will be obvious that
 15 my improved cotton-gin possesses many advantages over roller-gins and the ordinary saw-gins, as the former gin the cotton very slowly or require a great deal of time for removing the fiber from its seed, and therefore
 20 their use is not general, as it does not sufficiently compensate the planter for raising the "extra-staple" or long-fibered cotton, while the latter or the ordinary saw-gins, having no preliminary straightening and loosening
 25 and carding mechanisms, impair the quality of the fiber by cutting or breaking it intermediate of its length, which is due to the fact that the fiber, while still attached to the seed, is matted and generally extends across
 30 the angularly-faced or sharp-edged teeth of two saws and an intermediate rib, and is thus subjected to a breaking strain for its entire length, and therefore must be cut or broken. Such fiber is usually short and ragged at
 35 the ends, strained almost beyond elastic resistance, and therefore is often greatly impaired for the manufacture of textile fabrics; also, if the cotton be at all damp or otherwise damaged a large percentage of the fiber will
 40 become napped and also filled with motes and dirt. With my present cotton-gin all of these defects are avoided, as the fiber is cleaned, straightened, and loosened upon the seed before any stripping or carding and ginning
 45 action thereon occurs. As these operations are successive and gradual, the fiber is removed close to the seed. Then it is forced through the trunk or flue and over the condenser-cylinder by the force of the air-blast
 50 from the brush-cylinder, after which it is passed between the condensing-rolls and is formed thereby into a thin sheet or bat.

In ordinary saw-gins about one-half their power is expended in overcoming the friction
 55 of the rolls in the roll-boxes and the deep penetration of the saws into the mass of seed-cotton forming said rolls; but in my improved gin no roll whatever is formed, as the seed rest upon and are revolved between and tumbled about by the vertically and closely arranged carding and ginning mechanisms until they are wholly freed from lint or fiber and discharged. Thus, as there is nothing
 60 analogous to a roll formed in this gin, there is no great friction or pressure upon the interior parts thereof.

Under the conditions stated my improved

cotton-gin accomplishes its work with great rapidity and with surprisingly small expenditure of power, and during its operation requires but little attention beyond occasionally supplying the same with seed-cotton. It possesses all the merits of the ordinary saw and roller gins without having any of their defects, as there is no buckling of the saws
 75 from the strain of the usual cotton-seed roll and no danger of fire from friction, as no small stones, nails, and the like can come into contact with or reach either the carding or ginning mechanism; also, it will gin short and
 80 long fibered cotton better and with one-third less power than any gin of the same size of which I am aware.

I make no claim herein for the special construction or combination of parts of the cotton-seed feeding and fiber straightening and loosening devices, but only in general combination with the carding and ginning mechanisms, as the same form the subject-matter of another application for Letters Patent filed
 85 simultaneously herewith, Serial No. 354,518; also, I only make claim herein for the combination of the condensing mechanism with said carding and ginning mechanisms.

Having thus fully described my improved
 95 cotton-gin, the construction and arrangement or combination of its several parts, and its operation and relative advantages, what I claim as new is—

1. In a cotton-gin, the combination, with
 100 the feeding, retarding, cleaning, straightening, and loosening devices, of the carding and ginning mechanisms, substantially as described.

2. In a cotton-gin, the combination, with
 105 the feeding, retarding, cleaning, straightening, and loosening devices, of the vertically-arranged carding and ginning mechanisms, substantially as described.

3. In a cotton-gin, the combination, with
 110 the feeding, retarding, cleaning, straightening, and loosening devices, of the deflector 12, the brush-roll 13, the inclined chute 14, and the carding and ginning mechanisms, substantially as described.

4. In a cotton-gin, the combination, with
 115 the feeding, retarding, cleaning, straightening, and loosening devices, of the deflector 12, the brush-roll 13, the inclined chute 14, and the vertically-arranged carding and ginning mechanisms, substantially as described.

5. In a cotton-gin, the combination, with the carding mechanism provided with round, straight, and sharp-pointed teeth and the ginning mechanism, of means for revolving
 125 the movable parts of said mechanisms at different rates of speed, substantially as and for the purpose described.

6. In a cotton-gin, the combination, with the carding mechanism provided with round
 130 sharp-pointed teeth and the ginning mechanism, of means for revolving the movable parts of said mechanisms at different rates of speed, the movable part of said carding

mechanism being revolved at a slower rate of speed than that of said ginning mechanism, substantially as and for the purpose described.

5 7. In a cotton-gin, the combination, with the carding and ginning mechanisms consisting, respectively, of a revolving cylinder and a fixed concave provided with round, straight, and sharp-pointed teeth and of a
10 revolving cylinder provided with saw-teeth and a series of ribs, of means for revolving said cylinders at different rates of speed, substantially as and for the purpose described.

15 8. In a cotton-gin, the combination, with the carding mechanism provided with round sharp-pointed teeth and the ginning mechanism, of means for revolving the movable parts of said mechanisms at different rates of speed and a pivoted seed-board provided
20 with rows of teeth along its lower edges, substantially as described.

9. In a cotton-gin, the combination, with the saws and ribs, of the forwardly-revolving brush-roll, which is arranged in proximity to
25 said saws and ribs, substantially as and for the purpose described.

10. In a cotton-gin, the combination, with the saws and ribs, of the forwardly-revolving brush-roll, which is arranged in proximity
30 to said saws and ribs, and the open-topped casing within which said brush-roll is mounted, substantially as and for the purpose described.

11. In a cotton-gin, the combination, with
35 the saws and ribs, of the forwardly-revolving brush-roll, which is arranged in proximity to said saws and ribs, and the pivoted open-topped casing within which said brush-roll is mounted, substantially as and for the purpose
40 described.

12. In a cotton-gin, the combination, with the saws and ribs, of the forwardly-revolving brush-roll, which is arranged in proximity to
45 said saws and ribs, the open-topped casing, and the downwardly and forwardly inclined pivoted arms for supporting said brush-roll and casing in different positions, substantially as and for the purpose described.

13. In a cotton-gin, the combination, with
50 the saws and ribs, of the forwardly-revolving brush-roll, which is arranged in proximity to said saws and ribs, the open-topped casing, the downwardly and forwardly inclined pivoted arms for supporting said brush-roll and
55 casing in different positions, and suitable fastening devices for retaining said roll and casing in such positions, substantially as and for the purpose described.

14. In a cotton-gin, the combination, with
60 the saws and ribs, of the forwardly-revolving

brush-roll, which is arranged in proximity to said saws and ribs, and the sprocket-gearing 26, 27, and 28, for revolving said roll, substantially as described.

15. In a cotton-gin, the combination, with
65 carding mechanism provided with round, straight, and sharp-pointed teeth, ginning mechanism, a brush-cylinder, and a flue or trunk, of a condenser-cylinder and the condensing-rolls, substantially as described. 70

16. In a cotton-gin, the combination, with carding mechanism provided with round, straight, and sharp-pointed teeth, ginning
75 mechanism, a brush-cylinder, and a flue or trunk, of a condenser-cylinder and an upper and lower condensing-roll, the latter being provided with overlapping flaps of flexible material, substantially as and for the purpose described.

17. In a cotton-gin, the combination, with
80 carding and ginning mechanisms, a brush-cylinder, and a flue or trunk, of a condenser-cylinder and an upper and lower condensing-roll, the latter being provided with overlapping flaps of flexible material, and vertically
85 and horizontally slotted bearings for the journals of said rolls, substantially as described.

18. In a cotton-gin, the combination, with the carding and ginning mechanisms, the feeding, retarding, cleaning, fiber straighten-
90 ing and loosening mechanisms, and the condensing-cylinder, of the following means for imparting rotation to the movable parts thereof: the wide band-pulley 45, the sprocket-gearing 47, 48, and 49, the belt-gearing 51, 52, 53, and 55, the power-transmitting shaft 56,
95 the belt-gearing 60, 61, 62, and 63, the sprocket-gearing 64, 65, and 66, and the sprocket-gearing 57, 58, and 59, substantially as described.

19. In a cotton-gin, the combination, with
100 the carding and ginning mechanisms, the feeding, retarding, cleaning, fiber straightening and loosening mechanisms, and the condensing mechanism, of the following means for imparting rotation to the movable parts
105 thereof: the wide band-pulley 45, the sprocket-gearing 47, 48, and 49, the belt-gearing 51, 52, 53, and 55, the power-transmitting shaft 56, the belt-gearing 60, 61, 62, and 63, the sprocket-gearing 26, 27, and 28, the sprocket-gearing
110 64, 65, and 66, the sprocket-gearing 57, 58, and 59, and the sprocket-gearing 42, 43, and 44, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

GEORGE F. BROTT.

Witnesses:

E. L. WHITE,
TOM R. STUART.