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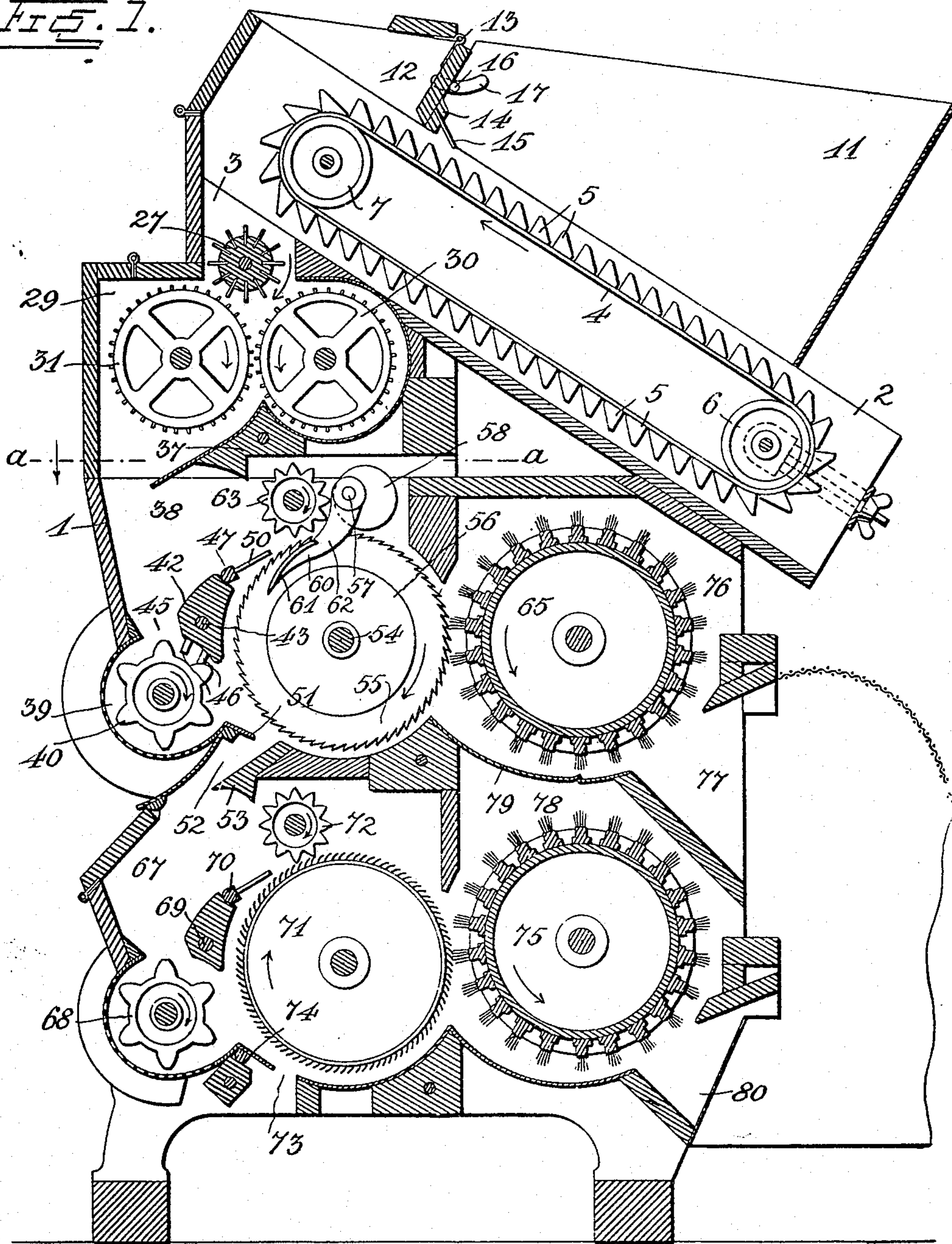
PATENTED JULY 10, 1906.

J. M. GARDNER.
COTTON BOLLING, CLEANING, AND GINNING MACHINE.

APPLICATION FILED MAR. 27, 1905.

6 SHEETS—SHEET 1.

Fig. 1.



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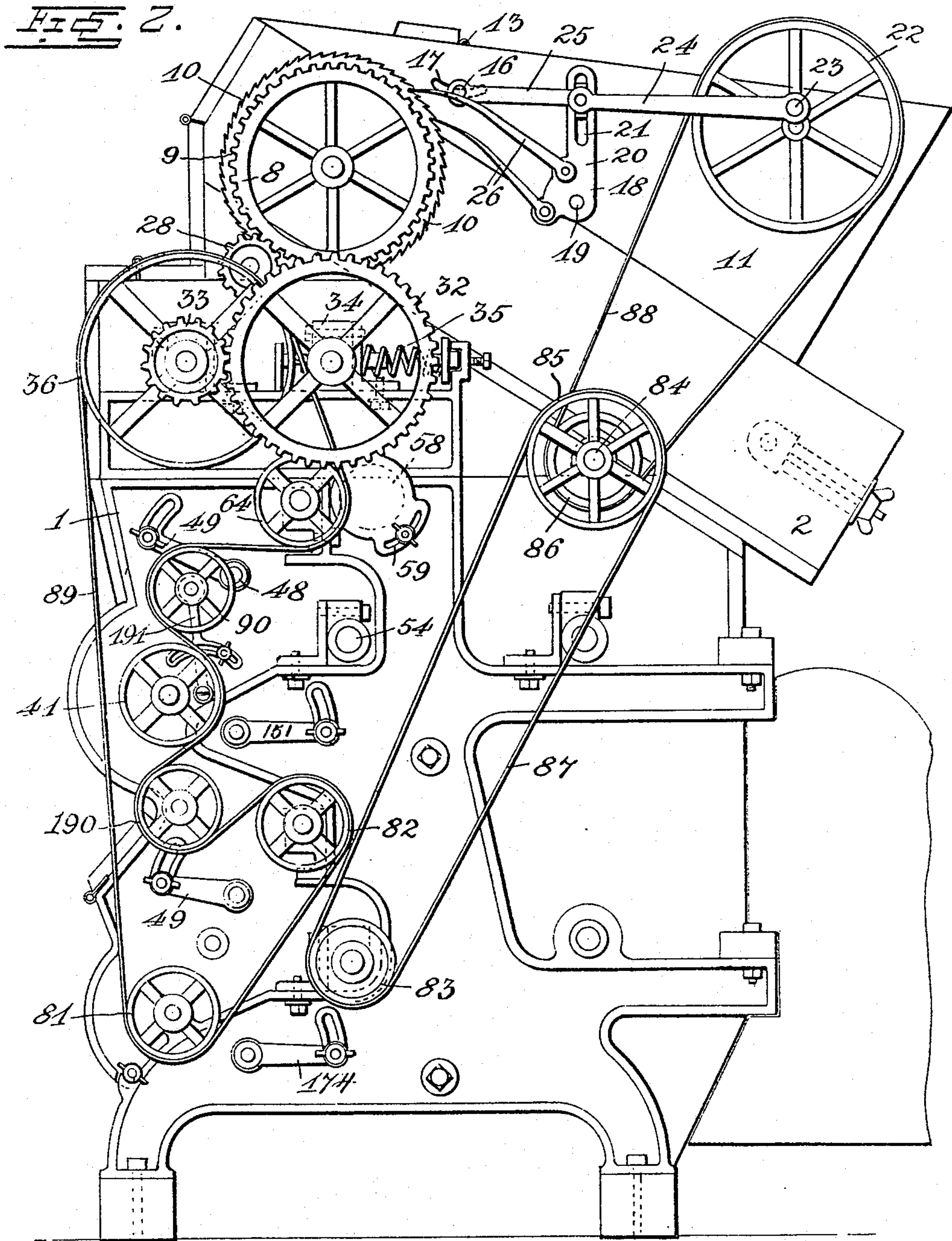
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6 SHEETS—SHEET 2.



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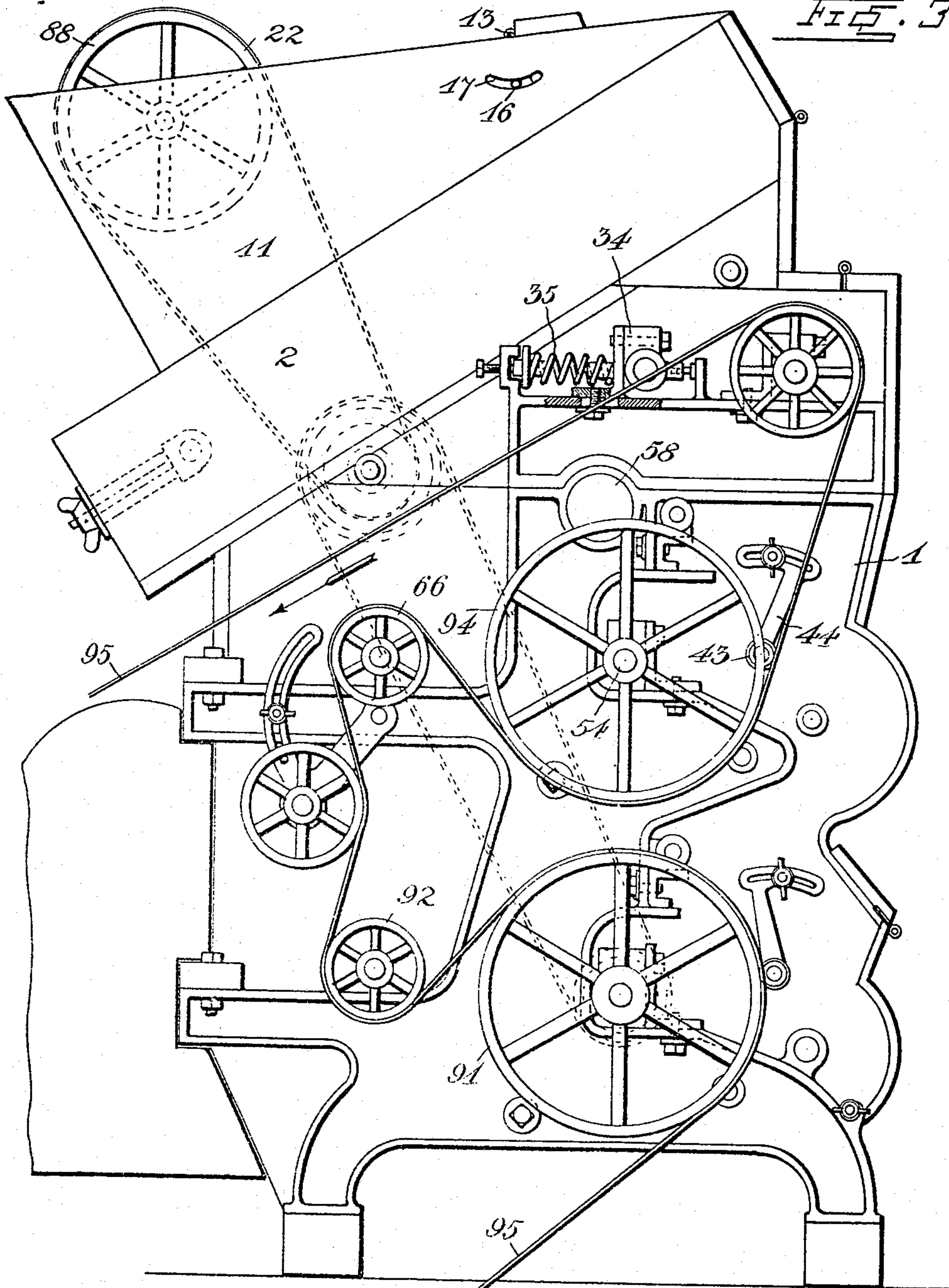
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6 SHEETS—SHEET 3.

FIG. 3.



Witnesses

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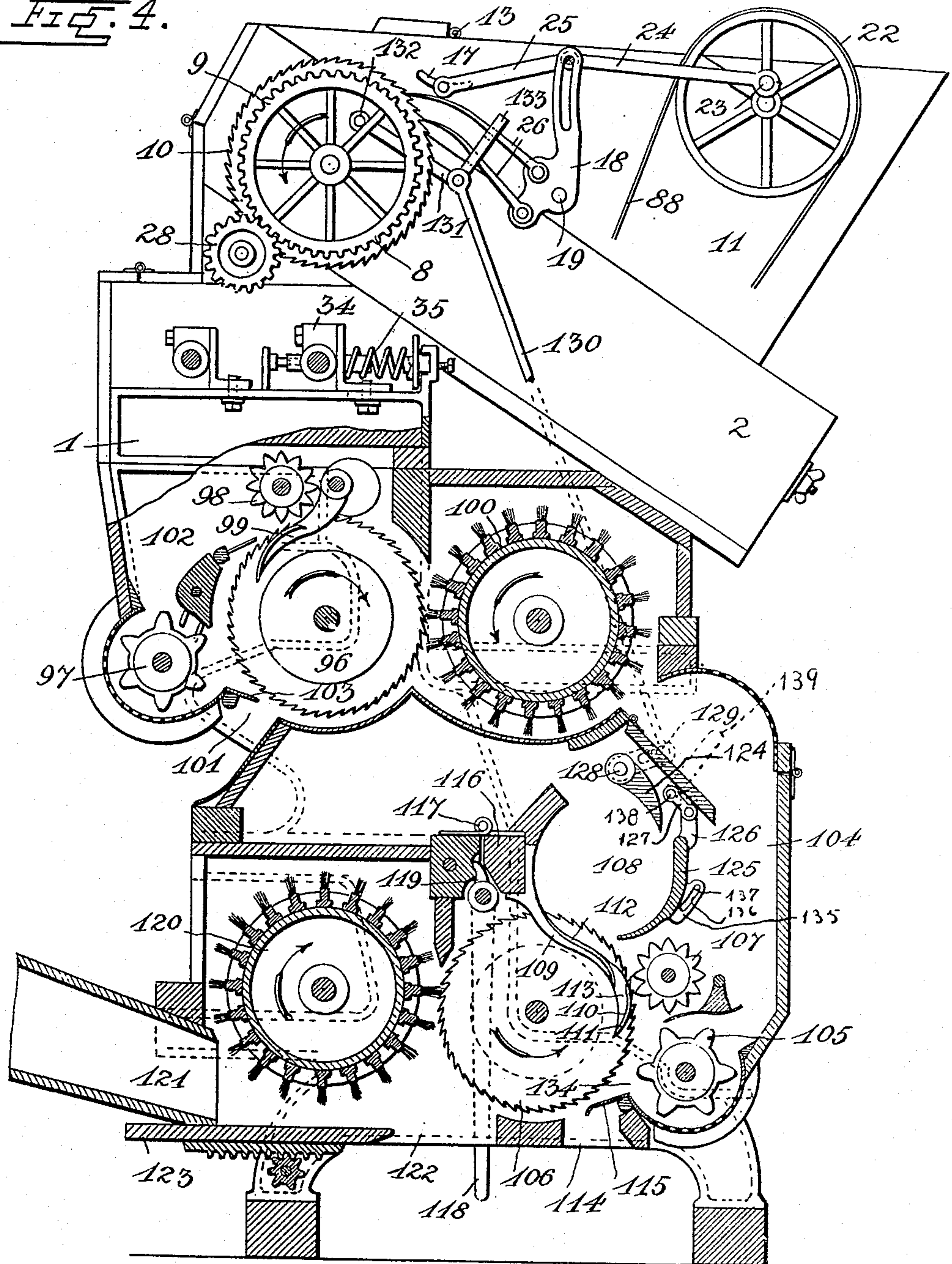
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6 SHEETS—SHEET 4.

Fig. 4.



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6 SHEETS—SHEET 5.

FIG. 5.

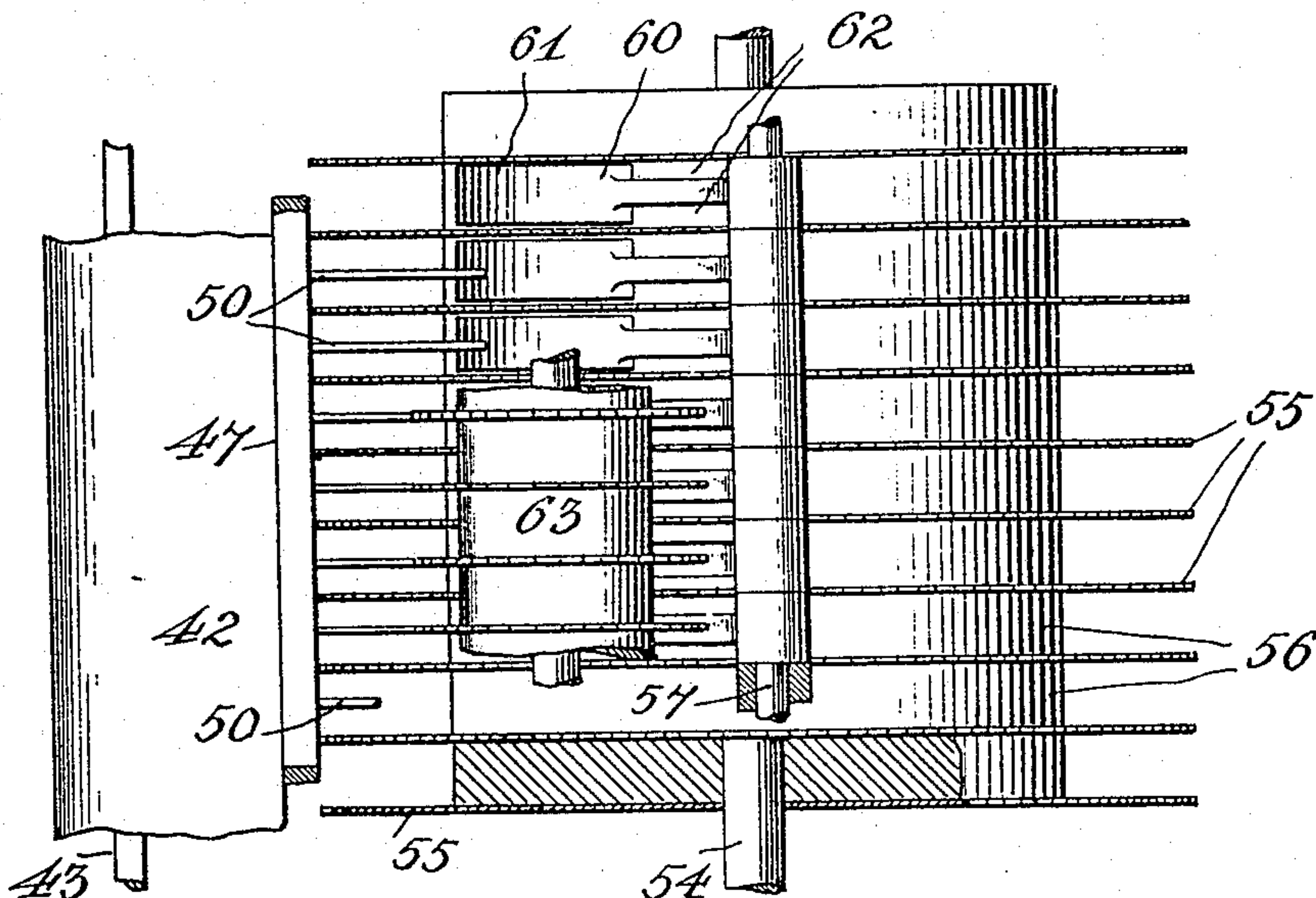


FIG. 6.

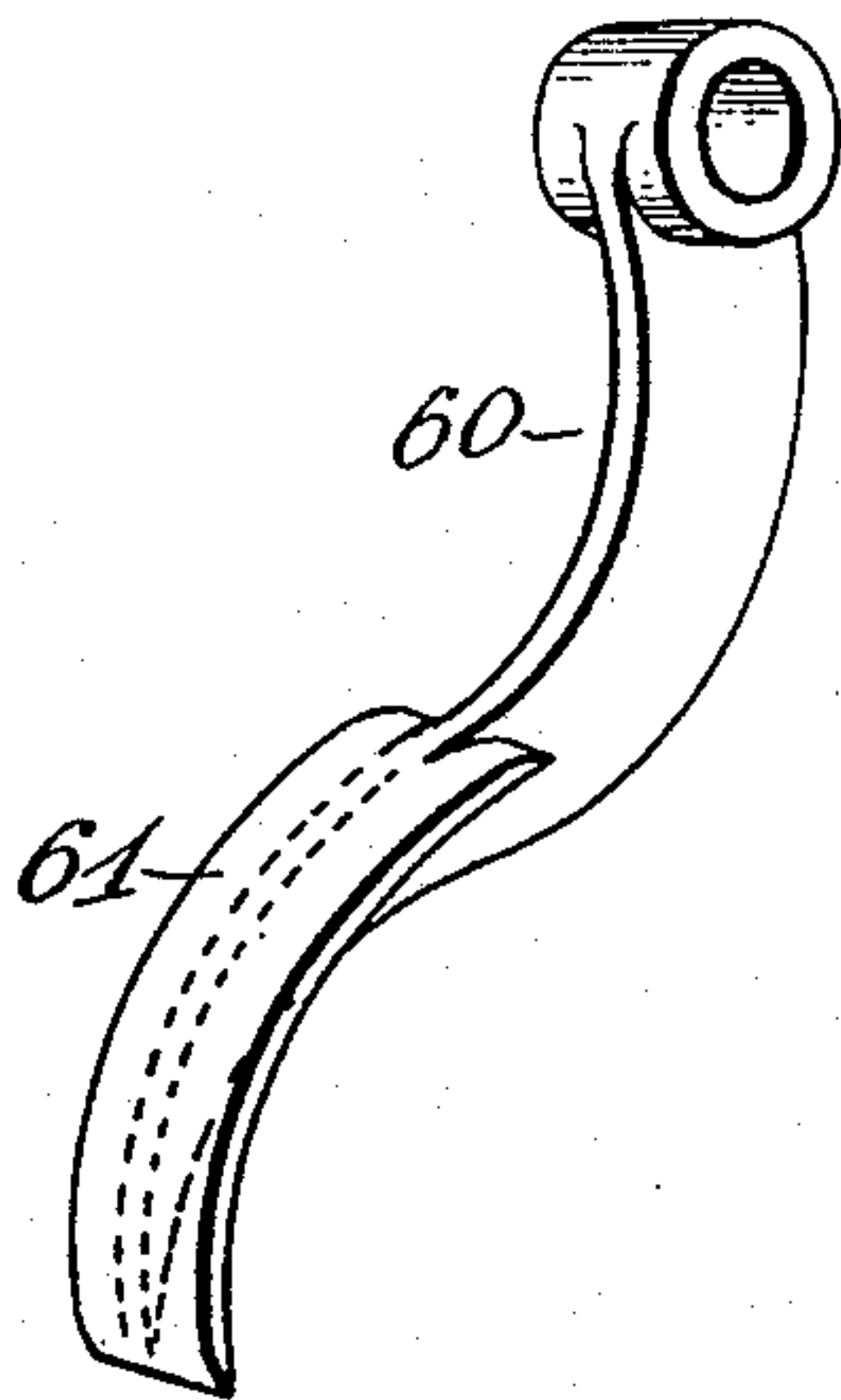
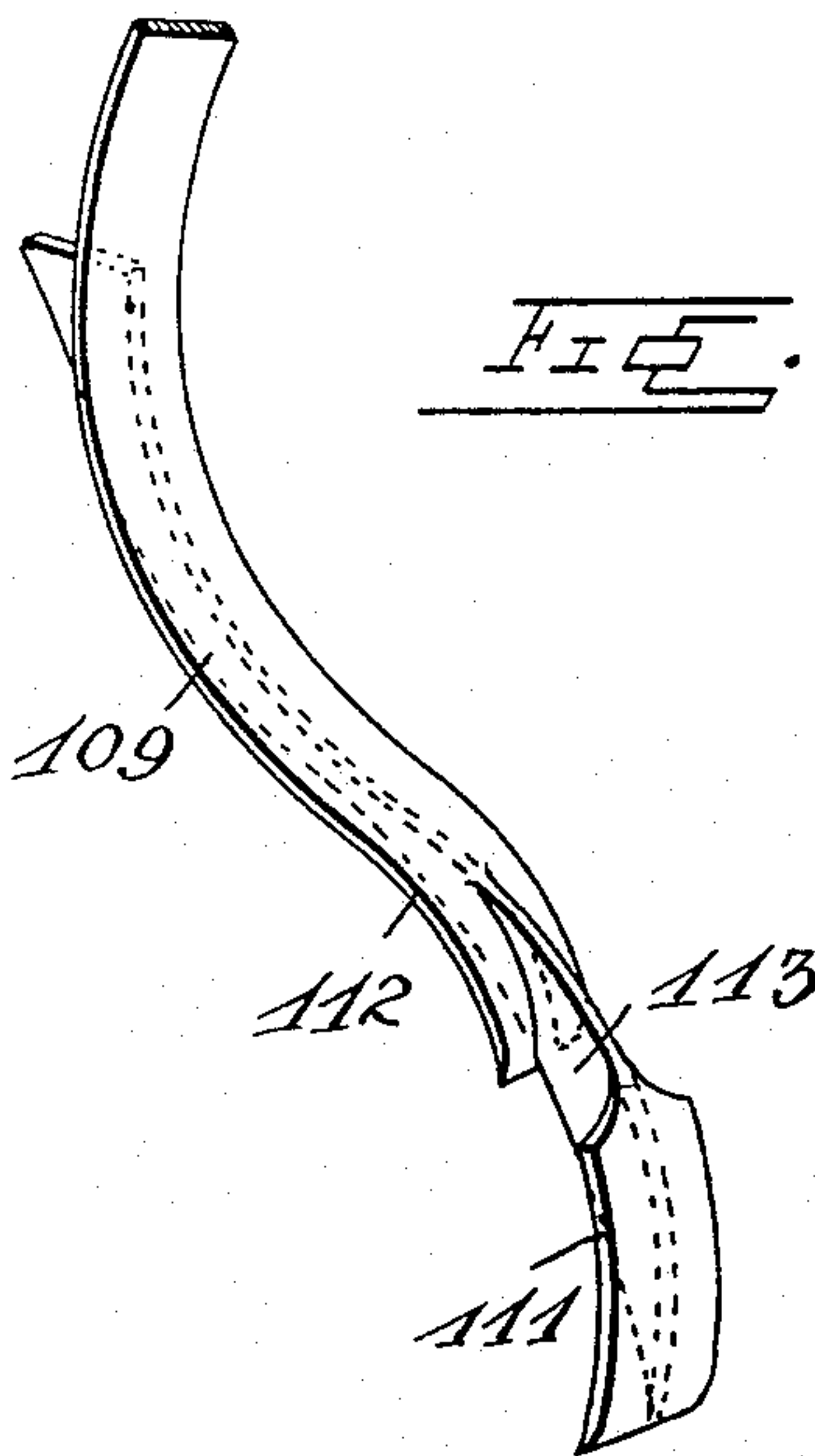


FIG. 7.



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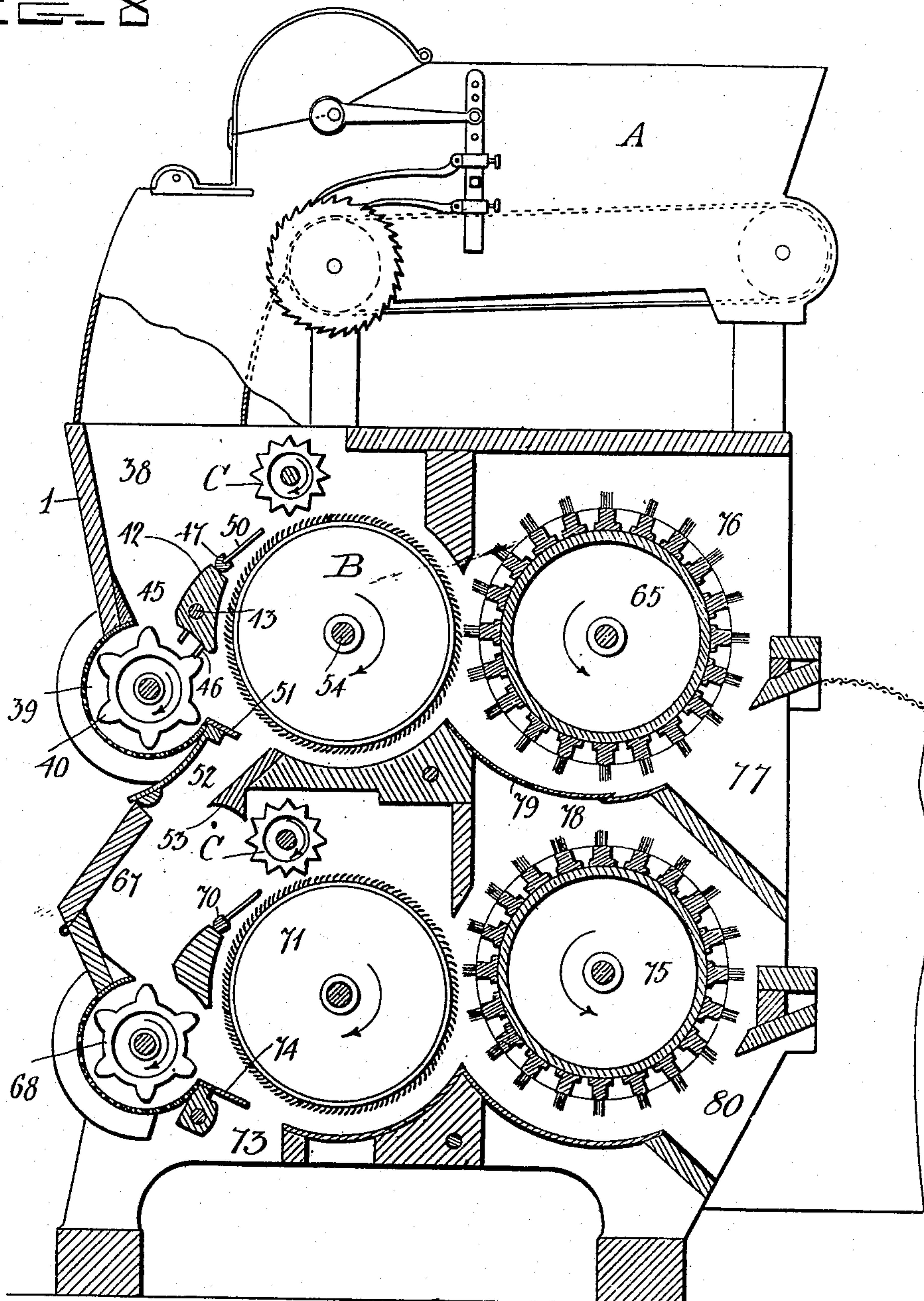
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6 SHEETS—SHEET 6.

FIG. 8



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UNITED STATES PATENT OFFICE.

JEFFERSON M. GARDNER, OF NEW LONDON, CONNECTICUT.

COTTON BOLLING, CLEANING, AND GINNING MACHINE.

No. 825,818.

Specification of Letters Patent.

Patented July 10, 1906.

Application filed March 27, 1905. Serial No. 252,354.

To all whom it may concern:

Be it known that I, JEFFERSON M. GARDNER, a citizen of the United States, residing at New London, in the county of New London and State of Connecticut, have invented certain new and useful Improvements in Cotton Bolling, Cleaning, and Ginning Machines; and I do 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 is an improved machine for separating cotton from its bolls, cleaning the cotton, and removing the lint from the seeds, its object being to enable cotton to be gathered in the bolls and to remove the cotton from the bolls, thus obviating the necessity of picking the cotton from the bolls by hand, which is the usual method of harvesting cotton.

A further object of the invention is to provide means for cleaning the cotton and discharging all boll particles, dust, leaf-trash, and other foreign substances therefrom while the cotton is being removed from the bolls.

With these and other objects in view the invention consists in the construction, combination, and arrangement of devices herein shown and described, and particularly pointed out in the appended claims.

In the accompanying drawings, Figure 1 is a vertical sectional view of a cotton bolling and cleaning machine, embodying my invention. Fig. 2 is a side elevation of the same. Fig. 3 is a similar view showing the opposite side of the machine from that shown in Fig. 2. Fig. 4 is partly a side elevation and partly a vertical sectional view showing a modified construction of my improved bolling, cleaning, and ginning machine. Fig. 5 is a detail top plan view which is partly a section on the plane indicated by the line *a a* of Fig. 1. Fig. 6 is a detail perspective view of one of the ribs which operate in the spaces between the saws of the saw-cylinder, and Fig. 7 is a similar view showing the construction of one of the ribs shown in the lower part of Fig. 4 which operate in the spaces between the saws of the saw-cylinder in the modified form of the invention shown in Fig. 4. Fig. 8 is a sectional view showing a modified construction of my invention adapted for use in ginning sea-island and other

black-seed species of cotton in which the fiber adheres to only one end of the seed.

I will first describe the form of my invention shown in Figs. 1 and 2, which is specially adapted for bolling and cleaning cotton and putting it in condition to be ginned. In the upper portion of the frame 1 is an inclined trough 2, which has a discharge-opening 3 in its lower side at the upper end of the trough, and in the said trough is an endless feed belt or apron 4, provided with slats 5, which slats have projections whereby the cotton is engaged by the upper lead of the endless belt. The said belt operates on the rollers 6 7, and the shaft of the roller 7 is provided at one end and on the outer side of the said trough with a wheel 8, which is provided with spur-teeth 9 and is also provided with ratchet-teeth 10. Above the trough 2 is a hopper 11, the bottom of which is formed by the upper lead of the endless belt. Near the upper end of the said hopper and over the discharge portion of the upper lead of the feed-belt 4 is a transversely-disposed oscillating leveling-board 12, which is hinged at its upper side, as at 13, is provided on its rear side at its lower edge with a cross-bar 14, from which project rearwardly and downwardly extending points or teeth 15, said leveling-board being further provided at its ends with outwardly-extending studs 16, which project through and operate in curved slots 17, made in the sides of the hopper 11 and which are concentric with the pintles of the hinges 13. A rocker 18 is pivotally mounted on one side of the frame, as at 19, and has an arm 20, which is provided with a slot 21. A pulley 22, which is mounted on one side of the frame, is provided with a crank-pin 23, to which is connected one end of a pitman 24, the opposite end of the pitman being pivoted to a block which is adjustable in the slot 21, whereby the throw of the rocker may be regulated. Said arm 20 of the rocker is connected to one of the studs 16 of the oscillating leveling-board by means of a link 25, said link being also connected to the said rocker. The rocker is provided with a pair of reversely-operating pawls 26, which engage the ratchet-teeth of the wheel 8 and which when actuated by the rocker will serve to rotate said wheel 8 by a step-by-step movement, as will be understood. Hence motion is imparted to the endless feed-belt. The cotton in the bolls is drawn from the hopper 11 by the movement of the

endless feed-belt 4, the quantity of cotton discharged from the hopper by the said feed-belt being regulated by the oscillating leveler 12, as will be understood. The slats of the
 5 endless feed-belt open as they pass over the roller 7 and drop the bolls through the opening 3 onto a revoluble spiked roller 27, which is provided at one end of its shaft with a pinion 28, which is engaged by the spur-teeth of
 10 the wheel 8. Hence the said spiked roller is rotated at a higher rate of speed than the roller 7 and in the direction indicated by the arrow in Fig. 1 and serves to regulate the discharge of the boll-cotton downwardly
 15 through the said opening.

In a chamber 29 below the opening 3 is mounted a pair of ribbed rollers 30 31, the shafts of which are respectively provided with a spur-wheel 32 and a pinion 33, which inter-
 20 mesh and cause the said shafts to revolve simultaneously in opposite directions and at different rates of speed to produce a crushing and rubbing effect on the bolls which pass between them. The shaft of the roller 30 is
 25 here shown as mounted in movable bearings 34, which are pressed in one direction by the springs 35. The shaft of the roller 31 has a pulley 36.

Below the opposing sides of the rollers
 30 30 31 in the lower portion of the chamber 29 is a deflector 37, which directs the cotton-bolls from between the rollers 30 31 into a chamber 38. In the lower portion of the said chamber 38 is a semicylindrical foraminous
 35 breast 39, which forms a cover for an opening in an outer wall of said chamber and in which rotates a toothed roller 40, the shaft of which is provided with a pulley 41 at one end. In the rear side of the lower portion of the cham-
 40 ber 38 is a deflecting element 42, which is pivotally mounted and the pivot-shaft 43 of which has its bearings in the side of the frame 1 and is provided at one end with an adjusting quadrant-arm 44, by means of
 45 which said deflecting element may be disposed at any required adjustment. Said deflecting element has concave faces which are respectively opposed to the saw and toothed cylinders. Said deflecting element forms a
 50 contracted throat 45 in the lower portion of the chamber 38 and immediately above the toothed roller 40 and is provided on its under side with teeth 46, which are disposed in staggered relation and between which the
 55 teeth of the roller 40 pass as said roller rotates. At the upper side of the said deflecting element is a presser-bar 47, which is pivotally mounted, as at 48, and the shaft of which is provided at one end with an adjusting
 60 quadrant-arm 49, whereby the said presser-bar and the fingers 50, with which it is provided and which project upwardly and rearwardly therefrom, may be adjusted. A
 65 valve 51 is placed in rear of the roller 40, which valve regulates an opening 52, the lower side

of which is formed by a forwardly and downwardly inclined deflector 53. Said valve permits the effective area of said opening to be varied as may be required and may be ad-
 70 justed by means of a quadrant-arm 151. On a shaft 54, which is mounted in rear of the deflecting element, is a saw-cylinder which comprises a series of alternately-disposed
 75 saws 55 and spacers 56. Said spacers are of suitable width, according to the required space between the saws, and the diameter of the said spacers is considerably less than that of the saws, so that annular openings or chan-
 80 nels are formed between the said saws around the said spacers, which channels communi- cate with the interior of the chamber 38 and with the discharge-opening 52 thereof, which is regulated by the valve 51. The presser-
 85 fingers 50 are disposed opposite the spacers between the saws and over the same and may be adjusted as may be required with relation to the said saws. Above the saw-cyl-
 90 inder is a bar 57, which is carried by eccentrics 58, which are mounted in suitable bearings in the end of the frame or casing 1 and which are provided with adjusting-arms 59, whereby the said bar may be raised and low-
 95 ered. Ribs 60 are attached to and depend from the said bar and extend between the upper portions of the saws of the saw-cylinder. The lower portion of each of said
 100 ribs where it is below the upper edges of the saws is widened at its front side, as at 61. The portion of each rib above the said widened portion 61 is contracted in width to
 105 form passages 62 between the ribs for the clearance of the seed-cotton and to permit cotton and seed to be carried by the saws past said ribs. A toothed doffing-roller 63 is
 110 mounted above the saws of the saw-cylinder and in the rear side of the upper portion of the chamber 38, and its shaft is provided at one end with a pulley 64. The doffing-roller
 115 63 is rotated at a high rate of speed and serves, as hereinafter described, to knock the bolls from the cotton, return the bolls to the chamber 38, and keep the spaces clear be-
 120 tween the ribs. In rear of the saw-cylinder is a revolving brush 65 for removing the cleaned cotton from the saws and the shaft of
 125 which brush is provided at one end with a pulley 66.

A chamber 67 is below the opening 52 and is fed through the said opening. In the lower
 130 portion of said chamber is a toothed roller 68, which is identical in construction with the roller 40, hereinbefore described. Above the said roller 68 and slightly in advance thereof is a pivotally-mounted deflecting element 69,
 135 which is similar in construction to the deflecting element 42, hereinbefore described, excepting that it is not provided with teeth. At the upper rear side of the deflecting ele-
 140 ment 69 is a presser device 70, which is identical in construction with the presser device

indicated by the reference-numerals 47 50. A cylinder 71, which is preferably covered with card-clothing, is in rear of the deflecting element 69, and over this cylinder is a doffing-roller 72, which is identical in construction with the doffing cylinder or roller 63, hereinbefore described. A discharge-opening 73 at the lower side of the chamber 67 is formed between and below the toothed roller 68 and the cylinder 71 and is provided with a valve 74, by means of which its effective area may be regulated—that is to say, said valve serves to partly close the said opening to any required extent. Said valve may be adjusted as may be required by means of a quadrant arm 174. In rear of the saw-cylinder is a revoluble brush 65. The latter is in a chamber 76, which has a discharge-opening 77 at its rear side. The brush 75 is in a chamber 78, which is below the chamber 76, is separated therefrom by a wall 79, and said chamber 78 is provided on its rear side with a discharge-opening 80. The shaft of the roller 68 is provided at one end with a pulley 81. The shaft of the doffing-roller 72 is provided at one end with a pulley 82.

The shaft of the cylinder 71 is provided at one end with a pulley 83. A stub-shaft 84 projects from one side of the frame or casing of the machine, and on the said shaft are pulleys 85 86, which revolve together. Said pulley 86 is smaller than the pulley 85. An endless belt 87 connects the pulleys 83 85. An endless belt 88 connects the pulley 86 with the pulley 22. An endless belt 89 connects the pulleys 36, 64, 41, 82, and 81 and also engages idler direction-pulleys 90 190, which are respectively between the pulleys 64 and 41 and between the latter and the pulley 82. The pulley 90 is a belt-tightener and has its bearings in an adjusting-arm 191. The shaft of the cylinder 71 is provided at the end opposite the pulley 83 with a pulley 91. The shafts of the brushes 75 65 are respectively provided at the same end with pulleys 92 66, and the shaft 54 of the saw-cylinder has a pulley 94 at the same end. A driving-belt 95 engages and connects said pulleys 91 92 66 94, and hence serves to drive the saw-cylinder, the card-cylinder, and the revoluble brushes.

In the operation of the machine the cotton after its bolls have been rubbed and crushed by the rollers 30 31 passes, together with the crushed bolls, into the chamber 38 and is caught by the rapidly-revolving toothed cylinder 40, the teeth of which coact with the teeth of the element 42 to further disintegrate the bolls and to throw the cotton against the saws 55 and such particles of the bolls as may be separated from the cotton into the opening 52. The saws 55 carry the cotton upwardly on their front sides, together with the remaining bolls and under the presser-fingers 50, which latter cause the

cotton to adhere to the saw-teeth. The widened portions 61 of the ribs 60 between the saws serve to move the cotton upwardly to the peripheries of the saws as the cotton passes under the doffing-roller 63. This doffing-roller 63 rotates rapidly, and its teeth serve to arrest the passage of the bolls and to throw them back onto the cylinder 40. The seed-cotton, which is thus freed from the bolls, is carried by the saws past the ribs 60 (the openings between the narrowed portions 62 of the ribs permitting the seed-cotton to pass) and is removed from the saws by the action of the brush 65, which revolves at a higher rate of speed than the saws. Said brush also discharges the seed-cotton through the opening 77. The brush also serves to create a blast of air which is directed forwardly through the passages formed by the spacers 56 of the saw-cylinder and outwardly through the lower portion of the chamber 38, the blast escaping through the foraminous wall 39 and carrying with it dust and leaf-trash, together with other minute foreign particles which are whipped loose from the fiber by the teeth of the roller 40. Such of the material as remains after having been thus treated by the toothed cylinder or roller 40, the saw-cylinder, the presser-fingers 50, the ribs 60, and the doffing roller or cylinder 63 is fed from the opening 52 into the lower chamber 67, where it is similarly acted upon by the toothed cylinder 68, the presser-fingers 70, the carding-cylinder 71, and the doffing cylinder or roller 72. The revoluble brush 75 takes the seed-cotton from the carding-cylinder and discharges it through the opening 80. The machine may be adapted for ginning sea-island and other black-seed species of cotton by removing the feed mechanism, crushing-rolls, ribs, saw-cylinder, and doffing-rollers, (shown in Fig. 1,) replacing such feed mechanism and crushing-rolls with an ordinary cotton-gin feeder A, as shown in Fig. 8, substituting a card-clothed cylinder B for the saw-cylinder, and replacing the doffing-rollers 63 72 (shown in Fig. 1) with doffing-rollers C, in which the spaces between the teeth longitudinally of such rollers are so small as to prevent the passage of the cotton-seed past the doffing-rollers, so that the latter serve to throw the cotton-seed back for re-treatment. The fibers engaged by the teeth of the card-clothed cylinder B will be taken therefrom by the brushes and discharged through the openings 77 80, while the seed will be finally discharged through the opening 73.

In the modified form of my invention shown in Fig. 4 and which is adapted for simultaneously bolling, cleaning, and ginning the green-seed species of cotton, in which the lint adheres to the entire surface of the seed, the feeder mechanism, crushing and rubbing mechanism, the upper saw-cylinder 96,

toothed cylinder 97, doffing-cylinder 98, ribs 99, and brush 100 are similar to the construction shown in Fig. 1; but the discharge-opening 101 in the lower side of the chamber 102 communicates with the exterior of the casing on the front side thereof and is provided with the regulating-valve 103. The seed-cotton which has been freed from the bolls is taken from the cylinder 96 by the brush 100 and discharged into the feed-hopper 104, in the lower portion of which is mounted a toothed feed-cylinder 105, adjacent to and back of which is a saw-cylinder 106. Above the feed-cylinder 105 and adjacent to the saw-cylinder 106 is a toothed doffing-cylinder 107. Above the saw-cylinder is a chamber 108, the bottom and front side of which are formed by a series of ribs 109, which extend between the saws of the saw-cylinder 106 and each of which is curved at its lower rear portion to bring the upper surface thereof near the periphery of the saw at the point nearest to the doffing-cylinder 107, as at 110. Each rib is provided near its terminal end with a lateral flange 111 and is further provided with a flange 112, which extends nearly to the flange 111 to form a channel 113 between them, through which linted seeds may drop to and through a discharge-opening 114, which is provided with a regulating-valve 115. The ribs 109 are secured to and carried by a bar 116, which is pivotally mounted, as at 117. A lever 118 is provided to operate a cam 119, by means of which the bar 116 may be turned to raise and lower the ribs 109. When the said ribs are raised, the cotton in the chamber 108 above the saws of the saw-cylinder 106 is raised from and out of contact with said saws. In front of the saw-cylinder 106 is a revoluble brush 120, which coacts therewith to draw the cotton fiber therefrom and force the same through a discharge-spout 121, which delivers the fiber to a condenser that is not here shown. A discharge-opening 122 is below the engaging side of the saw-cylinder 106 and brush 120 and is provided with an adjustable mote-board 123 of the construction usually employed in cotton-gins. The rear and upper portion of the chamber or roll-box 108 is formed by a movable board 124. The rear board 125 of the said chamber is curved, as shown, and is provided with lugs 135, which have inclined slots 136. Stud 137, which project inwardly from the end walls of the casing, operate in said slots. Links 126 project upwardly from the board 125 and are pivotally connected to arms 127, which are fixed to a rod 138, which has its bearings in the end walls of the casing and is provided at one end with a lever-arm 139, (shown in dotted lines in Fig. 4,) whereby said rod may be partly turned to cause the arms 127 and links 126 to raise or lower the said board. It will be understood that the slots 136 and studs 137

cause the said board to move outwardly as it is raised to relieve compression on the roll. A pitman 130, which is pivotally and adjustably connected to said arm 129, is also connected to a link 131, which is pivotally mounted on one side of the casing, as at 132, and is provided with an upwardly-extending arm 133, provided with slots through which the feed-pawls 26 pass. Said feed-pawls are carried by the rocker 18, which is substantially identical in construction with that shown in Fig. 1. The cotton discharged into the hopper 104 is caught by the teeth of the rapidly-revolving feed-cylinder 105 and projected against the saw-cylinder, which rotates in the same direction. The seed-cotton is caught and carried up by the saws of the cylinder under the rapidly-revolving cylinder 107, which serves to arrest any bolls that are mixed with or adhere to the seed-cotton and to throw the same back onto the feed-cylinder 105, which feed-cylinder discharges the same by centrifugal force through the opening 134. All the cotton adhering to the teeth of the saws is carried over to the rapidly-revolving brush 120, which serves to remove the same, as hereinbefore stated. The seed-cotton at each engagement with the teeth of the saw-cylinder is only partly deprived of its lint, so that it accumulates and forms a roll or mass which by the action of the saw-cylinder is rotated until the lint is entirely removed from the seeds. As fast as cleaned the seed passes down through an opening 134. The mass of cotton and seed in the roll-box 108 controls the amount fed to the bolting and cleaning and ginning mechanism by the feeder. When said roll-box or chamber is full, an increase of the material therein moves the board 124 outwardly, thereby causing the pitman 130 and link 131 to raise the feed-pawls 26 from the teeth of the wheel 8, and hence cut off the supply of material to the machine. As the quantity of material in the roll-box 108 diminishes the board 124, by the means hereinbefore described, reengages the feed-pawls 26 with the gear 8, as will be understood. Hence the machine is prevented from becoming clogged by an excess of material fed thereto.

In the drawings I show, and within the scope of my invention I employ, the revoluble toothed cylinder, the doffing-cylinder spaced therefrom, and a deflecting element between said toothed and doffing cylinders, in combination with a saw-cylinder and also in combination with a card-clothed cylinder. Such saw and card-clothed cylinders present peripheral points or projections which serve to catch and by the rotation of such cylinders to carry the material on which the machine operates, and in certain of the appended claims I employ the term "cylinder having peripheral points or projections" to include

and apply to both a saw-cylinder and a card-clothed cylinder.

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

1. In a machine of the character described, the combination of a cylinder having peripheral points or projections, a revoluble toothed cylinder opposed thereto, a doffing-cylinder also opposed thereto and spaced from the toothed cylinder, and a deflecting element between the toothed and doffing cylinders and having concave faces respectively opposed to the said cylinder which has peripheral points or projections and the said toothed cylinder, substantially as described.

2. In a machine of the character described, the combination of a cylinder having peripheral points or projections, a revoluble toothed cylinder opposed thereto, a doffing-cylinder also opposed thereto and spaced from the toothed cylinder, and a pivotally-adjustable deflecting element between the toothed and doffing cylinders and having concave faces respectively opposed to the said cylinder which has peripheral points or projections and the said toothed cylinder, substantially as described.

3. In a bolling-machine, the combination of a ginning-cylinder, a revoluble toothed cylinder opposed thereto, a doffing-cylinder also opposed thereto and spaced from the toothed cylinder, and a deflecting element between the toothed and doffing cylinders, having concave faces respectively opposed to the ginning-cylinder and said toothed cylinder, said deflecting element being provided with teeth that coact with those of the toothed cylinder, substantially as described.

4. In a bolling-machine, the combination of a ginning-cylinder, a revoluble toothed cylinder opposed thereto, a doffing-cylinder also opposed thereto and spaced from the toothed cylinder, a deflecting element between the toothed and doffing cylinders and having concave faces respectively opposed to the ginning-cylinder and the said toothed cylinder, and a presser element above the deflecting element and having fingers opposed to the ginning-cylinder, substantially as described.

5. In a bolling-machine, the combination of a ginning-cylinder, a revoluble toothed cylinder opposed thereto, a doffing-cylinder also opposed thereto and spaced from the toothed cylinder, a deflecting element between the toothed and doffing cylinders and having concave faces respectively opposed to the ginning-cylinder and the said toothed cylinder, and a pivotally-mounted presser element above the deflecting element and having fingers movable by the adjustment of said element toward and from the ginning-cylinder, substantially as described.

6. In a bolling-machine, the combination

of a ginning-cylinder having alternately-disposed saws and spacer-blocks, a revoluble toothed cylinder, a doffing-cylinder and a deflecting element opposed to the ginning-cylinder, said deflecting element being between the toothed cylinder and the doffing-cylinder, a presser element above the deflecting element and having fingers opposed to the ginning-cylinder, and ribs extending in rear of the doffing-cylinder and between the saws of the ginning-cylinder, substantially as described.

7. In a bolling-machine, a casing having a chamber provided in one side with an opening having a foraminous cover, a ginning-cylinder, doffing-cylinder, toothed cylinder and deflecting element in said chamber, said doffing-cylinder, deflecting element and toothed cylinder being opposed to one side of the ginning-cylinder, the said deflecting element being between the doffing-cylinder and the toothed cylinder, and having concave faces respectively opposed to the ginning-cylinder and toothed cylinder and the latter being opposite the foraminous cover, and means on the opposite side of the ginning-cylinder to remove the lint therefrom and discharge an air-blast across and through the ginning-cylinder, past the toothed cylinder, and out through the foraminous cover, substantially as described.

8. In a machine of the class described, a saw-cylinder having spaced saws, a doffer, ribs extending into the spaces between the saws, a bar supporting said ribs, and eccentrics to adjust said bar and ribs.

9. The combination of a trough, an endless feed-apron therein, a casing having a chamber below the discharge of the feed-apron and further provided with a passage between the discharge of the feed-apron and the said chamber, a revoluble spiked roller in said passage to regulate the passage of material downwardly therethrough, crushing and rubbing rollers in said chamber and to which the material is fed, a casing into which said passage discharges, a cylinder having peripheral points or projections, a revoluble toothed cylinder, a doffing-cylinder, and a deflecting element in said last-mentioned casing, said toothed cylinder being opposed to the said cylinder which has peripheral points or projections, said doffing-cylinder being also opposed thereto and spaced from the toothed cylinder, and said deflecting element being between the toothed and doffing cylinders and having concave faces respectively opposed to the said toothed cylinder and the said cylinder which has peripheral points or projections, substantially as described.

10. In a machine of the class described, the combination of a ginning-cylinder having spaced saws, a revoluble toothed cylinder, a doffing-cylinder, a deflecting element opposed to the ginning-cylinder and between the

toothed and doffing cylinders, ribs extending in rear of the doffing-cylinder and into the spaces between the saws, and means to adjust said ribs with reference to the periph-
5 eries of such saws.

11. In a machine of the class described, the combination of a ginning-cylinder, a roll box or chamber having an element movable by the roll in the roll-box, a trough, an end-
10 less feed-apron therein, a casing having a feed-passage leading from the discharge of the feed-apron in said feed-passage, driven by the feeder, crushing and rubbing rolls in said

casing below the said roller, means to operate the feeder and having a controlling element, 15 and a connection between said controlling element and the said element of the roll-box, to control the operation of the feeder and spiked roller.

In testimony whereof I have hereunto set 20 my hand in presence of two subscribing witnesses.

JEFFERSON M. GARDNER.

Witnesses:

EDWARD T. BOONEY,
GEORGE T. BROWN.