

No. 706,142.

Patented Aug. 5, 1902.

J. E. WOOD.  
CORN HARVESTER.

Application filed July 5, 1901.

(No Model.)

11 Sheets—Sheet 1.

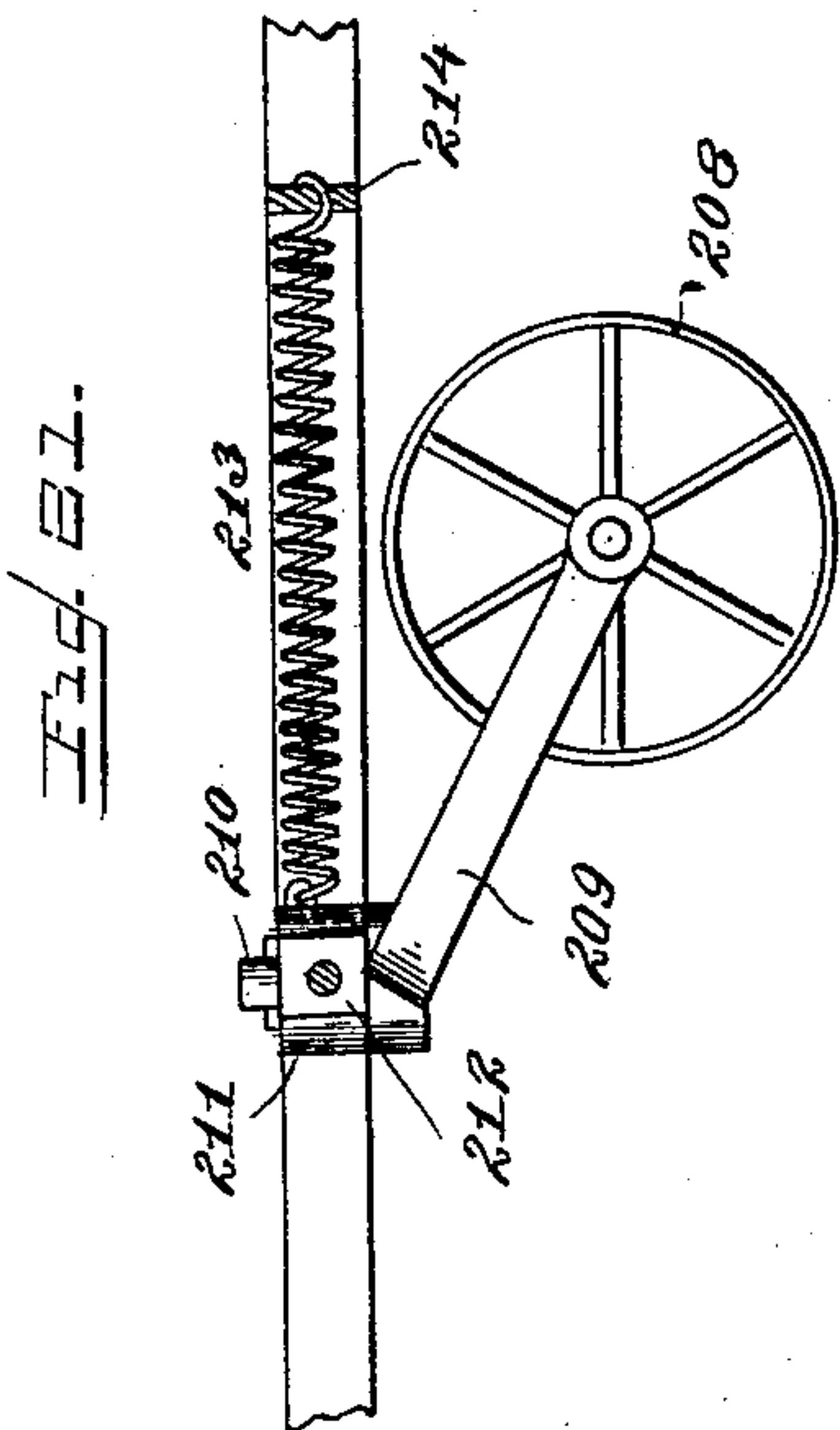
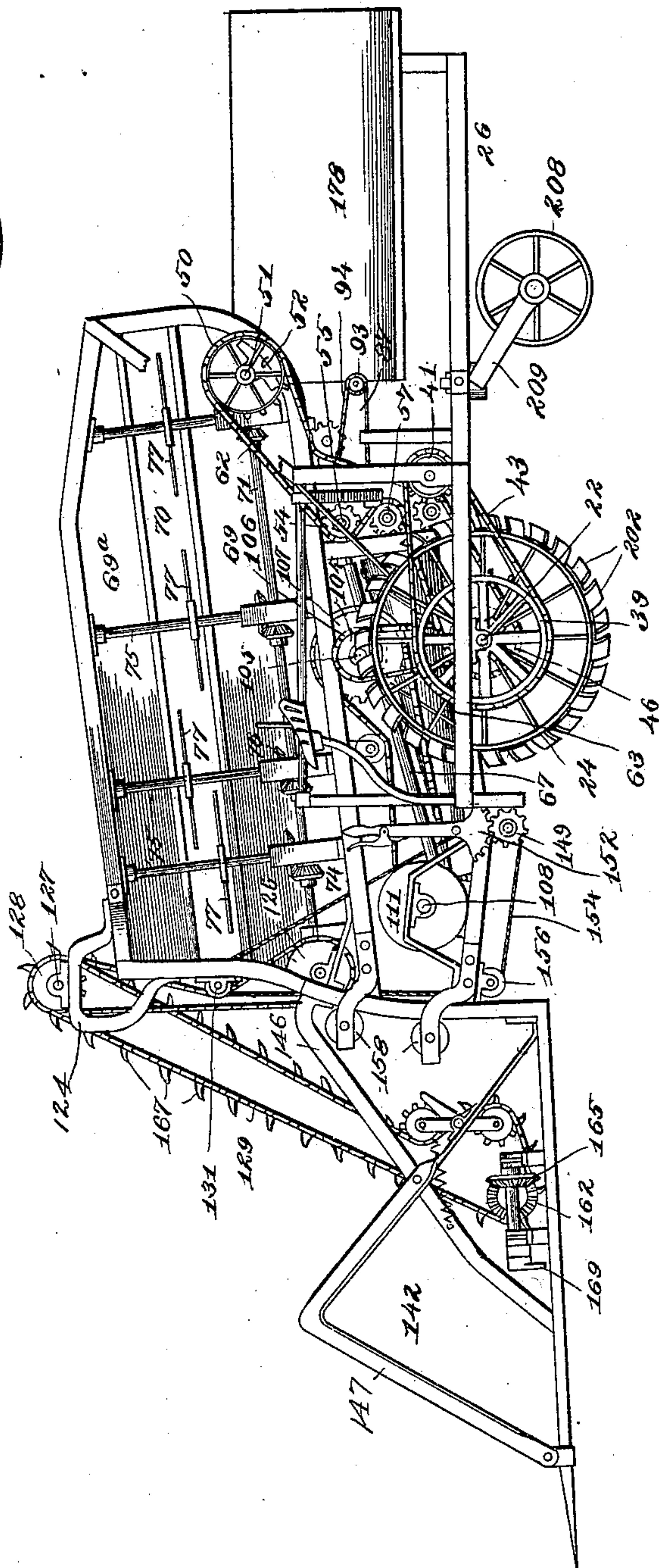


Fig. 1.



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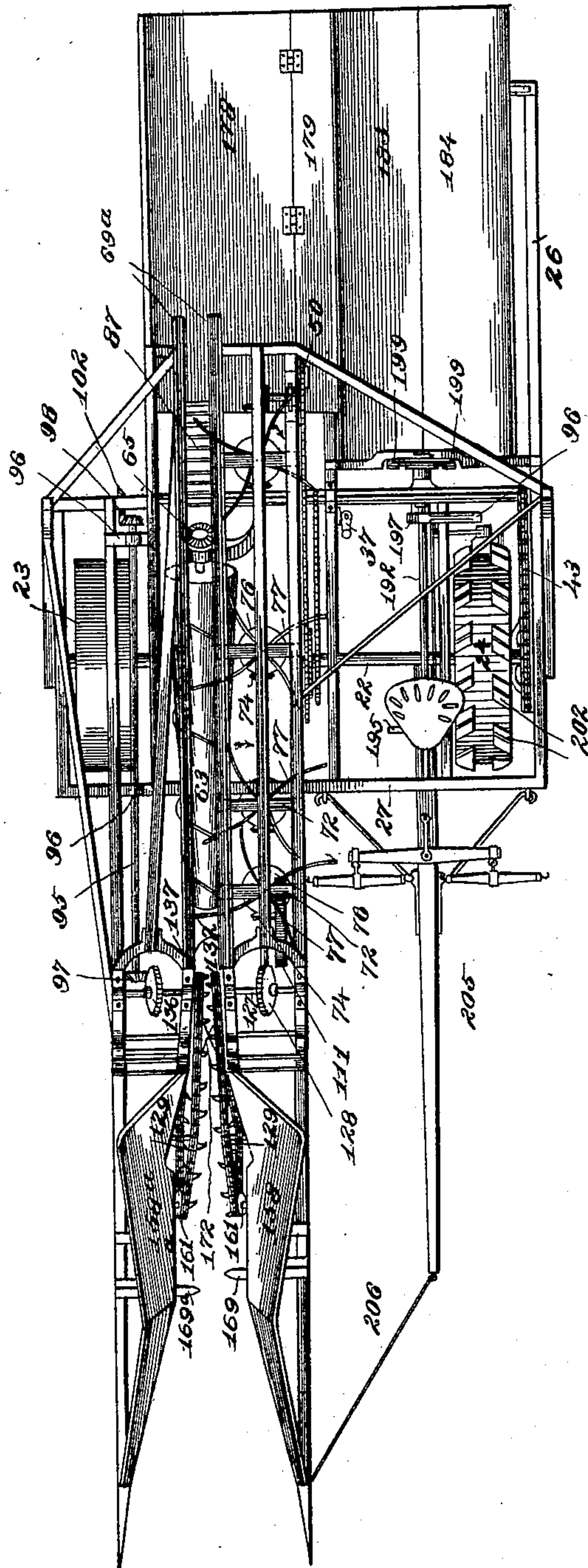
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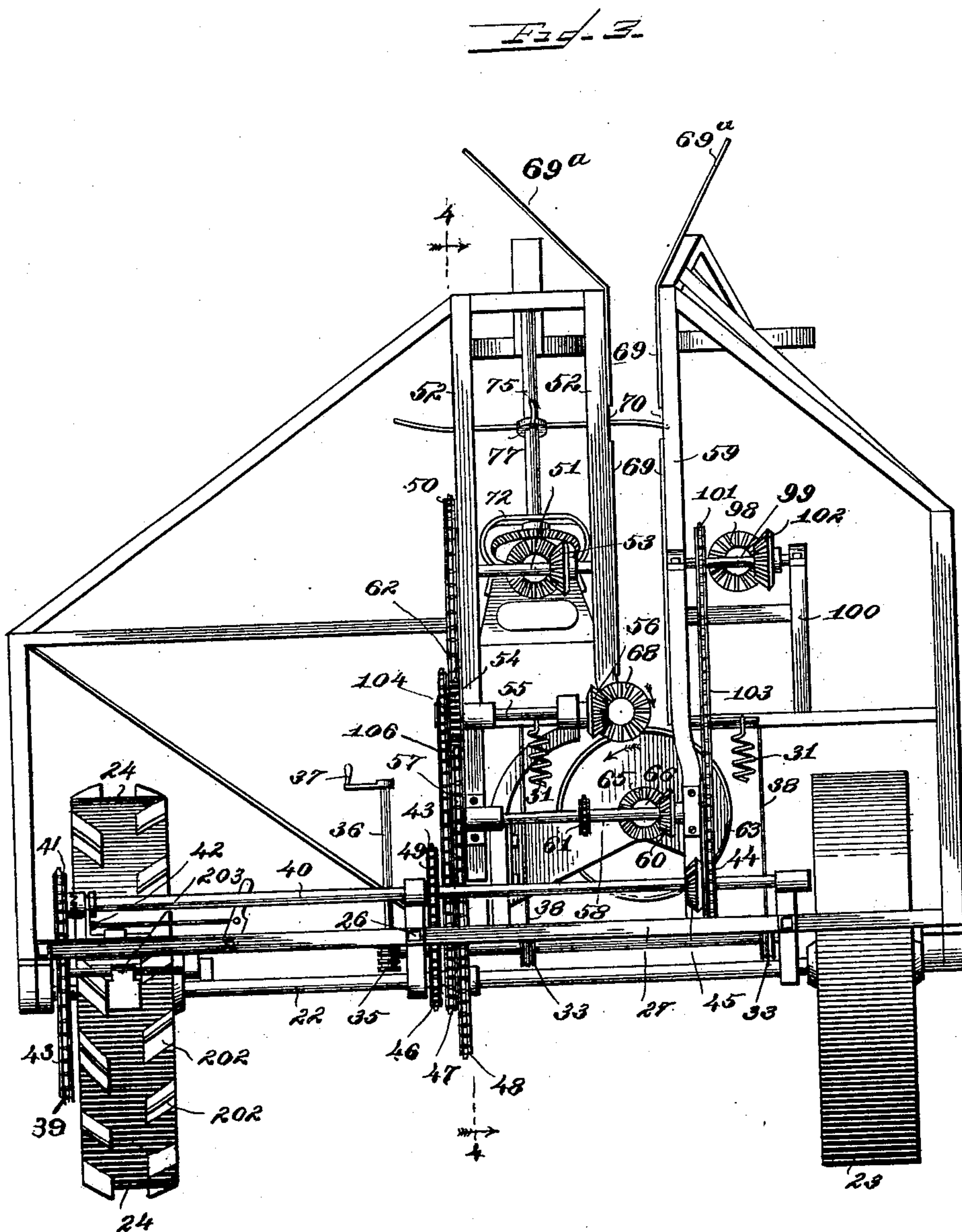
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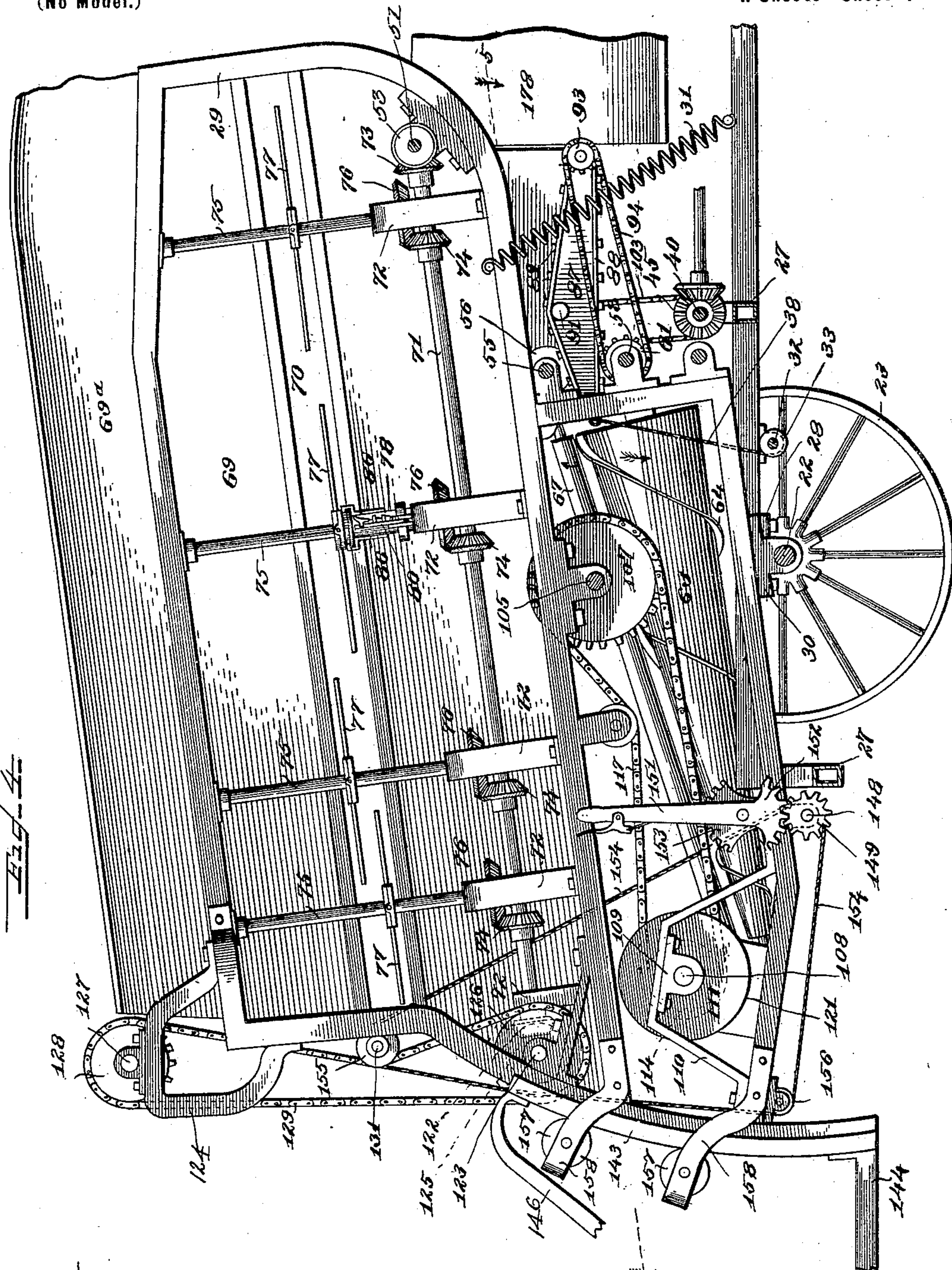
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No. 706,142.

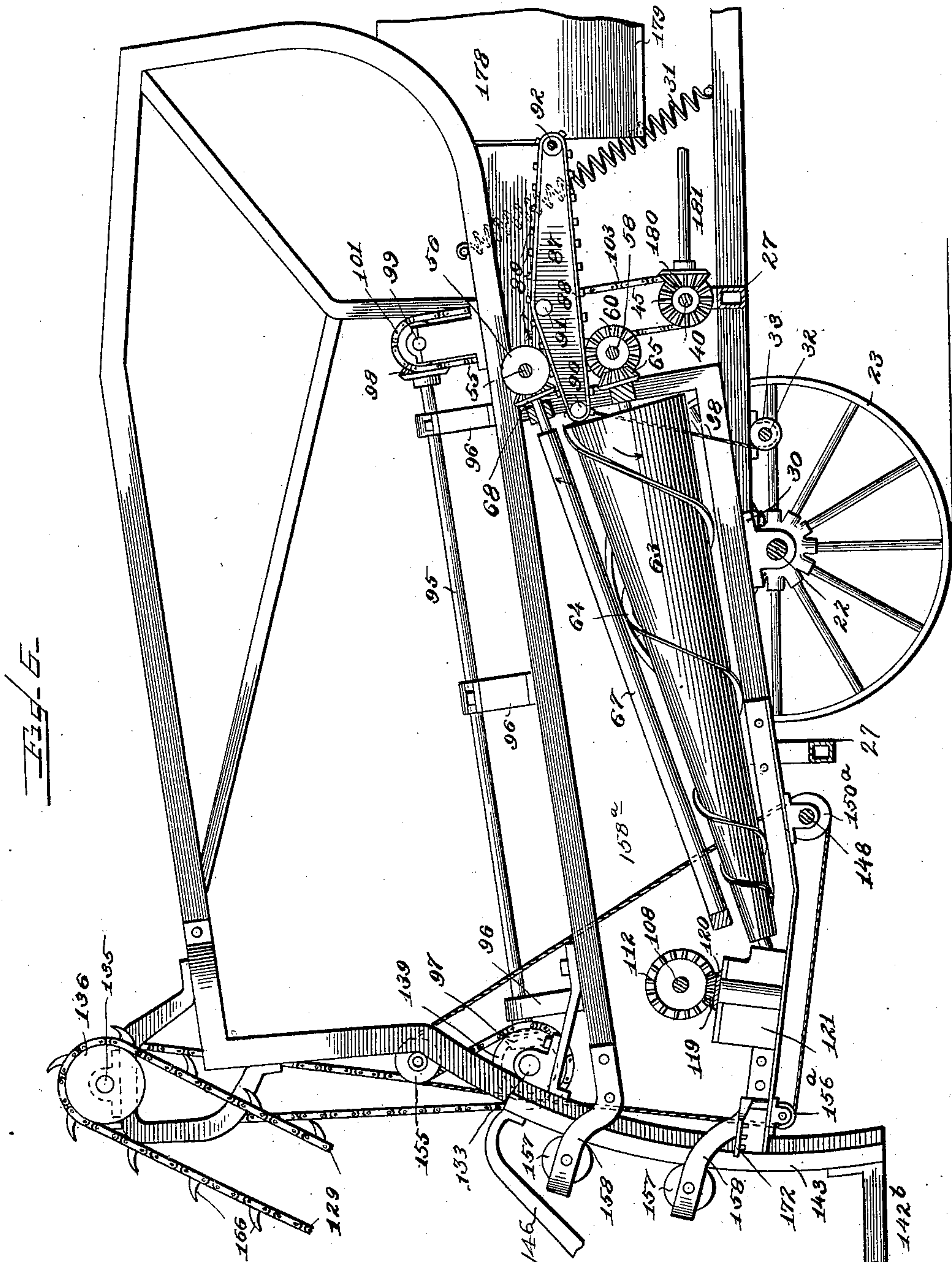
Patented Aug. 5, 1902.

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11 Sheets—Sheet 6.

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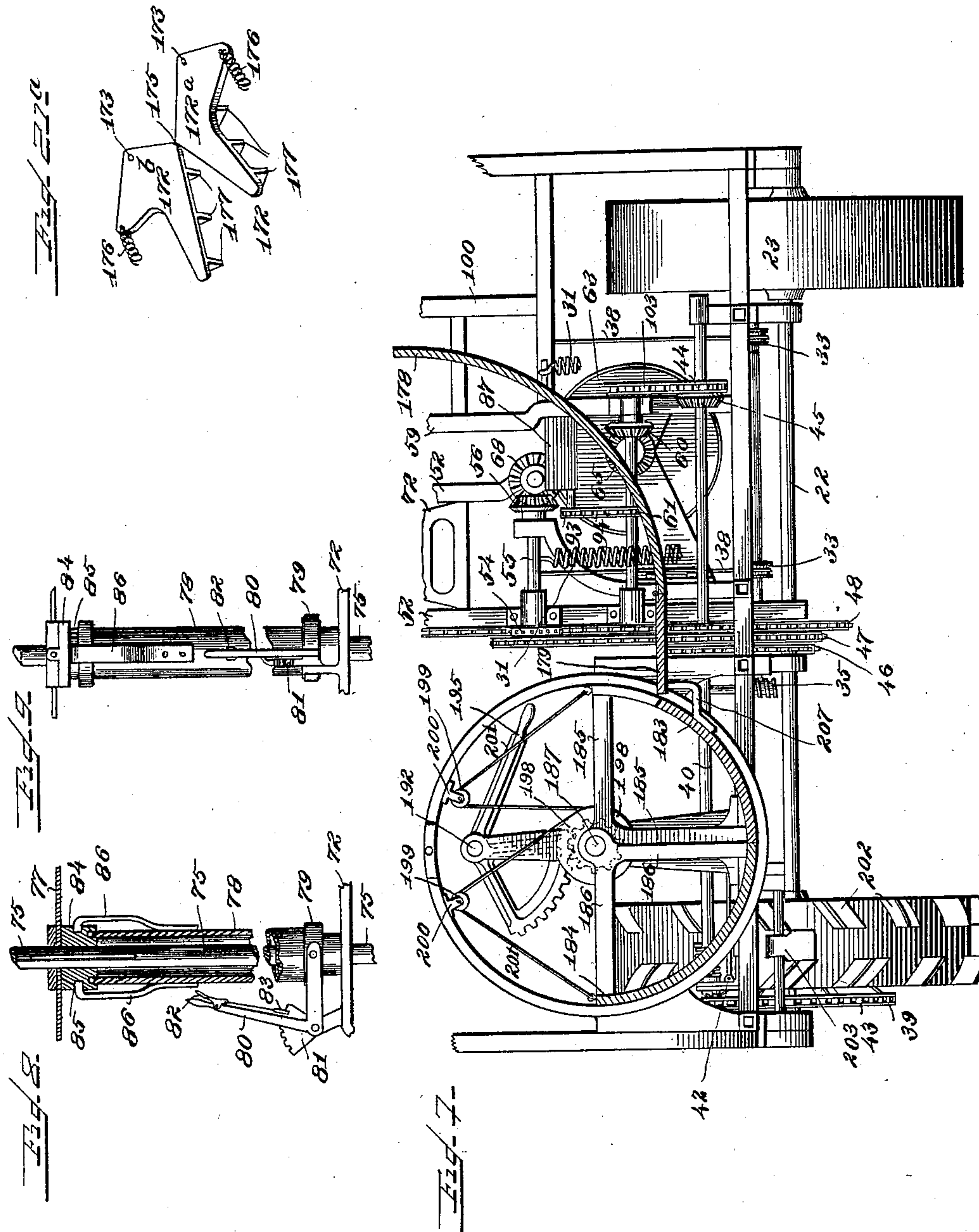
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(Application filed July 5, 1901.)

11 Sheets—Sheet 7.

(No Model.)



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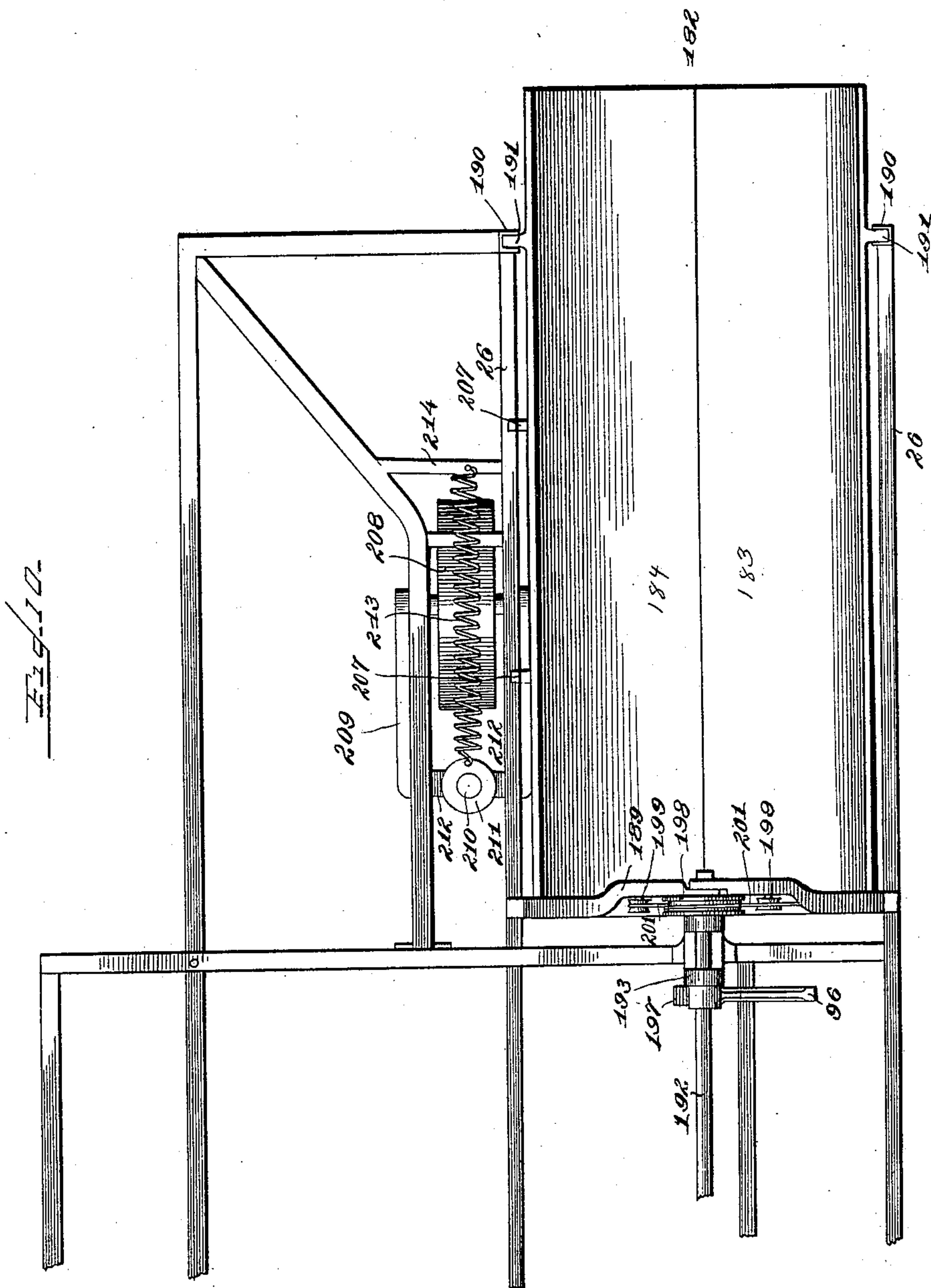
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Patented Aug. 5, 1902.

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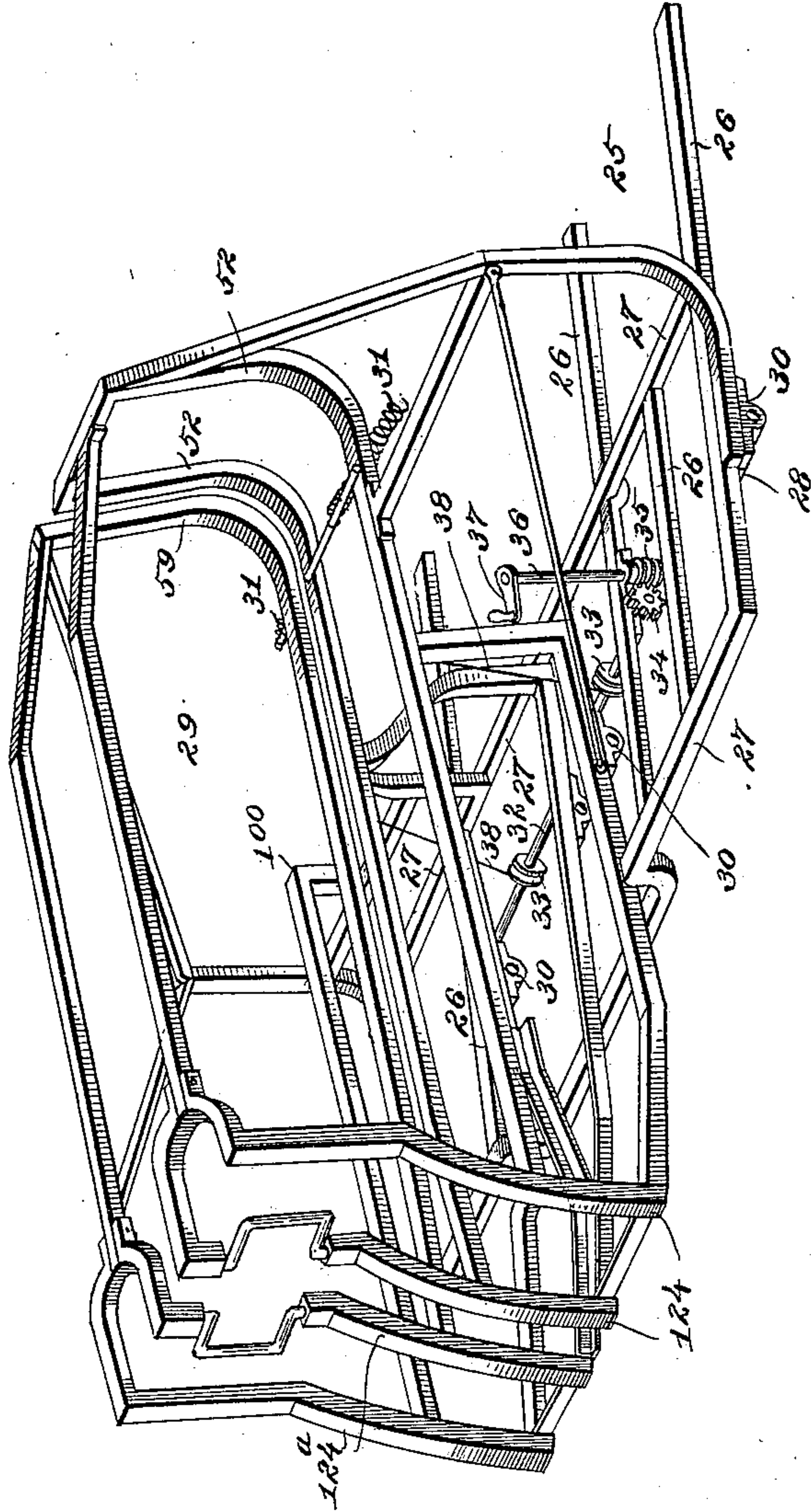
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No. 706,142.

Patented Aug. 5, 1902.

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(Application filed July 5, 1901.)

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(No Model.)

Fig. 13.

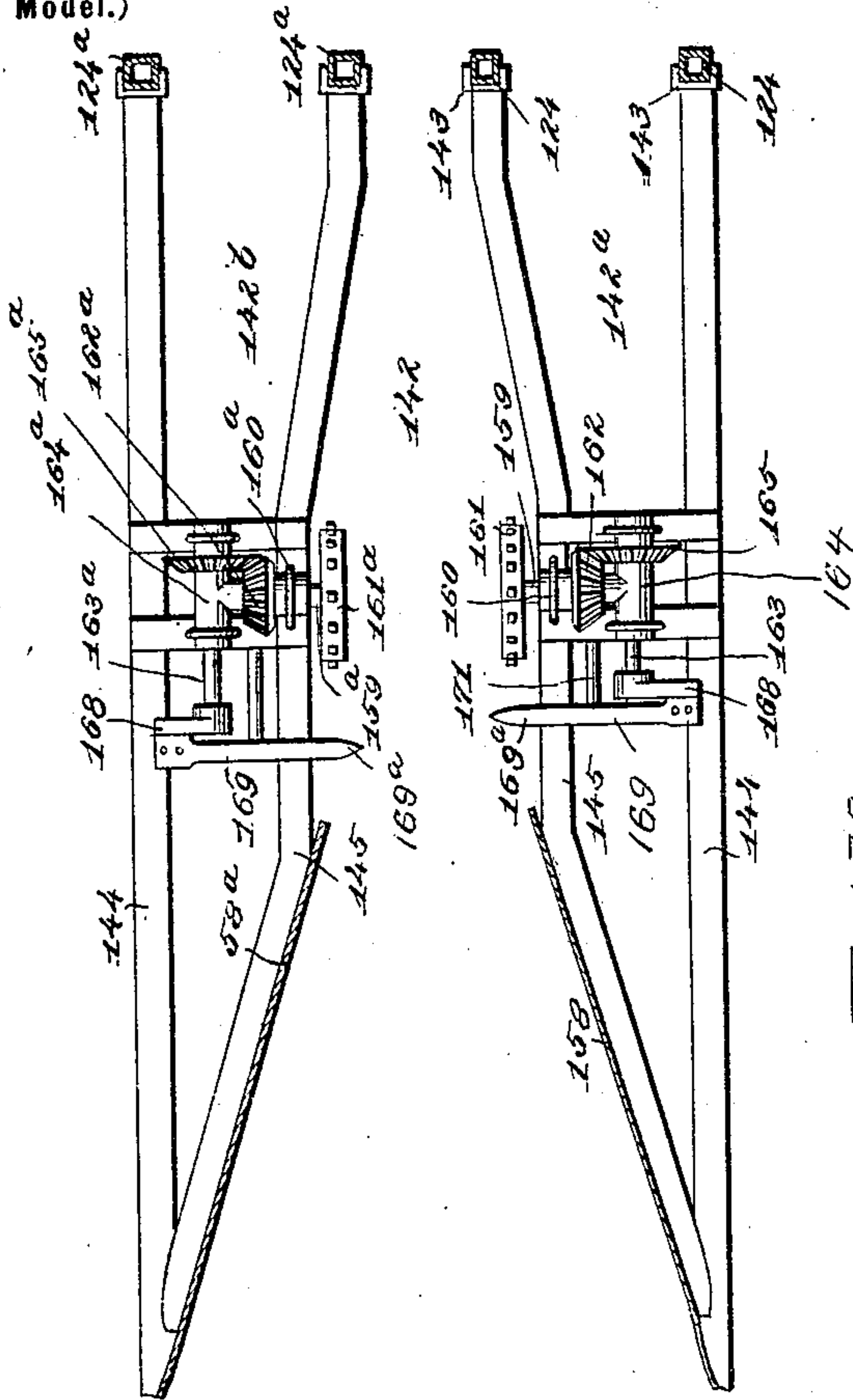


Fig. 14.

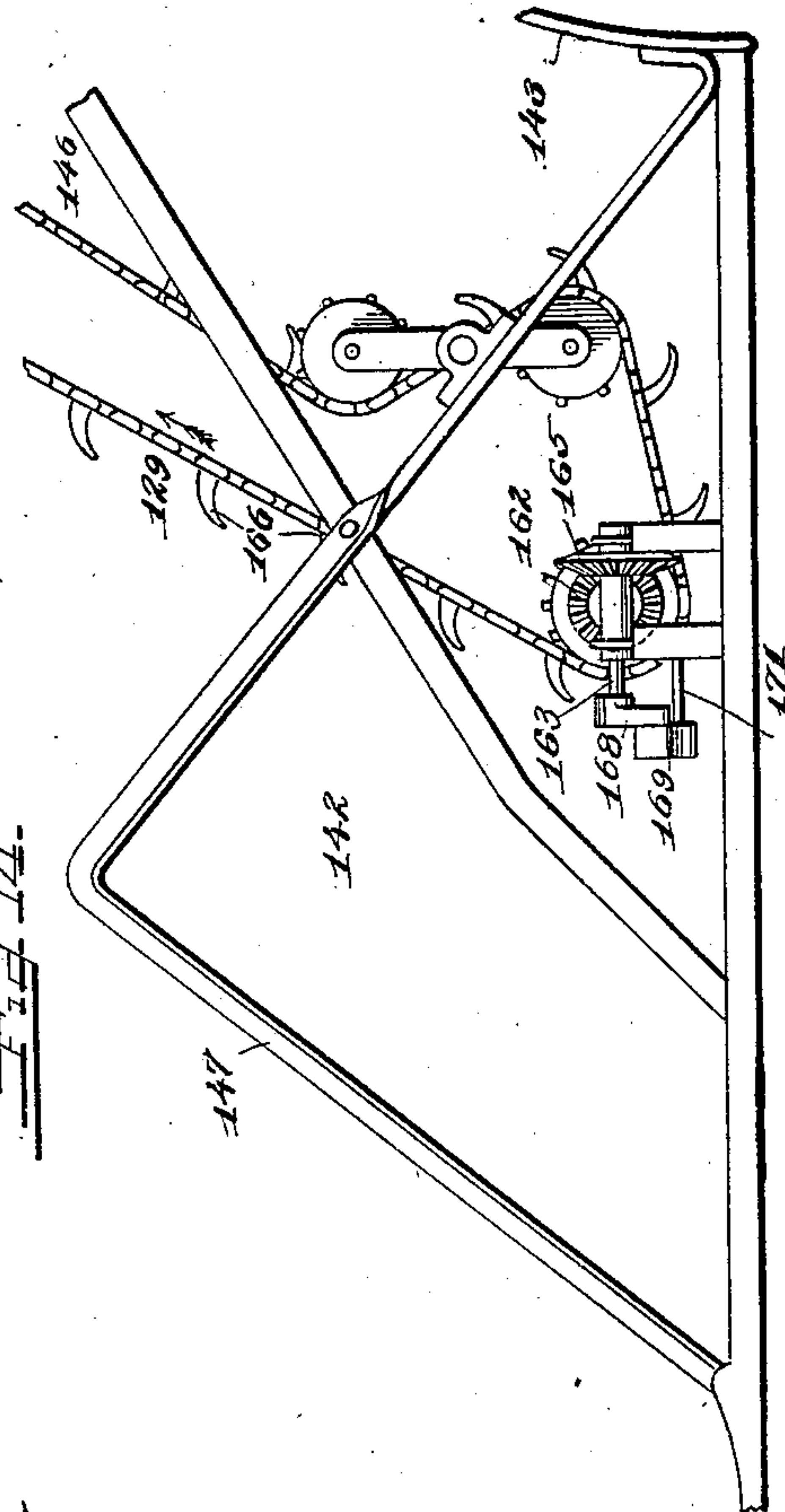
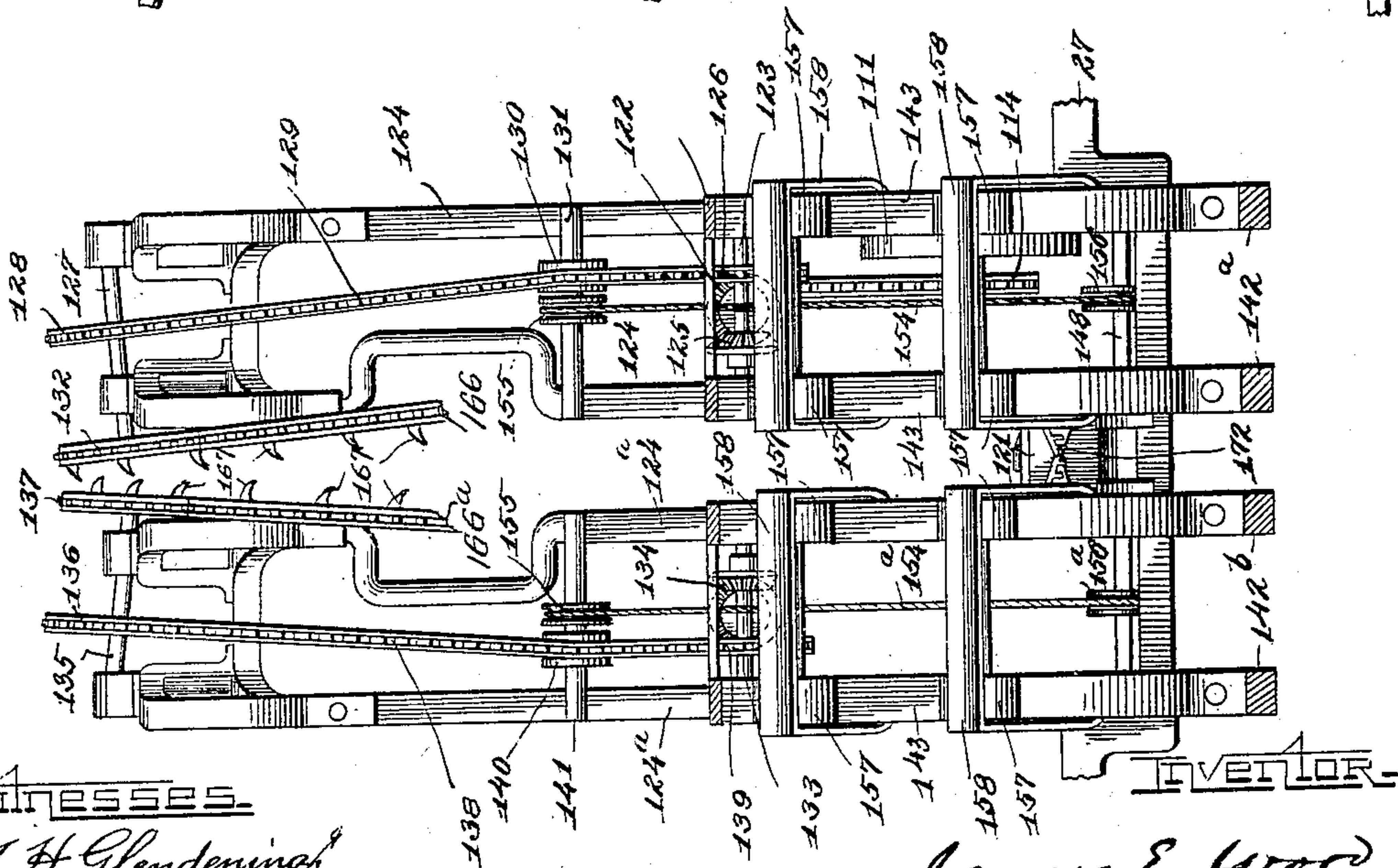


Fig. 12.



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Fig. 15.

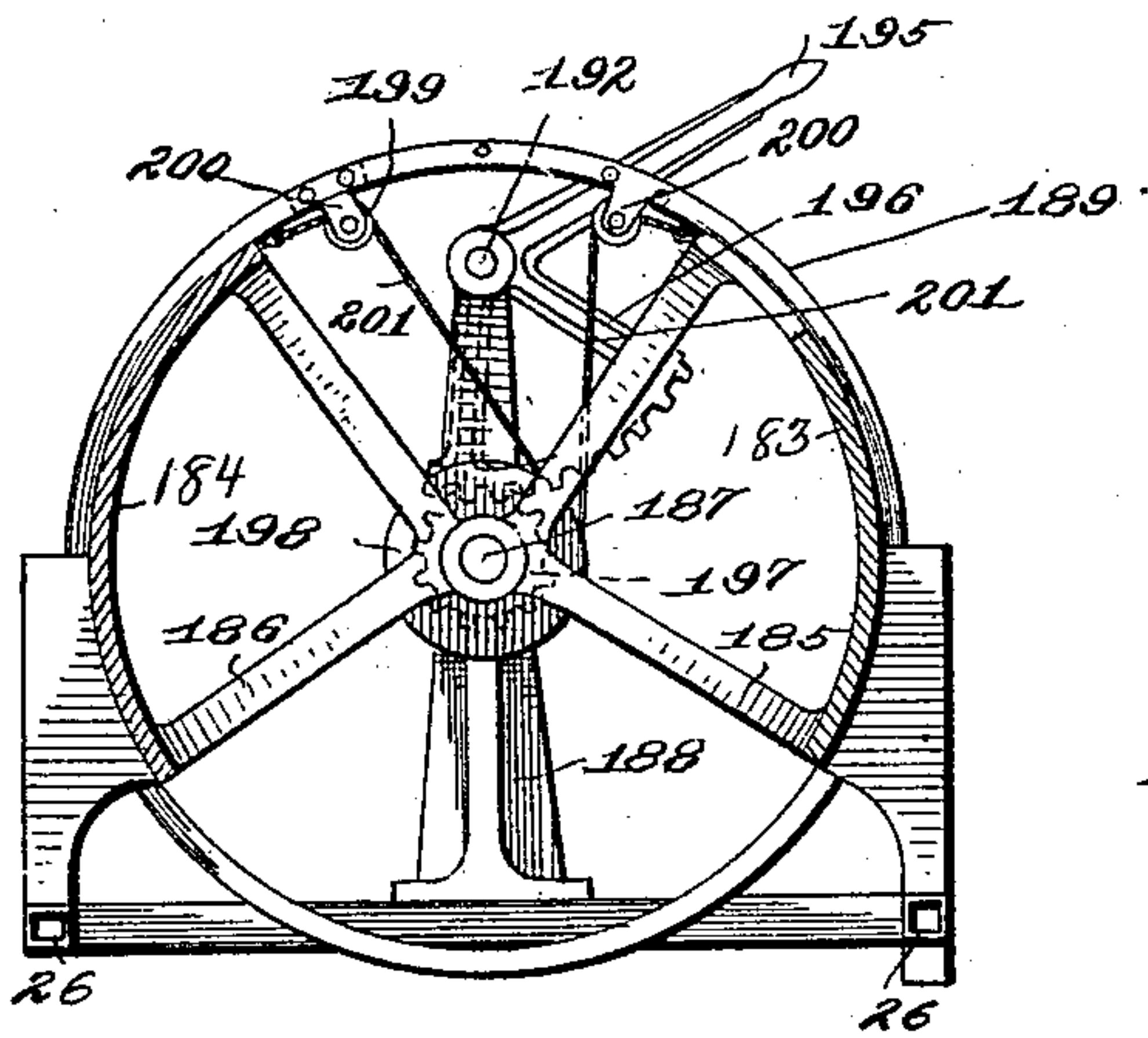


Fig. 16.

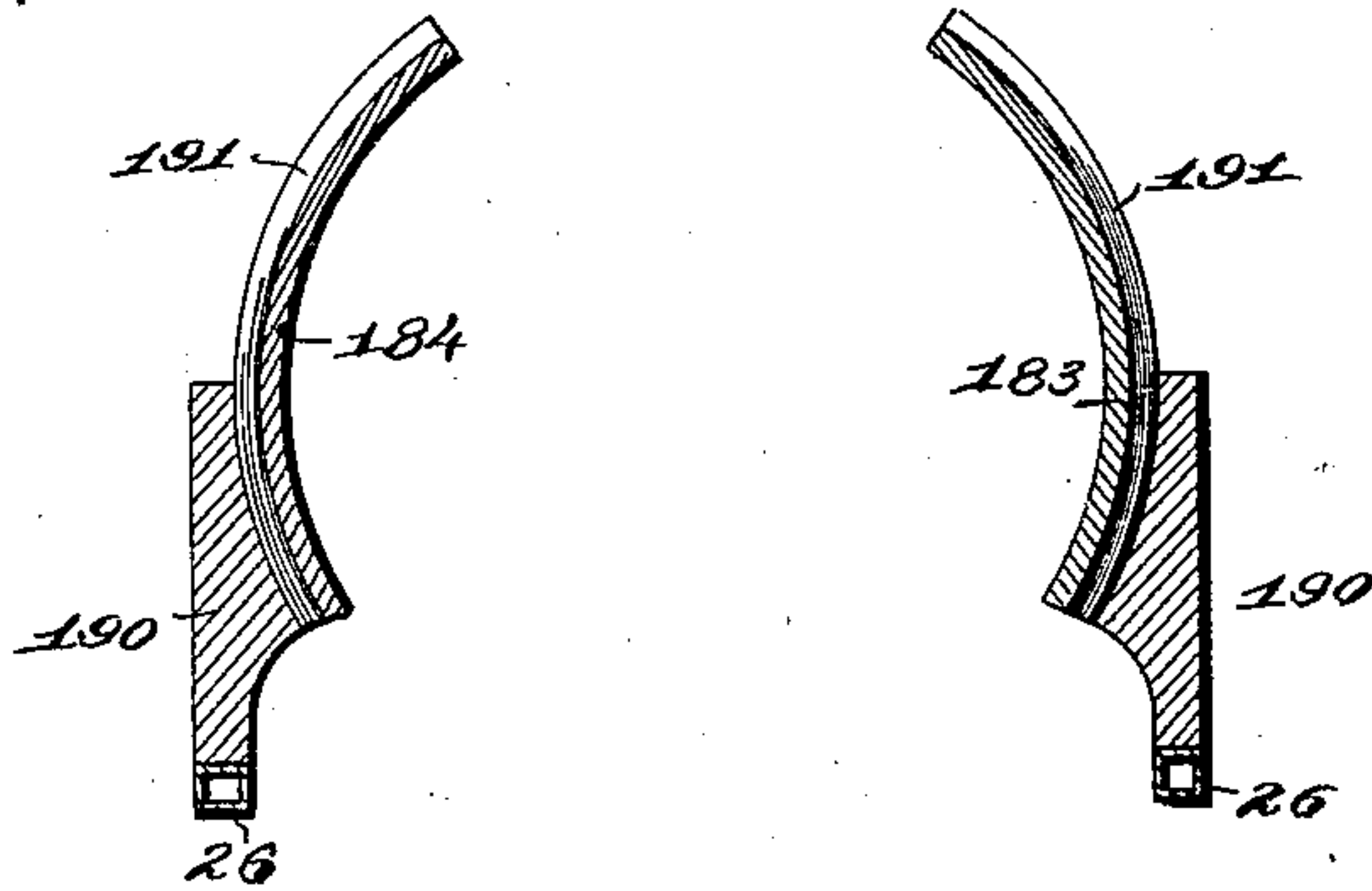


Fig. 17.

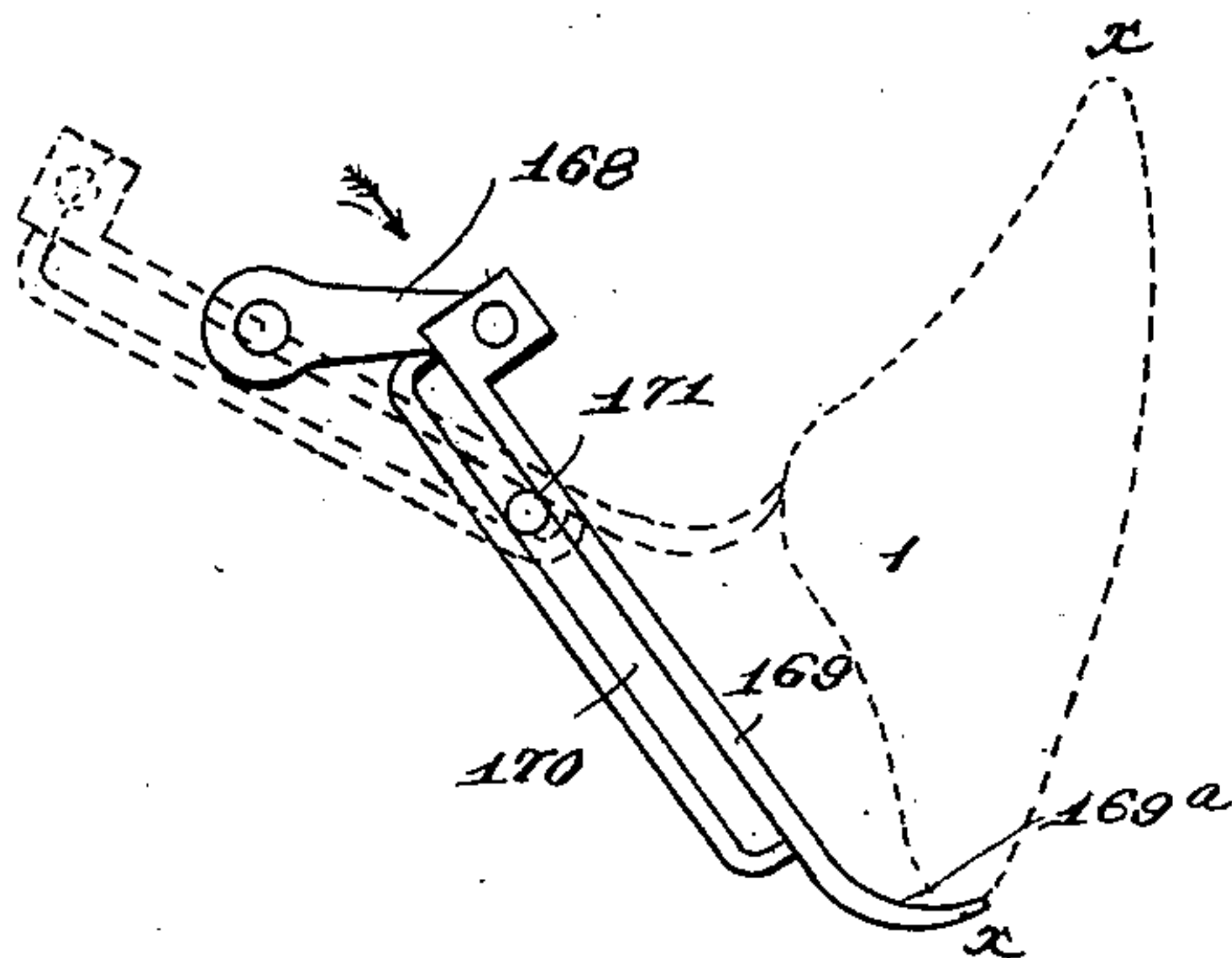


Fig. 18.

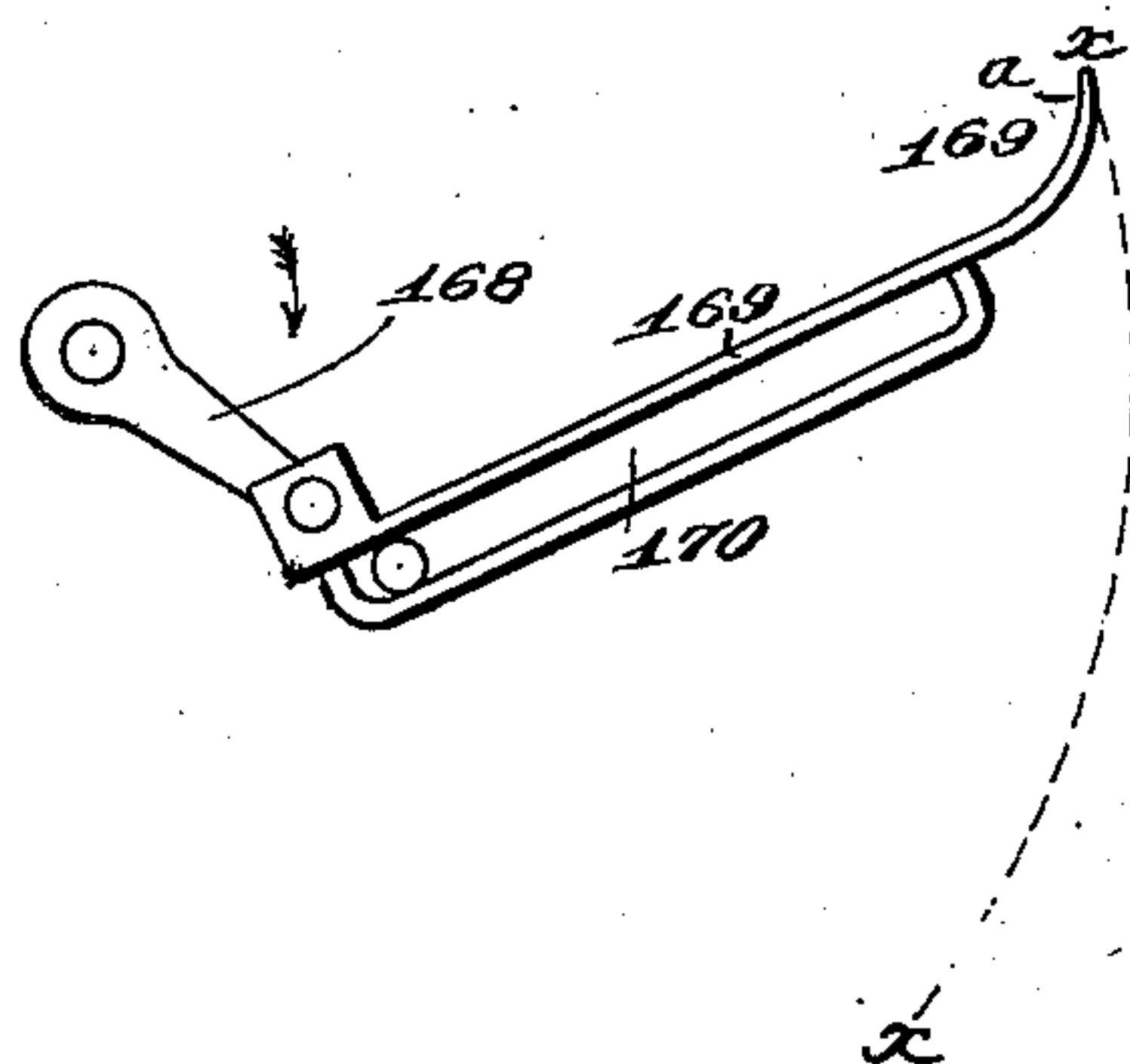


Fig. 19.

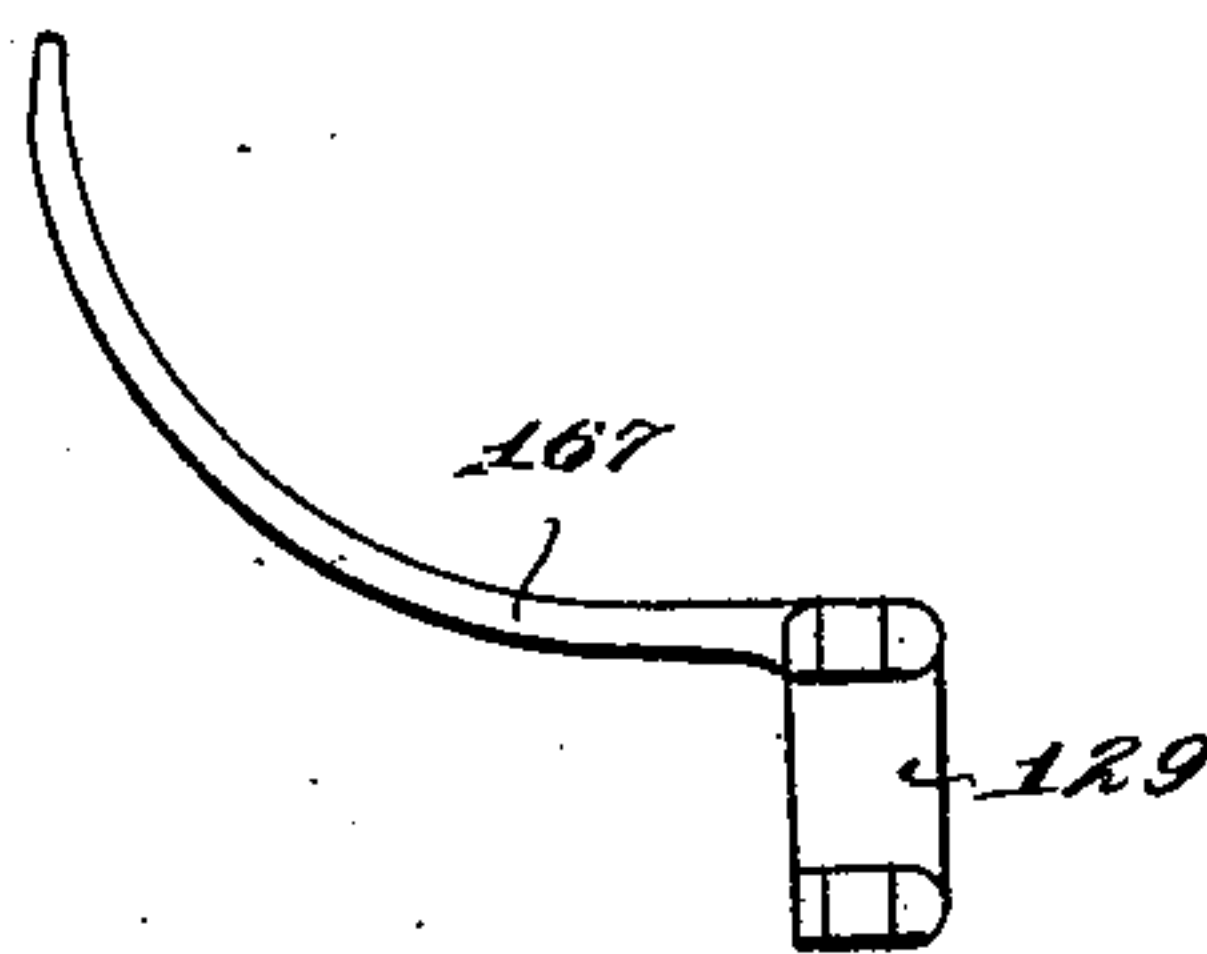
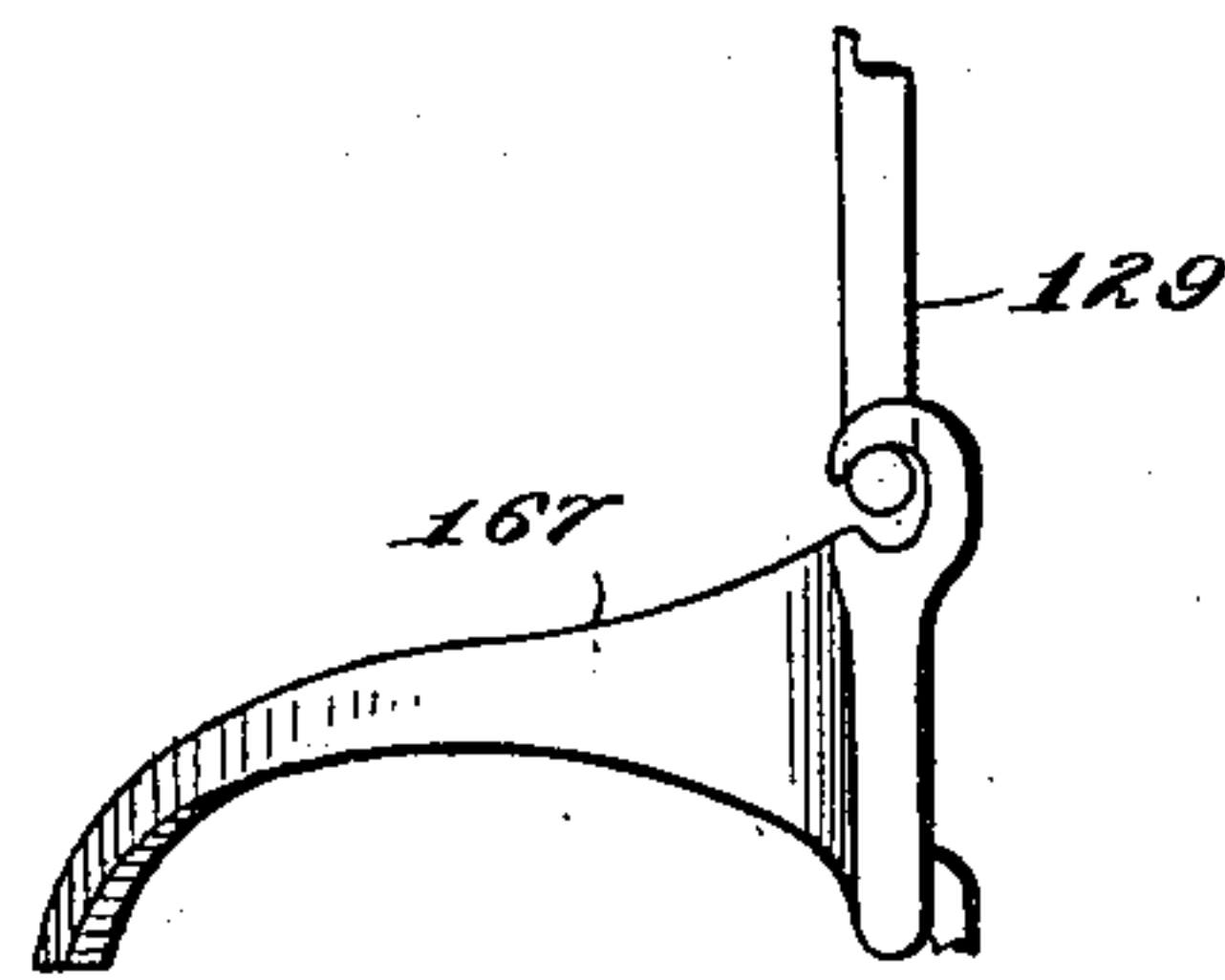


Fig. 20.



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# UNITED STATES PATENT OFFICE.

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## CORN-HARVESTER.

SPECIFICATION forming part of Letters Patent No. 706,142, dated August 5, 1902.

Application filed July 5, 1901. Serial No. 67,216. (No model.)

*To all whom it may concern.*

Be it known that I, JAMES E. WOOD, a citizen of the United States, residing at Harvard, in the county of McHenry and State of Illinois, have invented certain new and useful Improvements in Corn-Harvesters, of which the following is a specification, reference being had to the accompanying drawings.

My invention relates to corn-harvesters which are designed to cut down the corn in the field, bind the same into bundles, and deliver the bundles at suitable intervals; and one of its objects is to provide means by which any "down" corn—that is to say, corn which has fallen down and lies upon the ground, and particularly corn which lies parallel or nearly parallel to the line of draft of the machine—may be lifted from the ground and delivered to the cutter in a vertical position.

Another object of my invention is to provide means by which the corn when cut may be carried with the stalks in an approximately vertical position upward and delivered thence horizontally to the binder and in such a way that the carrying mechanism may not interfere with or strike the ears of corn upon the stalks.

Another object of my invention is to provide a new and improved framework for such corn-harvesters, and particularly to provide a balanced swinging frame, which carries the knife, the corn-elevating mechanism, and other portions of the driving mechanism and which may be swung about its pivotal point to regulate the height of the knife, and also a front frame, which is adjustably mounted on the swinging frame.

Another object of my invention is to provide a new and improved weeder which will separate the weeds from the corn in the process of harvesting the same.

Another object of my invention is to provide a new and improved drop-dump bundle-carrier adapted to receive the corn from the binder and to drop the gathered bundles at suitable intervals.

Another object of my invention is to improve corn-harvesters in sundry details, hereinafter pointed out.

I accomplish these results as hereinafter set forth and as illustrated in the drawings.

That which I regard as new will be set forth in the claims.

In the drawings, Figure 1 is a side elevation. Fig. 2 is a top or plan view. Fig. 3 is a rear view of the machine with the bundle-carrier and binder portion of the machine removed. Fig. 4 is an enlarged view, being a vertical section on line 4 4 of Fig. 3. Fig. 5 is an enlarged detail, being a sectional plan on line 5 5 of Fig. 4. Fig. 6 is an enlarged detail, being a vertical section on line 6 6 of Fig. 5. Fig. 7 is an enlarged detail, being a cross-section on line 7 7 of Fig. 5. Fig. 8 is an enlarged detail of the mechanism by which the beaters or reels may be adjusted in height, partly in vertical section. Fig. 9 is an enlarged detail, being a side view of Fig. 8. Fig. 10 is an enlarged detail, being a plan view of the rear portion of the machine, showing the binder-support and bundle-carrier. Fig. 11 is a detail, being an isometric view of the framework of the machine. Fig. 12 is an enlarged detail, being a front view of the front end of the tilting or swinging frame with portions of the front frame attached. Fig. 13 is an enlarged detail, being a plan view of the front end of the machine containing the lifter mechanism. Fig. 14 is an enlarged detail, being a side elevation of the same parts shown in Fig. 13. Fig. 15 is an enlarged detail, being a cross-section of the bundle-carrier with the segments open. Fig. 16 is an enlarged detail, being a cross-section of a portion of the bundle-carrier frame. Figs. 17 and 18 are enlarged details of the lifter mechanism for "lifting" down corn, showing the movements of the lifter. Fig. 19 is an enlarged detail showing one of the fingers on the feed-chain. Fig. 20 is an enlarged detail, being a side view of one of the fingers of the feed-chain. Fig. 21 is an enlarged detail, being a view of the caster-wheel supporting the rear frame, showing the manner in which it is mounted therein; and Fig. 21<sup>a</sup> is an enlarged detail of the weeders.

Referring to the drawings, 22 indicates the main axle of the machine, at one end of which is journaled a wheel 23 and at the other end a master-wheel 24. The axle 22 affords a support for the binder and bundle frame and for the tilting frame, as hereinafter described.



The framework of the machine consists of three parts—a rear or binder and bundle-supporting frame, a central tilting frame, and an adjustable front frame.

- 5 25 indicates the rear or binder and bundle-supporting frame, consisting of longitudinal bars 26 and cross-bars 27, which are journaled upon the axle 22 by means of suitable bearings 28.
- 10 29 indicates the central or tilting frame, which is journaled upon and supported by the axle 22 by means of suitable bearings 30 at each side of the central or tilting frame 29.
- 31 indicates spiral springs which are secured at one end to a suitable portion of the central tilting frame 29 and at the other end to a suitable portion of the rear frame 26 and operate to overcome the forward weight of the frame 29 and to keep it in balance.
- 15 32 indicates a shaft which is journaled in suitable supports on the rear frame 25 and carries two drums 33, keyed or otherwise secured thereto. One end of the shaft 32 is provided with a gear-wheel 34, which meshes with a worm-gear 35, that is carried at the lower end of an upright shaft 36, which is journaled in the rear frame 25 and provided with a crank 37 at its upper end.
- 20 38 indicates wire ropes or cords, one end of which is wound around the drums 33 and the other end secured to a suitable portion of the central or tilting frame 29 back of the axle 22, which forms the pivotal point thereof. By the turning of the crank 37 the worm-gear 35 operates to rotate the shaft 32, and by the winding or unwinding of the cords 38 the central or tilting frame 29 is tilted about the axle 22, so as to raise or lower the front end thereof.
- 25 39 indicates a sprocket-wheel which is secured to and rotates with the master-wheel 24.
- 30 40 indicates a shaft which is journaled in suitable bearings upon the rear frame 25 and is provided at its outer end with a sprocket-wheel 41, which engages by a suitable clutch mechanism 42 with the shaft 40.
- 35 43 indicates a sprocket-chain which passes around the sprocket-wheel 39 and the sprocket-wheel 41, so that when the clutch mechanism is engaged the shaft 40 is rotated with the rotation of the master-wheel 24 when the machine is drawn forward. The shaft 40 carries near its middle portion a sprocket-wheel 43, which is keyed or otherwise secured thereto, and near its outer end a sprocket-wheel 44 and a bevel-gear 45, keyed or otherwise secured thereto. The function of the bevel-gear 45 is to drive the binding mechanism, which is located as hereinafter stated and which, being of any well-known form and construction, is not illustrated or described, for reasons hereinafter more fully set forth.
- 40 46 47 48 indicate sprocket-wheels which are journaled upon the main axle 22 and are all fastened upon the same hub or otherwise rigidly secured together.
- 45 49 indicates a sprocket-chain which passes

around the sprocket-wheels 43 and 46, whereby when the shaft 40 is rotated, as above described, the sprocket-wheels 46 47 48 are rotated with it, it being understood, of course, that the axle 22, upon which the parts hereinbefore described are journaled, does not rotate. 70

50 indicates a sprocket-wheel which is keyed or otherwise secured to the outer end of a shaft 51, which is journaled in uprights 52 of the framework 29 and carries near its inner end a bevel-gear 53. 75

54 indicates a sprocket-wheel which is keyed or otherwise secured to the outer end of a shaft 55, which is also journaled in suitable bearings in the uprights 52 and carries at its inner end a bevel-gear 56. 80

57 indicates a sprocket-wheel which is keyed upon the outer end of a shaft 58, which is journaled in suitable bearings in one of the uprights 52 and another upright 59 of the central or tilting frame 29 and carries near its other end a bevel-gear 60 and near the middle of the shaft 58 a sprocket-wheel 61. 85 90

62 indicates a sprocket-chain which passes around the sprocket-wheels 48 and 50 and engages with the sprocket-wheels 54 and 57, as is best shown in Fig. 1, so as to rotate the shafts 51, 55, and 56 with the rotation of the master-wheel 24. 95

63 indicates a cone which is journaled in suitable bearings in the central or tilting frame 29, and, as is best shown in Figs. 1, 4, and 6, is so mounted that its front end is somewhat lower than the rear end. The cone 63 carries upon its surface a spiral flange 64, preferably made of sheet-steel. 100

65 indicates a bevel-gear which is keyed upon the rear end of a shaft 66, upon which the cone 63 is carried and which meshes with the bevel-gear 60, so that when the shaft 58 is rotated, as above described, the cone 63 is rotated in the direction indicated by the arrow in the several figures. 105 110

67 indicates a roller which is journaled in suitable bearings in the central or tilting frame 29 above and somewhat to one side of the middle line of the cone 63 and close to the periphery of the spiral flange 64. 115

68 indicates a bevel-gear which is carried upon the rear end of the roller 67 and meshes with the bevel-gear 56 upon the shaft 55, causing the roller 67 to rotate in the direction shown by the arrow in the several figures when the shaft 55 is rotated, as above described. 120

69 indicates guide-boards which are mounted, facing each other, between the uprights 52 and 59 above the cone 63 a sufficient distance apart to permit the passage of several stalks of corn vertically between them and to hold the same substantially upright in their passage up the cone, as hereinafter described. The tops of the guide-boards 69 are flared outward at 69<sup>a</sup>, so as to permit the passage of the spreading tops of the stalks of corn and the parts containing the ears between them, as is 125 130



best shown in Fig. 3, and they are provided with longitudinal openings 70, extending from front to back to permit the revolution of the reels, hereinafter described. One of the guide-boards 69 extends down close to the top of the roller 67 and the other close to the periphery of the spiral flange 64, as is best shown in Fig. 3.

71 indicates a shaft which is journaled in suitable bearings in supports 72 in the central or tilting frame 29. The rear end of the shaft 71 is provided with a bevel-gear 73, which is keyed or otherwise rigidly secured thereon and meshes with the bevel-gear 53 on the shaft 51, whereby when said shaft 51 is rotated the shaft 71 is rotated with it.

74 indicates bevel-gears which are keyed or otherwise secured upon the shaft 71.

75 indicates shafts which are journaled in the central or tilting frame 29, as is best shown in Fig. 4, and which carry at their lower ends bevel-gears 76, which mesh with the bevel-gears 74, causing the shafts 75 to rotate when the shaft 71 is rotated, as above described.

77 indicates reels which are keyed or otherwise secured upon the shaft 75 and are rotated with it in the direction indicated by the arrows in Fig. 2, their ends passing, as will be best seen in Figs. 2 and 3, through the openings 70 and operating as beaters to carry up the upper portions of the stalks of corn, as hereinafter described. In order that I may make the reels adjustable, I prefer to use the construction shown in Figs. 8 and 9 and indicated upon one of the reels in Fig. 4.

Referring to Figs. 8 and 9, 78 indicates a sleeve which surrounds the shaft 75 and carries at its lower end a collar 79. 80 indicates a lever provided with a segmental rack 81, a lever 82, and dog 83, which engages with the collar 79 on the sleeve 78, so as to raise and lower the sleeve 78 by the motion of the handle 80, which is locked in any desired position by means of the dog 83. The reel 77 is mounted upon a block 84, which is feathered upon the shaft 75 and rests upon the top of the sleeve 78, which bears upon the same in a circular groove on the rim of the block 84. The block 84 is provided with a circumferential groove 85. 86 indicates spring-clips which are secured upon the sleeve 78 and engage with the circumferential groove 85 on the block 84, permitting the block to be raised and lowered by the raising and lowering of the sleeve 78 and at the same time to rotate with the shaft 75. 87 indicates a butter, which is composed of an apron 88, of canvas or other suitable material, carrying cross-bars 89 upon its outer surface and carried upon rollers 90, 91, and 92, as is best shown in Figs. 5 and 6. The rollers 91, 92, and 93 may be supported in any suitable manner from the framework of the machine. The roller 92 carries upon its outer end a sprocket-wheel 93. 94 indicates a sprocket-chain, which passes around the sprocket-wheel 93

and the sprocket-wheel 61 and the shaft 58, which causes the butter to move in the direction indicated by the arrows in Figs. 5 and 6 when the shaft 58 is rotated, as above described.

95 (see Figs. 3 and 6) indicates a shaft which is journaled in suitable bearings 96 in the central or tilting frame 29. The shaft 95 carries a bevel-gear 97 at its forward end and a bevel-gear 98 at its rear end.

99 (see Fig. 3) indicates a shaft which is journaled in the upright 59 and another upright 100 in the central or tilting frame 29.

101 indicates a sprocket-wheel, and 102 a bevel-gear keyed or otherwise secured upon the shaft 99.

103 indicates a sprocket-chain which passes around the sprocket-wheels 44 and 101, whereby when the shaft 40 is rotated the shaft 99 is rotated, rotating with it the shaft 95 through the medium of the bevel-gears 98 and 102.

104 (see Fig. 1) indicates a sprocket-wheel which is mounted upon a shaft 105. (See Figs. 4 and 5.)

106 indicates a sprocket-chain which passes around the sprocket-wheel 47 and the sprocket-wheel 104, so as to rotate the shaft 105.

107 indicates a sprocket-wheel which is keyed upon the shaft 105 and rotates therewith.

108 indicates a shaft which is mounted in a bearing 109 upon a bracket 110 on the forward part of the central or tilting frame 29.

111 indicates a balance or fly wheel which is keyed or otherwise secured upon one end of the shaft 108.

112 (see Fig. 5) indicates a bevel-gear which is keyed or otherwise secured to the other end of the shaft 108.

113 indicates one member of a clutch which is keyed to or otherwise secured upon the shaft 108.

114 indicates a sprocket-wheel which is journaled upon the shaft 108 near the fly-wheel 111 and is provided with a clutch member 115, which is adapted to engage with the other clutch member 113 on the shaft 108.

116 indicates a spiral extension-spring which surrounds the shaft 108 and bears at one end upon the bracket 110 and at the other end upon the sprocket-wheel 114, tending to normally force the two clutch members 113 and 115 into engagement.

117 indicates a sprocket-chain passing around the sprocket-wheels 107 and 114, whereby the shaft 108 is rotated from the driving-wheel by means of the several sprocket-chains above described.

118 (see Fig. 6) indicates a short shaft journaled in suitable bearings in the lower forward end of the central or tilting frame 29 and carrying upon its upper end a bevel-gear 119, which meshes with the bevel-gear 112 on the shaft 108.

120 indicates a rotary knife which is mounted upon the shaft 118 and rotates immedi-



ately above a plate 121, mounted in the framework 29 and having its front surface curved inward and backward toward the knife, as is best shown in Fig. 5.

5 The clutch members 113 115, as shown, are so constructed that when the sprocket-wheel 114 is rotated the clutch members will engage, rotating the shaft 118, the fly-wheel 111, and also the knife in the direction indicated by  
10 the arrows in Fig. 5; but, as is shown in said figure, in case the driving motion of the sprocket-chain 117 suddenly stops the momentum of the fly-wheel will continue to rotate the shaft 108, the sloping edges of the  
15 teeth on the clutch members passing one another and forcing the sprocket-wheel 114 inward against the action of the spring 116, thus preventing any sudden stoppage of the knife and assisting in the severing of the corn.

20 122 (see Fig. 12) indicates a bevel-gear (shown also in dotted lines in Fig. 4) which is keyed upon the front end of the shaft 71, which, it should be said, is so geared as to rotate at the same rate of speed as the shaft 95.

25 Referring to Figs. 4 and 12, 123 indicates a short shaft which is mounted in suitable bearings between uprights 124 on the front portion of the central or tilting frame of the machine. 125 indicates a bevel-gear which  
30 is keyed upon the shaft 123 and meshes with the bevel-gear 122. 126 indicates a sprocket-wheel which is keyed upon the shaft 123. 127 indicates a shaft which is journaled in suitable bearings at the top of the uprights  
35 124 and is set therein upon a slight incline, as is best shown in Fig. 12. 128 indicates a sprocket-wheel which is keyed upon the shaft 127. 129 indicates a sprocket-chain which passes around sprocket-wheels 126 and 128,  
40 over an idler sprocket-wheel 130, which is revolubly mounted upon an axle 131, mounted between the uprights 124. 132 indicates a sprocket-wheel which is keyed to the inner end of the shaft 127, as is best shown in  
45 Fig. 12.

Referring to Figs. 6 and 12, 133 indicates a shaft which is journaled between uprights 124<sup>a</sup> upon the front portion of the machine, which are similar in all respects to the up-  
50 rights 124, above referred to. 134 indicates a bevel-gear which is keyed upon the axle 133 and meshes with the bevel-gear 97 at the forward end of the shaft 95. 135 indicates a shaft which is journaled in suitable bearings in the upper portions of the uprights  
55 124<sup>a</sup>, carrying sprocket-wheels 136 and 137, which correspond, respectively, with sprocket-wheels 128 and 132. 138 indicates a sprocket-chain which passes around sprocket-wheel  
60 136 and a sprocket-wheel 139, which is keyed upon the shaft 133. The sprocket-chain 138 also passes over an idler-pulley 140, journaled upon an axle 141, which is mounted in the uprights 124<sup>a</sup>.

65 The front frame 142 consists of two parts 142<sup>a</sup> and 142<sup>b</sup>, which are exactly similar, but face each other in reverse positions, as is best

shown in Fig. 13. The lower portions of the uprights 124 and 124<sup>a</sup> of the central or tilting frame 29 are formed upon the arc of a circle, as  
70 is best shown in Figs. 1, 4, and 11. The front frame consists of curved upright portions 143, forward - projecting bars 144 145, and braces 146 147. The curved portions 143 are bent upon the arc of a circle to correspond to  
75 the curvature of the uprights 124 124<sup>a</sup> and are journaled, so as to embrace the same, as is best shown in Fig. 13, and so as to move upward and downward thereon.

148 indicates a shaft which is journaled in  
80 suitable bearings below the central or tilting frame 29 and carries upon its outer end a cog-pinion 149 and two drums 150 150<sup>a</sup>.

151 indicates a lever which is pivoted upon the central or tilting frame 29 and is provided  
85 at its lower end with a segmental rack 152, which engages with the cog-pinion 149. The lever is locked in place by a segmental rack 153 and the ordinary hand-lever and dog, operating in the well-known way.  
90

154 indicates a wire cord or rope which winds around the drum 150 and passes over guiding-sheaves 155 156 and has both its ends secured to a suitable cross-bar on one portion  
95 of the front frame 142<sup>a</sup>, whereby when the lever 151 is rocked the shaft 148 will be partially rotated, winding the cord upon the drum 150 and raising or lowering the portion 142<sup>a</sup> of the front frame 142. A precisely similar cord 154<sup>a</sup> is wound around the drum 150<sup>a</sup>,  
100 passing over guide-sheaves 155 156<sup>a</sup>, and is secured at both ends in the same manner to the portion 142<sup>b</sup> of the front frame 142.

157 indicates rollers which are mounted in brackets 158', carried by the central or tilt-  
105 ing frame 29, and bear upon the forward surfaces of the curved portions 143 of the front frame 142, so as to slidably hold the same between the said roller 157 and the curved portions 124 124<sup>a</sup> of the central or tilting  
110 frame 29.

As is best shown in Figs. 2 and 13, the two portions 142<sup>a</sup> 142<sup>b</sup> have their bars 145 most  
widely separated from one another at their front ends and gradually drawn toward each  
115 other at their inner ends, so as to gather and guide the corn between them as the machine passes along. As is best shown in Fig. 2, they are also provided with guide-boards 158 158<sup>a</sup>, which slope upward and toward each  
120 side away from each other, assisting in gathering and guiding the corn. Referring to Fig. 13, where it is best shown, 159 159<sup>a</sup> indicate short shafts which are journaled in suitable bearings 160 160<sup>a</sup> on the parts 142<sup>a</sup> 142<sup>b</sup>  
125 of the front frame 142. 161 161<sup>a</sup> indicate sprocket-wheels which are keyed upon the shafts 159 159<sup>a</sup>. 162 162<sup>a</sup> indicate bevel-gears which are keyed upon the other end of the shafts 159 159<sup>a</sup>. 163 163<sup>a</sup> indicate shafts which  
130 are mounted in suitable bearings 164 164<sup>a</sup> and carry each upon one end bevel-gears 165 165<sup>a</sup>, which mesh, respectively, with the bevel-gears 162 162<sup>a</sup>. 166 166<sup>a</sup> indicate sprocket-



chains which pass, respectively, around the sprocket-wheels 132 and 161 and 137 and 161<sup>a</sup> and which are somewhat closer together at the top than they are at the bottom, the sprocket-wheels 132 and 127 being somewhat inclined, as said above, and somewhat nearer together than the sprocket-wheels 161 and 161<sup>a</sup>. The sprocket-chains 166 166<sup>a</sup> carry teeth or fingers 167, which, with their uses and functions, are hereinafter more fully described. When the shafts 127 and 135 are rotated, as above described, the rotation is communicated, by means of the sprocket-wheels 132 137 and sprocket-chains 166 166<sup>a</sup>, to the sprocket-wheels 161 161<sup>a</sup> and thence through interposed bevel-gears to the shafts 163 163<sup>a</sup>.

Referring particularly to Figs. 17 and 18, where these devices are best shown, 168 indicates a crank which is mounted upon the forward ends of the shafts 163 163<sup>a</sup>. As these parts are precise duplicates of one another upon the two sides of the machine, with the exception that the shaft 163<sup>a</sup> is a little longer than the shaft 163, for reasons hereinafter described, the description of one will suffice for the description of both, as they operate in precisely the same manner except that toward each other, and hence in a reverse direction. Upon the outer end of the crank 168 is pivoted a lifter 169, which is curved upward at its outer end 169<sup>a</sup> and is provided with a slot 170. 171 indicates a fixed pin secured to the front frame 142 and engaging the slot 170. As the crank 168 rotates in the direction shown in Figs. 17 and 18, the pin 171 engaging the slot 170, the operative end of the lifter describes a movement which, beginning in the position shown in dotted lines in Fig. 17, is first downward and inward toward the space between the parts 142<sup>a</sup> and 142<sup>b</sup> of the front frame 142, thence slightly inward upon the ground-line, (indicated by the lines *x x* in Figs. 17 and 18,) thence quickly upward on a curved line, and thence upon a curved line downward and outward to the point of beginning. The movement of the point of the lifter is shown in dotted lines in Fig. 17.

172 indicates a weeder composed of two arms 172<sup>a</sup> and 172<sup>b</sup>, which are pivoted by ots 173 to two forward-projecting bars 174 on the central or tilting frame. The bars 174 are spaced a distance apart, as is best shown, for instance, in Fig. 5, to permit the passage of the corn between them. As is best shown in Fig. 21<sup>a</sup>, the arms 172<sup>a</sup> and 172<sup>b</sup> of the weeder 172 are formed somewhat in the shape of bell-crank levers, with the surfaces of the longer arms, which face each other, coming to an angle 175 between the pivotal points 173 and the ends of the arms.

176 indicates spiral springs which are fastened to the short arms of the weeders 172<sup>a</sup> and 172<sup>b</sup> and to the framework and tend normally to bring the angles 175 of the weeder in contact with one another in the position

shown in Fig. 5 and in detail in Fig. 21<sup>a</sup>, the longer arms of the said weeder projecting forward and separating from one another, so as to receive the corn between them. The lower surface of the arms 172<sup>a</sup> 172<sup>b</sup> is provided with a series of downward-projecting cross-plates 177. (Best shown in Fig. 21<sup>a</sup>.) The springs 176 are of sufficient tension to prevent the two arms from being forced apart by ordinary weeds that may come between them in the passage of the machine through the field, but are not strong enough to resist the pressure of the stalks of corn, which as the machine is driven forward cause the two arms of the weeder to separate and permit the passage of the stalks of corn between them to the knife above described.

The operation of the weeders will be described hereinafter in describing the operation of the machine.

Figs. 19 and 20 show details of the teeth 167. These teeth or fingers are mounted, as was said above, upon the sprocket-chains 166 and 166<sup>a</sup> and are curved in such a way that when they are in operative position—that is, upon the front side of the sprocket-chains 166 166<sup>a</sup> as the same are rising—the fingers extend forward and then curve inward toward each other and downward in order to assist in raising the corn and delivering the same in a vertical position to the cutting-knife in the manner described hereinafter in describing the operation of the machine.

Referring more particularly to Figs. 1, 7, and 10, where these parts are best shown, 178 indicates a binder-platform which is carried upon the rear frame 25, immediately behind the rear end of the cone 63, and is adapted to receive a corn-binder of any well-known and approved form and description. As the said corn-binder forms no part of my present invention and, as said above, may be of any well-known and approved description, I have not shown it in the drawings, as to do so would complicate the drawings and render less clear the parts which I have shown and described and which relate directly to my invention. The lower part 179 of the binder-platform 178 is hinged, so as to be capable of being lifted upward when the bundle-dump of the bundle-carrier is operated in the manner and for the purpose hereinafter described. The binder, as was said above, is operated through the medium of the bevel-gear 45, a bevel-gear 180 meshing therewith, and a shaft 181, upon which said bevel-gear is keyed or otherwise secured. The connection of the same with the binder being of any well-known form and description is not shown here for reasons above stated. 182 indicates a bundle-carrier which is also carried by the rear frame 25 to one side of the binder-platform 178, as is best shown in Figs. 7 and 10. The bundle-carrier consists of two segments 183 184, which are in the form of an arc in cross-section and are supported at their forward ends by braces 185 186, which are journaled on the rear end



of a shaft 187, which is journaled in suitable bearings in an upright 188, supported upon the rear frame 25. 207 indicates lugs which are mounted upon the outer surface of the segment 183, near its upper edge, and project therefrom, so as to engage the hinged portion 179 of the binder-platform 178 to lift the same when the segments are operated, as hereinafter described.

Referring particularly to Figs. 7, 10, and 15, 189 indicates a circle which is supported upon the longitudinal bars 26 of the rear frame 25 at the front end of the bundle-carrier. Said circle conforms to the outer surface of the arc upon which the segments 183 184 curve and supports the segments at their forward ends, so that they may be moved around therein. 190 indicates uprights which are secured to the longitudinal bars 26 and whose upper portions on the surfaces which face each other are curved, as is best shown in Fig. 16, to conform to the arc of the segments 183 184 and are grooved, as is best shown in Fig. 16. 191 indicates flanges upon the outer surfaces of the segments 183 184, which move in the grooves in the curved portions of the surfaces 190, operating to support the rear end of the segments 183 184 and to permit them to move therein. 192 indicates a shaft which is supported in bearings 193 194 on the rear frame. 195 indicates a lever keyed upon said shaft 192. 196 indicates a segmental rack which is also keyed upon the shaft 192 near its inner end. 197 (see Fig. 5 and dotted lines in Fig. 15) indicates a cog-pinion which is keyed upon the forward end of the shaft 187 and meshes with the segmental rack 196. 198 indicates a drum which is keyed or otherwise secured upon the shaft 187 close to the braces 185 186. 199 indicates sheaves which are carried by the circle 189 near its upper end and journaled in suitable bearings 200 thereon. 201 indicates cords, one end of each of which is secured to the segments 183 184. The cords 201, passing over the sheaves 199, pass around the drum 198 and are secured thereto. When the hand-lever 195 is rocked, rocking the shaft 192, the segmental rack operates to rotate the drum 198 and wind the cords upon it, thus separating the segments from one another at the bottom and driving them into the position shown in Fig. 15, permitting, of course, any bundles of corn which have accumulated therein, as hereinafter described, to drop to the ground. The segments 183 184, it will be understood, are normally in the position shown in Fig. 7.

The master-wheel 24 is provided upon its surface with a number of lugs 202, which are formed of angle-iron and are set diagonally upon the periphery of the wheel 24, upon each side thereof, so as to leave a space between them, and, as is best shown in Figs. 3 and 7, are staggered.

203 indicates a scraper which is carried by the rear frame 25 and is provided with a foot-lever 204, by means of which the scraper may

be brought against the periphery of the master-wheel 24 in the peripheral space between the inner ends of the lugs 202.

Referring to Fig. 2, 205 indicates a tongue mounted upon the front portion of the rear frame 25. 206 indicates a brace which is pivotally connected with the forward end of the tongue 205 and with one side of the front frame near its front end.

Referring particularly to Figs. 1, 10, and 21, 208 indicates a caster-wheel which is carried by a yoke 209. The yoke 209 has at its forward end an upright shaft 210, which passes through a sleeve 211, so as to rotate therein. The sleeve 211 is provided upon each side with lugs 212, which are journaled in the rear framework 25. 213 indicates a strong spiral spring, one end of which is secured to the sleeve 211 and the other end to a suitable cross-bar 214 in the rear frame 25. The spring 213 tends to move the sleeve 211 backward, and thus to force the caster-wheel downward, and is strong enough to balance the weight of the rear portion of the machine when the bundles of corn are delivered thereto and carried thereby, as hereinafter described, and to keep the caster-wheel in constant elastic bearing upon the ground, no matter upon what inequalities of ground the other wheels may drop, affording a constant but appropriately elastic bearing and support for the rear portion of the machine.

The operation of the machine is as follows: The machine is driven forward along the rows of corn with the two portions of the front frame straddling the rows of corn. The forward portions of the front frame being separated from one another and coming to a point, as above described, and then sloping back inward toward each other will operate, by the assistance of the guide-boards 158 158<sup>a</sup>, to lift into an approximately vertical position any stalks of corn which may have fallen out at right angles or approximately right angles with the line of draft. The lifters 169, being so driven as to operate rapidly—that is, giving several movements between the hills and moving in the direction above described—will pass under any stalks of corn which are thrown down upon the ground in line or approximately in line with the draft of the machine, and operating across or at right angles with the line of draft of the machine will lift the stalks of down corn which are lying either forward or backward in a line in the direction or slightly to one side of the line of draft, thus lifting all stalks of corn which have not been lifted by the operation of the forward end of the machine, as above described. The stalks of corn being thus raised from the ground as the machine is driven forward, the teeth 167 on the front portion of the sprocket-chains 166 166<sup>a</sup> engage with the stalks of corn and lift them still farther. The curved shape of the teeth, curving forward, then inward and downward, as above described, will engage the stalks of corn, lifting them as the



machine is driven forward to a vertical position, but will allow any one tooth if it strikes an ear of corn to slip off and not break the ear from the stalk or the stalk of corn, the stalk being of course prevented from falling by the immediate engagement of the next tooth. The stalks of corn thus lifted, as the machine is driven forward, to a vertical position pass between the sprocket-chains 166 166<sup>a</sup> and between the two forward portions of the machine backward to the weeder. As was said above, the two parts of the weeder 172 separate to permit the passage of the stalks of corn between them, but remain closed as against any weeds. The weeds thus by the angular separation of the two parts of the weeder are thrown downward and by the assistance of the downward-projecting plates on the under sides of the weeder are turned backward and under, so that they will not reach the knife. The stalks of corn then coming to the knife 120, which is rotated rapidly, as above described, are severed, the distance of the point of severance from the ground being regulated by the central or tilting frame in the manner above described. The lower end of the cone 63, being immediately back of and under the plate 121, as the machine is driven forward the butts of the cornstalks, delivered thus to a vertical position, rest upon the cone 63 and are carried backward by the operation of the spiral flange 64 between the guides 69. The reels or beaters 77, rotating in the direction above described, bear upon the upper ends of the stalks of corn, carrying them backward and tending to keep the stalks of corn approximately in a vertical position as they travel upward on the surface of the cone 63 and backward toward the binder. As the lower ends of the stalks of corn thus carried upward and backward pass from the cone they are immediately delivered to the beater 87, which, bearing upon the butts of the stalks, carries them backward, the last of the series of reels or beaters carrying the upper ends backward. The beaters are so arranged that as the corn approaches the rear end of the machine the tops of the stalks are carried backward somewhat more rapidly than the butts or lower ends of the stalks, so that when the last of the reels or beaters 77 operates upon the stalks they are thrown backward into the binder, into which they fall in a horizontal position, the butter operating to assist the delivery of the stalks of corn in a horizontal position in the beater, with the butts forward and the tops of the stalks backward. Upon being bound in bundles by any suitable binder the bundles roll down the binder-support 178 into the bundle-carrier 182, where they are retained until a sufficient number have accumulated. When a sufficient number of bundles have been received in the bundle-carrier, the bundle-carrier is operated, as above described, to discharge the contained bundles at a required

speed, and the lugs 207, coming in contact, as above described, with the outer end of the hinged portion 179 of the binder-platform 178, raise the said hinged portion and prevent any bundles bound by the binder in the meantime from coming forward and retain the same until the bundle-carrier is again closed for their reception.

I have shown the devices for engaging the butts of the stalks of corn and carrying them upward and backward as consisting of a cone with a spiral flange. Some other form of carrier might be used, however, to effect the same purpose, and I therefore do not confine myself to the use of such cone with spiral flange, except as specifically claimed.

That which I regard as my invention, and desire to secure by Letters Patent, is—

1. In a corn-harvester, the combination with a frame having a longitudinal opening therein adapted to straddle a row of corn, of levers pivoted to said frame upon each side of said opening and pointing crosswise of the line of draft, and mechanism adapted to give to the inner and operative end of said levers a downward and inward movement crosswise of the line of draft, then a relatively rapid upward movement, then a movement downward and outward to the point of beginning, substantially as described.

2. In a corn-harvester, the combination with a frame having a longitudinal opening therein adapted to straddle a row of corn, of a forwardly-projecting pin fixed to said frame, a lever provided with a longitudinal slot intermediate its ends adapted to engage said pin and support said lever with its inner and operative end pointing crosswise of said longitudinal opening and crosswise of the line of draft, a crank having its wrist-pin pivoted to the other end of said lever, and mechanism for rotating said crank, substantially as described.

3. In a corn-harvester, the combination with a frame having a longitudinal opening therein adapted to straddle a row of corn, of forwardly-projecting pins fixed upon said frame upon each side of said opening, levers provided each with a longitudinal slot intermediate its ends adapted to engage said pins and support said levers with their inner and operative ends pointed crosswise of said opening in said frame and crosswise of the line of draft, cranks having their wrist-pins pivoted to the other ends of said levers, and mechanism for rotating said cranks, substantially as described.

4. In a corn-harvester, the combination with a sprocket-chain having fingers adapted when said chain is moved to engage partially-lifted corn and lift the same to a substantially upright position and mechanism for driving said sprocket-chain, of a lever adapted when operated to engage down corn lying along the line of draft and lift the same into engagement with said sprocket-chain, and means for



giving the operative end of said lever a movement across the line of draft and upward, substantially as described.

5 In a corn-harvester, the combination with a sprocket-chain having fingers adapted when said chain is moved to engage partially-lifted down corn and lift the same to a substantially upright position and mechanism for driving said sprocket-chain, of a lever operating substantially at right angles to the line of draft and adapted when operated to engage down corn lying along the line of draft and lift the same into engagement with said sprocket-chain, and means for giving the operative end of said lever a movement across the line of draft and upward.

6. In a corn-harvester, the combination with a pair of sprocket-chains adapted to straddle a row of corn and provided with fingers adapted when said chains are moved to engage partially-lifted corn and raise the same to a substantially vertical position, of a pair of levers operating crosswise of the draft and adapted to engage down corn lying forward or backward along the line of draft and lift the same into engagement with the said sprocket-chains, and mechanism for giving the operative end of said levers a movement across the line of draft and upward, substantially as described.

7. In a corn-harvesting machine, the combination with a frame provided with a longitudinal opening adapted to straddle a row of corn, a pair of sprocket-chains carried by said frame, one upon each side of said opening, adapted to straddle a row of corn and provided with fingers adapted as said machine is driven forward to engage partially-lifted corn and lift it to a vertical position, and means for moving said sprocket-chains, of movable arms operating crosswise of said opening in said frame, in advance of said sprocket-chains, and adapted by their movement to engage down corn lying either forward or backward along the line of draft and to lift the same into engagement with said sprocket-chains, and means for operating said arms, substantially as described.

8. In a corn-harvesting machine, the combination with a frame provided with a longitudinal opening adapted to straddle a row of corn, a pair of sprocket-chains carried by said frame, one upon each side of said opening, adapted to straddle a row of corn and provided with fingers adapted as said machine is driven forward to engage partially-lifted corn and lift it to a vertical position, and means for moving said sprocket-chains, of levers pivotally mounted upon each side of the longitudinal opening in said frame, in advance of said sprocket-chains and pointing substantially at right angles with the line of draft, and mechanism adapted to give to the operative ends of said levers a downward and inward movement crosswise of the line of draft, and thence upward, substantially as described.

9. In a corn-harvesting machine, the com-

70 bination with lifting mechanism for down corn, consisting of a lever pivotally mounted near the front end of the machine and pointing substantially at right angles with the line of draft, mechanism adapted to give to the operative end of said lever a downward and inward movement across the line of draft, and thence upward, a pair of sprocket-chains located behind said lifting mechanism adapted to straddle a row of corn and provided with fingers adapted as said machine is driven forward, to engage the corn when partially lifted by said lifters and lift said corn to a vertical position as it passes between said sprocket-chains, and means for moving said sprocket-chains, substantially as described.

10. In a corn-harvesting machine, the combination with a frame provided with a longitudinal opening through which standing corn may pass, of lifters for down corn, consisting of levers pivotally mounted near the front of said frame at each side of said opening and pointing toward each other substantially at right angles with the line of draft, mechanism adapted to give to the operative ends of said levers, alternately, a downward and inward movement toward each other across said opening, and then upward, a pair of sprocket-chains on each side of said opening located behind said lifting mechanism and adapted to straddle a row of corn and provided with fingers adapted, as said machine is driven forward, to engage the corn when partially lifted by said lifting devices and to lift said corn to a vertical position as it passes between said sprocket-chains, and means for moving said sprocket-chains, substantially as described.

11. In a corn-harvesting machine, the combination with devices adapted to lift down corn toward a vertical position, of a pair of sprocket-chains adapted to straddle a row of corn and provided with curved fingers, which, when in their operative position, curve first inward, then downward and inward, adapted, as said machine is driven forward, to engage the corn when partially lifted by said lifting devices and to lift said corn to a vertical position as it passes between said sprocket-chains, and means for moving said sprocket-chains, substantially as described.

12. In a corn-harvesting machine, the combination with a knife adapted to sever stalks of standing corn, of a rotating cone provided with a spiral flange adapted, when said cone is rotated, to move the butts of the corn backward in the machine, means for rotating said cone, a plurality of reels adapted in their rotation to successively engage the stalks of corn at some distance above the butts and to cooperate with said cone in carrying the stalks of corn back in a substantially vertical position, and mechanism for rotating said reels, substantially as described.

13. In a corn-harvesting machine, the combination with an axle, carrier-wheels mounted thereon, and a rear frame journaled on said axle and adapted to carry corn-binding



and bundle carrying and dropping mechanism, of a central tilting frame adapted to carry corn-harvesting mechanism and journaled on said axle, springs connecting the rear part of said central frame to said rear frame and tending to balance said central frame on said axle, and mechanism adapted to tilt said central frame upon said axle and secure it in any desired position thereon, substantially as described.

14. In a corn-harvesting machine, the combination with a rear frame adapted to carry corn-binding and bundle carrying and dropping mechanism, and a central or tilting frame adapted to carry corn cutting and forwarding mechanism, of a front frame adapted to carry corn-lifting mechanism and slidingly mounted on said central frame, and means for raising and lowering said front frame on said central frame, substantially as described.

15. In a corn-harvesting machine, a weeder, consisting of two arms pivotally mounted near the front of said machine and separated from one another at their forward ends and provided with downward-projecting plates extending across the under side of said arms, and springs adapted to yieldingly hold said arms together at a point back of their forward ends, substantially as described.

16. In a corn-harvesting machine, the combination with an axle, wheels mounted on said axle, and a rear frame journaled on said axle and adapted to contain corn-binding and corn carrying and dumping mechanism, of a caster-wheel pivoted on said rear frame and having a movement on its pivotal points in a horizontal and in a vertical arc, and a spring connected with said caster-wheel and said rear frame, substantially as described.

17. In a corn-harvesting machine, the combination with a binder-platform, consisting of a fixed and a hinged portion, of framework, two segments mounted in said framework and adapted to swing about a central longitudinal axis and, when closed together at their lower ends, to receive bundles of corn from a binder, mechanism adapted to swing said segments apart from one another at their lower edges and drop contained bundles of corn, one of said segments being adapted, when so swung, to engage the hinged portion of said binder-platform and lift the same into a substantially vertical position, substantially as described.

JAMES E. WOOD.

Witnesses:

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