985,478.

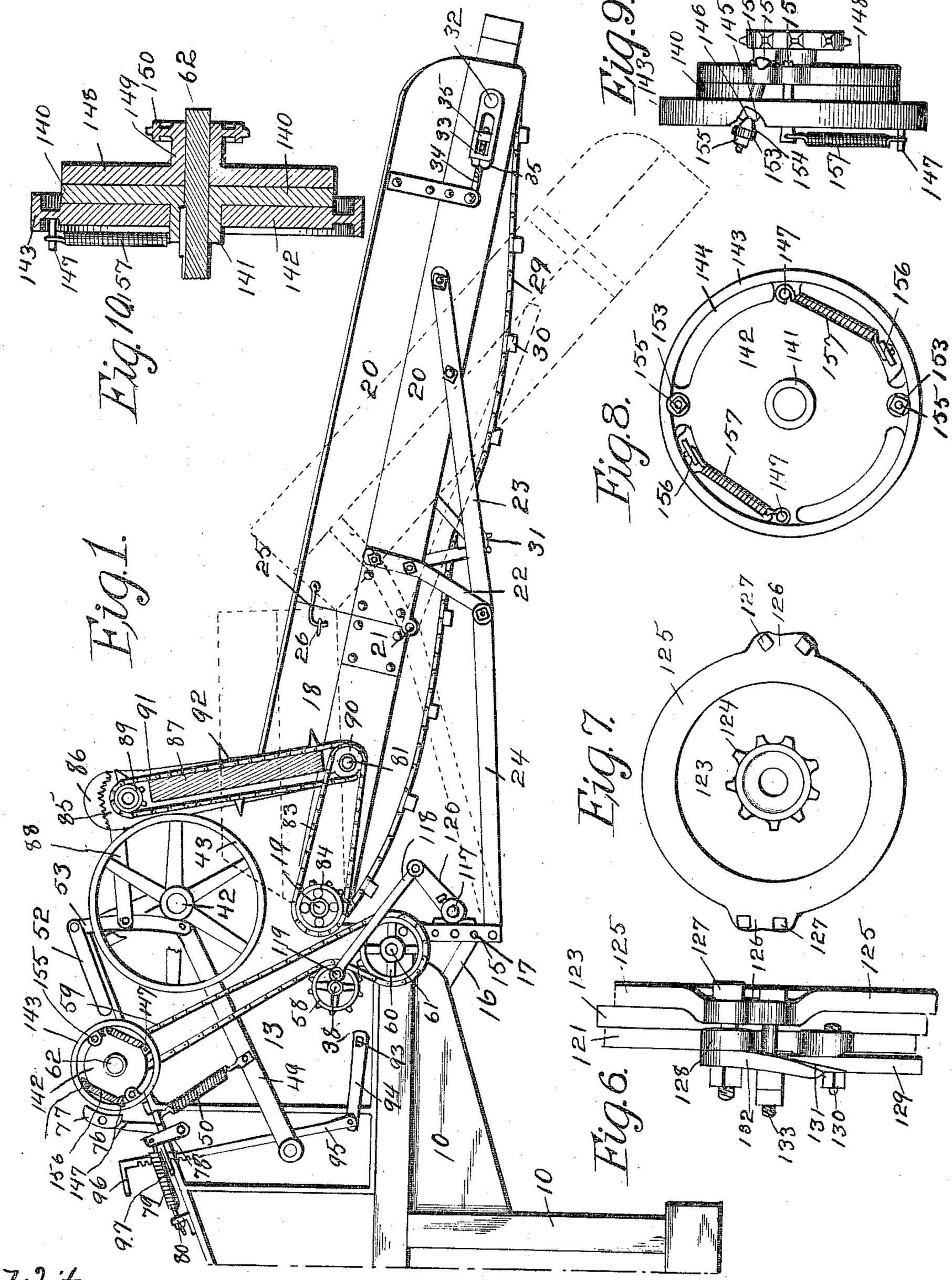
A. C. VAN HOUWELING.

BAND CUTTER AND FEEDER.

APPLICATION FILED APR. 3, 1905.

Patented Feb. 28, 1911.

5 SHEETS—SHEET 1.



Witnesses.

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A. C. Woody

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by Orwig & Lane Attys

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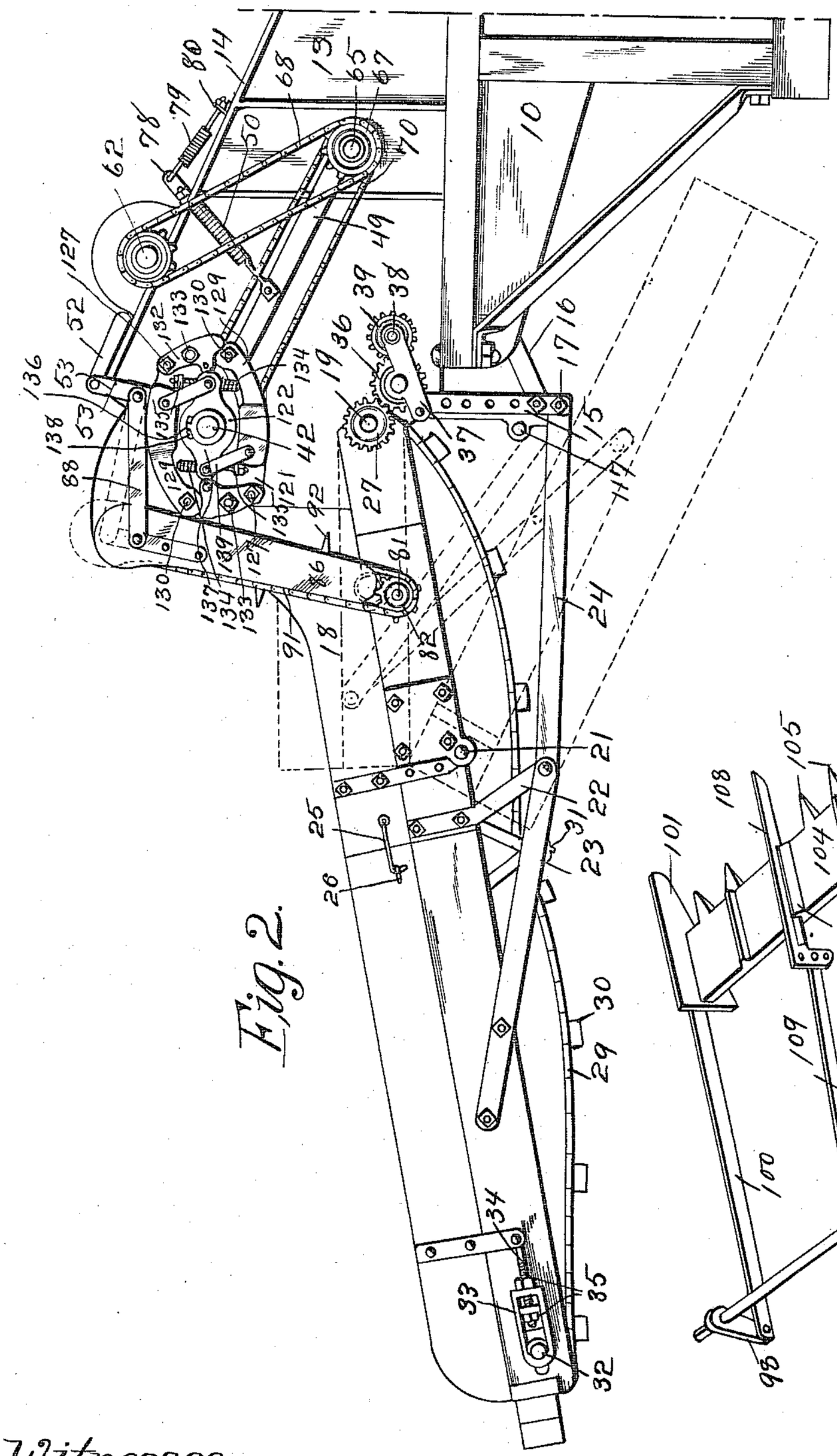

Fig. 2.

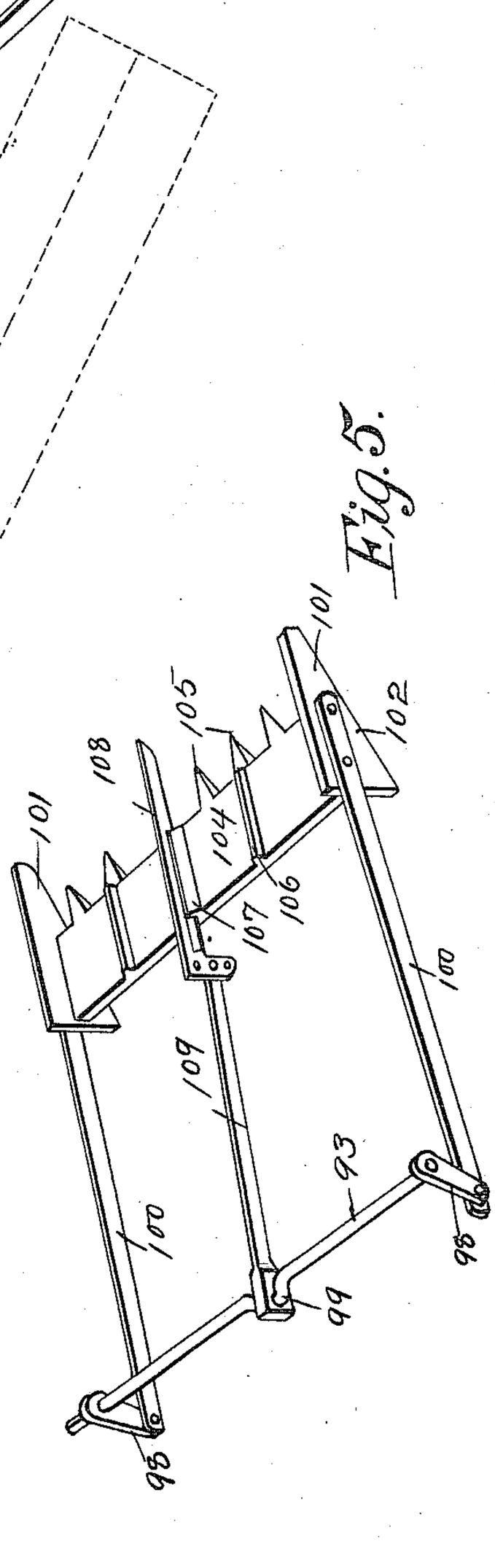

Fig. 5.

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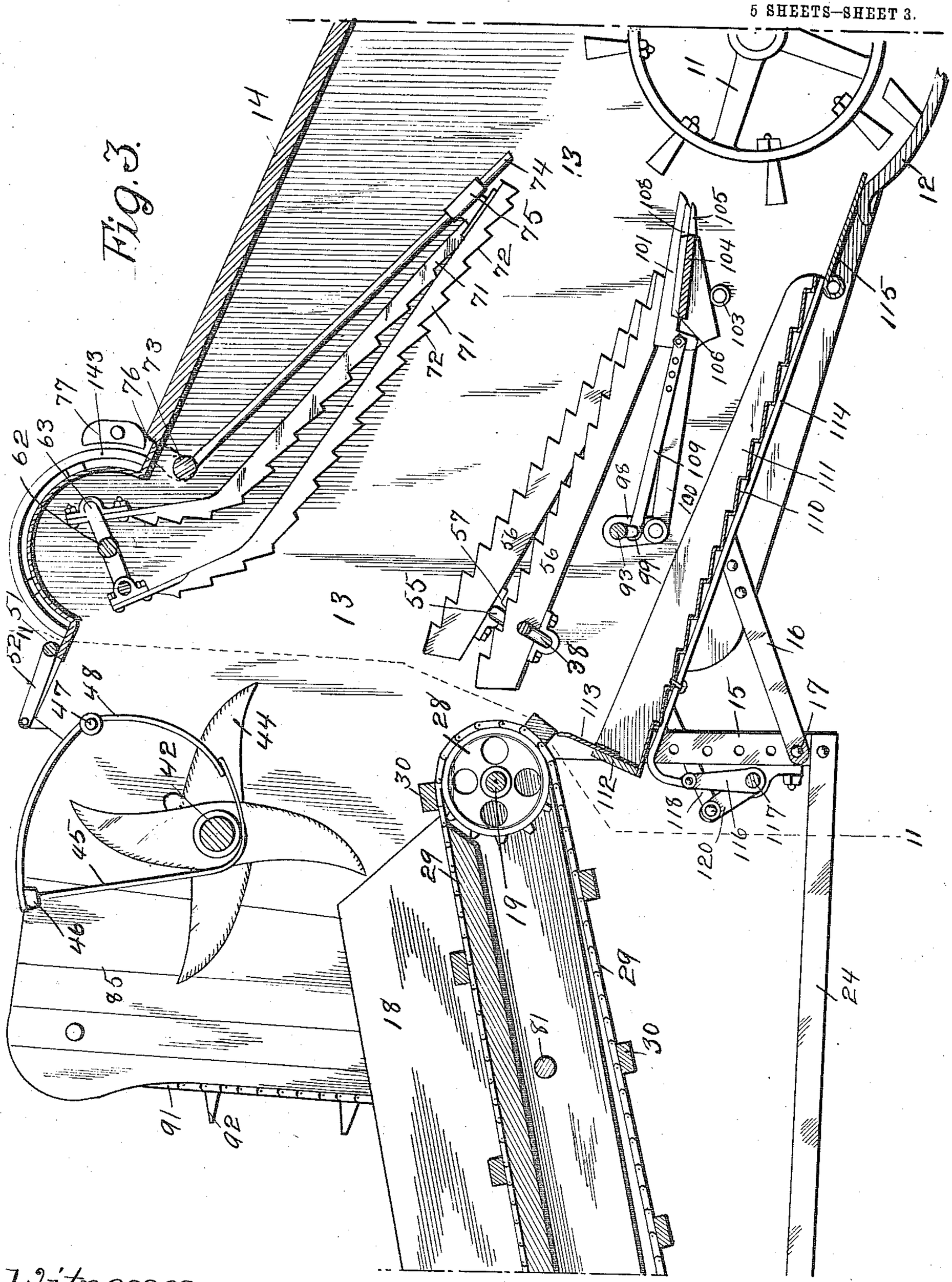
5 SHEETS—SHEET 3.

Fig. 3.



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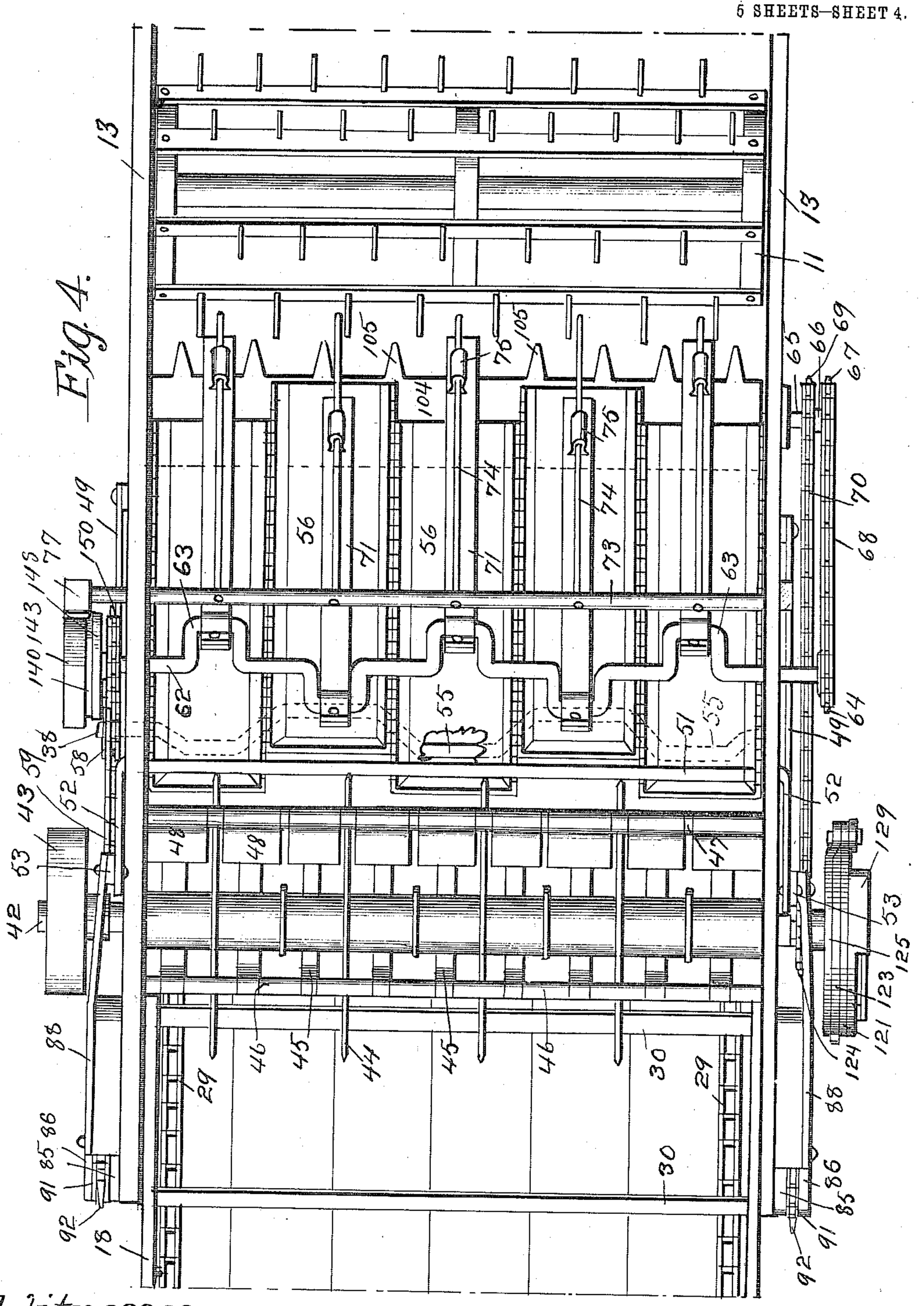
5 SHEETS—SHEET 4.

Fig. 4.



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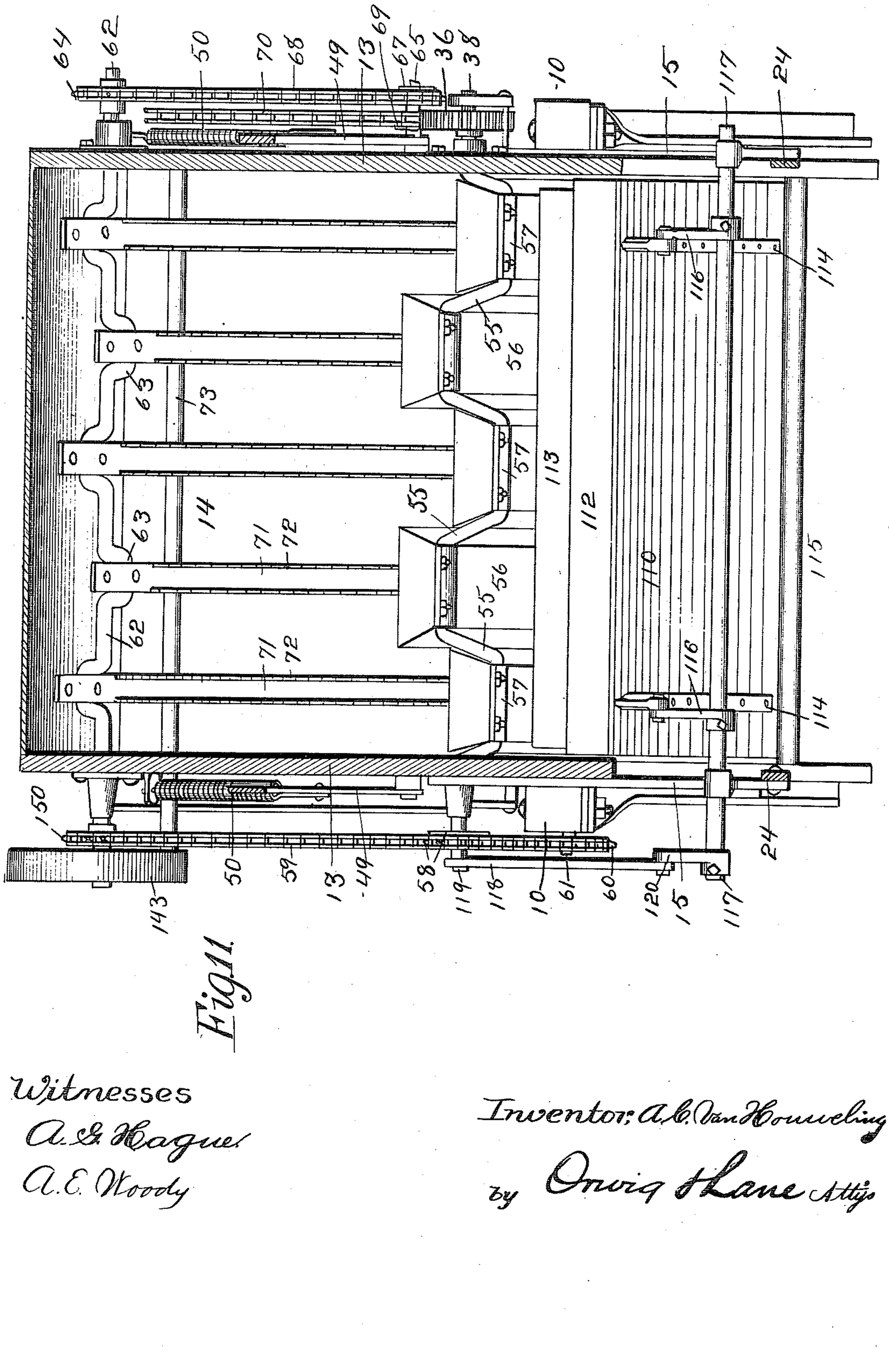

Fig 1.

Witnesses
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A. E. Woody

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by Orwig & Lane Attys

UNITED STATES PATENT OFFICE.

ARTHUR C. VAN HOUWELING, OF PELLA, IOWA.

BAND-CUTTER AND FEEDER.

985,478. Specification of Letters Patent. Patented Feb. 28, 1911.

Application filed April 3, 1905. Serial No. 253,695.

To all whom it may concern:

Be it known that I, ARTHUR C. VAN HOUWELING, a citizen of the United States, residing at Pella, in the county of Marion and State of Iowa, have invented a certain new and useful Band-Cutter and Feeder, of which the following is a specification.

The objects of my invention are to provide a machine of this class of simple, durable and inexpensive construction designed to sever the bands of bundles of grain and to convey them to a threshing machine cylinder in a uniform and even manner.

My invention consists in the construction, arrangement and combination of the various parts of the machine, as hereinafter more fully set forth, pointed out in my claims and illustrated in the accompanying drawings, in which—

Figure 1 shows a side elevation partly in section of the machine applied to a portion of the threshing machine frame, the dotted lines in said figure indicate the portion of the conveyer frame sections when partly folded. Fig. 2 shows a similar view from the opposite side of the machine. The dotted lines indicate the position of the conveyer sections when folded. Fig. 3 shows a central, vertical, sectional view through the body portion of the machine. Fig. 4 shows a top or plan view of same of the body portion of the machine with the top removed to show the interior construction. Fig. 5 shows a detail, perspective view of the retarder and bundle straightener. Fig. 6 shows an edge elevation of a part of the speed governor. Fig. 7 shows a side elevation of the inner disk of the speed governor and the sprocket wheel thereon. Fig. 8 shows a side elevation of the speed governor. Fig. 9 shows an edge view of same. Fig. 10 shows a vertical, sectional view of same. Fig. 11 shows a transverse, sectional view on the line 11—11 of Fig. 3.

In order to show the relation between the band cutter and feeder and the threshing machine, I have illustrated a portion of the threshing machine and the cylinder and concave thereof. The part of the threshing machine frame shown is indicated by the reference numeral 10, the cylinder by the numeral 11 and the concave by the numeral 12. These parts are all of the usual construction and form no part of my invention.

Referring to the band cutter and feeder proper, I shall first describe the frame.

The frame.—The frame comprises a body portion, which contains and supports the operative parts of the band cutter and feeder, and a folding, sectional conveyer frame. The numeral 13 indicates the sides of the body portion and 14 the top. The sides are designed to rest upon a portion of the threshing machine frame and are secured thereto by means of the arms 15 fixed to the sides 13 and projected downwardly and connected with the threshing machine frame by the braces 16, connected by the bolts 17 with the arms 15. A number of openings are formed in the arms 15 for convenience in attaching the braces 16 thereto. The body portion of the frame is in this way firmly and immovably connected with the threshing machine.

The conveyer frame comprises two sections, the one adjacent to the main frame I have termed the delivery end section and the other one the receiving end section. The delivery end section is indicated by the reference numeral 18 and is pivotally connected with the main frame to be capable of limited vertical movement by being mounted upon the shaft 19 supported in the main frame, as will hereinafter appear. The sides of the delivery end section are contained within the sides 13 of the main frame. The receiving end section of the conveyer frame is indicated by the numeral 20 and is connected with the section 18 by the hinge 21 at its bottom which permits the receiving end of the frame 20 to swing downwardly and under the section 18. I provide for supporting the sections of the conveyer frame in line with each other as follows: On the sides of the receiving end frame are two arms 22 fixed to said section and extended downwardly and toward the delivery end section, their lower ends however being under the receiving end section. These arms 22 are braced and supported firmly in position by the strips 23. Pivoted to the arms 22 are the arms 24 which extend under the delivery end section and are pivotally connected to the lower ends of the arms 15. By this arrangement, the hinge 21 stands considerably above a line drawn between the pivotal points of the arms 24 and the said arms 24 will, therefore, tend to hold the sections 18 and 20 in line with each other. If, however, a considerable pressure is brought to bear upon the receiving end of the section 20, it will be forced downwardly, as shown

by dotted lines in Fig. 1, causing the other end thereof to move upwardly until the pivotal connections of the arms 24 with the arms 22 are in line with the hinged joint 21, whereupon the receiving end of the section 20 will swing of its own weight to about the position shown by dotted lines in Fig. 2. The weight of the delivery end section 18 being sufficient to overcome the weight of the receiving end section 20 to bring said sections to this position. Hence no other support for the receiving section is necessary and no springs or counter-balancing weights are required to support the sections in line to aid in folding them or to swing them to their folded position. In practice I preferably place a hook 25 on one of the sections of the conveyer frame to enter an eye 26 on the other section to lock the sections in line with each other.

The conveyer.—The shaft 19 supported in the frame 13 is provided on one end with a pinion 27 by which it is rotated. This shaft 19 aside from forming a pivotal support for the delivery end section of the conveyer frame drives the conveyer itself and is provided with sprocket wheels 28 between the sides of the frame over which the chains 29 of the conveyer pass. The conveyer is provided with cross pieces 30. From the receiving end to the delivery end, it passes on top of the bottom conveyer frame and returns some distance beneath the bottom thereof, and at its central portion it passes over idler sprockets 31 to prevent it from sagging downwardly and to hold it in position when the frame is folded.

At the outer end of the section 20 is a shaft 32 which is provided with sprockets similar to the sprockets 28 and which is made longitudinally adjustable relative to the frame by the sliding brackets 33 connected with the bolts 34 on which the lock nuts 25 are mounted.

Motion is imparted to the pinion 27 through an idler pinion 36 mounted on a bracket 37 which bracket is supported by the shaft 38 of the stock feeders, hereinafter described. This shaft has a pinion 39 fixed to it in mesh with the pinion 36. This conveyer receives bundles of grain and carries them under the band cutting knives where their bands are severed and delivers the severed bundles of grain to the stock feeders in the ordinary manner.

The band cutter.—Rotatably mounted in the sides 13 of the main frame is the knife shaft 42 having on one end a pulley 43 by which the said shaft is rotated said pulley 43 being driven by a belt, not shown in the drawings, from the threshing machine drive shaft. Fixed to the shaft between the sides of the frame are the knives 44 of the ordinary kind. I have provided for preventing the stock from becoming entangled on the knives and on the knife shaft by means of the fenders 45 which are secured at one end to a cross piece 46 which is above the knife shaft on the side of the receiving end, said fenders project downwardly and under the knife shaft and toward the delivery end.

At the delivery side of the knife shaft 42 is a cross piece 47 on which I have mounted the knife cleaning blades 48, which extend downwardly toward the knife shaft and their lower ends rest on top of the lower ends of the fenders 45. These cleaning blades stand close to the edges of the knives and serve to strip off from the knives any stock that may be carried up by the knives. The shaft of the band cutter knives is passed through slots in the sides 13 and is made capable of a limited vertical movement by having its ends mounted in the hangers 49, which hangers project downwardly and toward the delivery end of the main frame and are pivotally connected with the main frame. I provide for balancing the weight of the knife shaft by means of the contractible coil springs 50 fixed to the top of the main frame and to the hangers 49. The weight of the knife shaft is such that the knives will stand at their lower limit of movement and if any obstruction passes under them that offers considerable resistance to the knife blades, the springs 50 will aid the knife shaft in moving upwardly to permit the obstruction to pass through without breaking the knives. In this connection, I have provided means for holding both ends of the knife shaft at the same degree of elevation as follows: On top of the machine frame is a rock shaft 51 having crank arms 52 at its ends and on these crank arms, I have pivoted the links 53 which are connected with the hangers 49 and since both of said arms 52 stand in the same plane the shaft 42 will always be held with its ends at the same degree of elevation.

The lower feeding pans.—The shaft 38, before described, is rotatably mounted in the main frame adjacent to and below the delivery end of the conveyer. On the central portion of the shaft 38, I have formed a series of crank arms 55.

The numeral 56 indicates a series of feeding pans of ordinary construction, each provided with a boxing 57 mounted on one of the crank arms 55. The delivery ends of these feed pans are slidingly supported so that a reciprocating motion is imparted to the pans as the shaft 38 is rotated, each alternate pan moving forwardly while the others move rearwardly.

On the end of the shaft 38 opposite from the end on which the pinion 39 is mounted is a sprocket wheel 58 by which motion is imparted to the shaft 38. The means for driving the sprocket wheel 58 comprises a sprocket chain 59 passing around a loose

sprocket wheel 60, on the stub shaft 61 and around one side of the sprocket wheel 58, said chain 59 passes around and is driven by a sprocket wheel connected with the feed governor, as will hereinafter appear. In this connection it is to be noted that the means for driving the band cutting knife shaft is entirely independent of the means for driving the conveyer and the feeding pans. This is desirable for the reason that the band cutting knives are intended to be rotated continuously during the operation of the machine, while when an excess of stock is fed to the cylinder, means hereinafter described are provided for stopping the movement of the conveyer and feeding pans.

The floating feeding pans.—Rotatably mounted near the top of the main frame above the feeding pan shaft is a shaft 62 provided with crank arms 63. I provide for rotating this shaft in unison with the knife shaft as follows: Fixed to one end of the shaft 62 is a sprocket wheel 64. On the machine frame adjacent to the end of one of the arms 49 is a stationary shaft 65 on which is rotatably mounted a hub 66 carrying a sprocket wheel 67, connected with the sprocket wheel 64 by the chain 68. Mounted on the hub 66 is a second sprocket wheel 69 connected by a chain 70 with a sprocket wheel mounted on the knife shaft 42 and connected with a speed governing device to be hereinafter described. In this way the shaft 62 is operatively connected with the knife shaft and is rotated during the rotation of same. Mounted on each crank arm 63 of the shaft 62 is a feeding pan 71 with serrated under edges 72 and each pan extends, first downwardly from the crank shaft and then downwardly and toward the delivery end of the machine. As the shaft 62 is rotated, each alternate feeding pan will be oscillated in opposite directions from the other. I have provided for supporting the delivery or lower ends of these feeding pans as follows: The numeral 73 indicates a rock shaft mounted in the sides of the machine frame and having fixed thereto a number of straight rods 74 projected downwardly and toward the delivery end of the machine and on each of the feeding pans 71 is a guide sleeve 75 fixed to the pan and slidingly connected with a rod 74. On one end of the shaft 73, exterior to the side 13 is an arm 76 provided with a brake shoe 77, for purposes hereinafter made clear. In use with this portion of the device and assuming that an excessive quantity of stock is placed on the feeding pans 56, the top of said stock will be engaged by the floating feeding pans 71 and forced upwardly, thus elevating the rods 74 and in this way operating the brake 77. However, the continued oscillating movement of these floating feeding pans will tend to force the top layer of the stock downwardly and toward the threshing cylinder and in this way the excessive quantity of stock is gradually removed until the floating feeding pans again drop by gravity. In this connection, I have provided for yieldingly supporting the free ends of the floating feeding pans as follows: On one end of the shaft 73 is an upwardly projecting arm 78 to which is attached a contractible coil spring 79, the other end of which is adjustably connected to a lug 80 on top of the frame. In this way the weight of the free ends of the floating feed pans is counter-balanced so that a relatively slight upward pressure thereon by excessive stock will be sufficient to raise said pans.

The frame cleaning device.—In use with machines of this class it sometimes happens that an excessive quantity of bundles is placed in the conveyer frame and overlaps the side edges thereof, then as the conveyer advances these overlapping edges of the bundles engage the edge of the main frame and become caught and entangled thereon, thus clogging the machine. To avoid this, I have provided a cleaning device as follows: Rotatably mounted in the sides of the conveyer frame beneath the bottom thereof is a shaft 81. This shaft is driven by means of a sprocket chain 83 with a sprocket wheel 84 on the shaft 19 so that the said shaft 81 is driven during the movement of the conveyer. The cleaning devices on each side of the machine frame are identical, hence but one will be specifically described. The said cleaning device comprises a frame composed of sides 85 and 86 spaced apart with a guide block 87 between the central portions thereof, one end of the sides is mounted upon the shaft 81 and the said sides project upwardly adjacent to the edge of the main frame at the receiving end thereof. The top of said sides 85 and 86 is supported by means of a link 88 pivoted thereto and also pivoted to the arm 53. Rotatably mounted between the upper end of the sides 85 and 86 is a sprocket wheel 89 and on the shaft 81 is a corresponding sprocket wheel 90. A sprocket chain 91 carrying the outwardly projecting arms 92 is passed over these sprocket wheels 89 and 90 and the guide block 87 engages the portion of the chain that moves upwardly adjacent to the edge of the main frame. In this way, if a bundle of stock should be carried by the conveyer with a portion of it projecting outwardly over the sides of the conveyer frame, then as soon as this bundle engaged the edge of the main frame it would be caught by the arms 92 and elevated, thus cleaning the frame and drawing the bundle inwardly, so that it might pass on into the main frame. These cleaning devices have been found to be of great value when the machine is being

used in connection with loose stock not tied in bundles, because in such cases a relatively large quantity of the stock overlaps the sides of the conveyer frame. By supporting the cleaner frames upon the links 88 in the manner described and shown, they will not in any way interfere with the folding movement of the delivery end of the conveyer frame as they will be carried up with the conveyer frame during such folding movement as illustrated by dotted lines in Fig. 2.

The retarder.—I have provided means for slidingly supporting the delivery ends of the feeding pans and also for retarding and combing out excessive stock and preventing it from entering between the cylinder and concave and also for preventing any bundles of wheat and tangled masses of stock that may pass beyond the feeding pans from entering between the cylinder and concave without first being torn apart by the cylinder teeth and straightened out so as to enter between the cylinder and concave with the straws arranged longitudinally. This mechanism comprises a shaft 93 rotatably mounted in the sides of the main frame below the feeding pans. On one end of said shaft 93 is an arm 94 projecting toward the delivery end of the main frame on the exterior of the side 13. Pivoted to the arm 94 is a rack rod 95 extended upwardly above the top of the main frame and provided with a handle 96. The said rack is designed to engage a bracket 97 so that the operator may grasp the handle 96, move the rack either upwardly or downwardly and retain it in position by having it engage the bracket 97. In this way, the shaft 93 may be rocked and firmly locked in any position. On the end portions of the shaft 93 within the main frame are two crank arms 98 and on the central portion of the shaft 93 is a crank arm 99 of much shorter length than the arms 98. Pivoted to the arms 98 are the side pieces 100 projected toward the delivery end of the machine and fixed to the sides 101 of the retarder. The under surfaces of these sides 101 are inclined at 102 upwardly and toward the delivery end of the machine and supported within the machine frame. For supporting each of the sides 101 there is a roller 103. By this arrangement, as the side pieces 100 are moved toward the threshing cylinder, the sides 101 will be moved upwardly as well as toward the threshing cylinder. Between the sides 101 is the body portion 104 of the retarder, said body portion is formed with retarder teeth 105 at its delivery edge and also with longitudinally arranged ribs 106, on its top the central rib is indicated by the numeral 107 and is formed with a longitudinal dove-tailed groove, which groove slidingly receives the bundle straightening tooth 108, which tooth is pivoted to the arm 109 which is mounted on the crank arm 99 of the shaft 93. The forward end of the tooth 108 normally projects a considerable distance in front of the teeth 105.

In use, the lower ends of the feeding pans 56 are slidingly supported by the top of the retarder and are guided in their movement by the ribs thereon. When relatively loose and dry stock is being fed to the machine, the retarder is moved to a considerable distance away from the cylinder by manipulation of the handle 96. When this is done, the relative lengths of the crank arms 98 and 99 will cause the retarder teeth 105 to withdraw from the threshing cylinder much more than the retarding tooth 108 and it is intended that this tooth 108, which at all times stands quite close to the threshing cylinder, will positively prevent any mass or bundle of stock from entering between it and the threshing cylinder. When the retarding comb is moved to its limit toward the threshing cylinder, which is the position in which it is shown in Fig. 3, then the tooth 108 will not project as far in advance of the teeth 105 as in the position previously described. Hence no matter what position the retarding comb assumes within its range of movement, the central tooth 108 is at all times so close to the cylinder that an uncut bundle of stock discharged from the feeding pans in a position at right angles to the machine frame will be engaged by the tooth 108 and tilted thereby until the straws thereof are in line with the feeding pans and during the time this bundle is being straightened out, the band will be broken by the threshing cylinder teeth and the stock will be fed in a manner that will not clog the cylinder. This retarder coöperates with the floating feeders as follows: If an excessive quantity of stock is delivered to the retarder, it will be held by the retarder and will gradually pile up on top of the retarder until it is of sufficient thickness to elevate the float and means hereinafter described are provided for stopping the movement of the conveyer when the float is thus elevated. Heretofore in machines of this class where floats have been used to control the speed of the conveyer, the said floats have usually been acted on by the variations in the thickness of the layer of stock traveling toward the threshing cylinder. This method of controlling the feeding of stock is defective in principle because the thickness of the layer does not determine its condition for feeding to the cylinder, for when the stock is dry and loose a relatively thick layer may be successfully fed, while when the stock is wet and tangled or tightly compressed a relatively thin layer must be used. By controlling the stock advancing means in the manner herein shown and described, the feeding is automatically governed, not by the thickness of the layer passing to the threshing cylinder, but by the quantity of

excessive stock piled up and retarded by the retarder comb. By my method of feeding, if the stock is wet and tightly compressed, the retarding comb will hold it even if a very thin layer is being fed, because the straws will be engaged by the cylinder teeth and bent over the retarder teeth and retained, and if a bundle of stock is fed to the retarder, it will be caught and held until it is gradually straightened and torn apart by the cylinder teeth. In either instance, although the layer of stock is relatively thin, its condition is such that it will not discharge freely from the retarder, but will pile up and actuate the float. On the other hand, if a relatively thick layer of dry and loose stock is fed, the cylinder teeth will strike it and carry it past the retarder and the float will not be affected.

The grain pan—The stock that is supported by the oscillating feed pans and the stock that is held on the retarder and struck by the cylinder teeth will have many kernels of grain threshed from it and to collect these kernels and discharge them to the concave, I have provided the grain pan to extend across the bottom of the main frame, said grain pan comprises a serrated bottom 110, upright sides 111 and an upright back 112. Connected to the back 112 is a flexible upright strip 113 to extend upwardly adjacent to the under surfaces of the conveyer 29 to prevent kernels of grain from passing under the conveyer. This grain pan is fixed to the rods 114, which have their delivery ends slidingly supported on the apron 115. Their other ends being attached to the crank arms 116 on the shaft 117, which shaft is rocked during the operation of the feeding pans by means of the pitman 118 connected to the wrist pin 119 on the sprocket wheel 58 and also connected to the crank arm 120 on the shaft 117, hence all kernels of grain thrown in the pan will be discharged on top of the apron 115 and from thence will drop to the concave.

The speed governor.—As before stated, the knife shaft 42 is rotated constantly during the operation of the machine and the conveyer and other parts should be operated only when the speed of the knife shaft is above a certain predetermined point. To provide for automatically stopping the movement of the chain 70 when the speed of the knife shaft falls below a certain degree and to automatically start it again when the speed reaches or passes above a certain predetermined degree, I have provided a device as follows: Keyed to one end of the shaft 42 is a disk 121 having a hub 122. Adjacent to the inner face of this disk is a second disk 123 rotatably mounted on the shaft and having a sprocket wheel 124 connected with its hub, which projects inwardly. This sprocket 124 receives the chain 70 and when said disk 123 rotates the chain will be driven. On the inner face of the disk 123 is a circular rim 125. This rim is connected with the first or outer disk 121 as follows: On the periphery of the rim 125 at diametrically opposite points are the lugs 126, which overlap the periphery of the central disk 123. Bolts 127 are passed through the lugs 126 and also through corresponding lugs 128 on the disk 121. In this way the disk 121 and the rim 125 are rotated in unison and the bolts 127 are so arranged that they normally permit the disk 121 and the rim 125 to stand apart far enough so that the central disk 123 may stand stationary, while the others rotate with the shaft and in order to lock the central disk between the disk 121 and the rim 125, it is only necessary to force said parts together so that they will firmly engage the central disk. To provide for accomplishing this automatically, I have pivoted to the diametrically opposite sides of the disk 121 the weighted levers 129 by means of the bolts 130, which form a fulcrum upon which the said levers turn. The end of each arm on the side of the fulcrum opposite from the weight is inclined or beveled at 131 as clearly shown in Fig. 6 and mounted on each of the bolts 127 is a short curved lever 132 fulcrumed to a bolt 133, which bolt is secured to the rim 125 and the said levers 132 and their curved ends are engaged by the beveled faces 131 of the weighted levers 129, said parts being so arranged that as the weighted levers 129 move away from the shaft, the beveled ends of said levers 129 will engage the curved ends of the levers 132 and force the plate 121 and the rim 125 together, thus locking them to the central plate 123.

I have provided for yieldingly holding the weighted levers to their inward limit of movement as follows: Connected with each lever is a contractible coil spring 134 having one end adjustably connected to a lug 135 on the plate 121. Hence when the shaft 42 is at rest the weighted levers are at their inner limit of movement and the beveled ends of the levers 129 are in such position that the levers 132 will not bind the central plate between the outer plate and rim. However, when the shaft is rotated at a high speed, the weighted levers will be thrown outwardly by centrifugal force against the pressure of the springs 134 and the beveled ends of said levers will operate the levers 132 to clamp the central plate between the others.

I have provided for limiting both the inner and outer movement of the weighted levers as follows: Formed on one side of the hub 122 is a lug 136. Mounted upon the hub 122 is a plate 137 having two arms at opposite ends and having a notch 138 to

receive the lug 136, said notch being of such length as to permit a limited rotary movement of the plate 137 relative to the hub 122. Pivoted to each of the arms of the plate 137 is a link 139 which is also pivoted to the adjacent weighted lever. The said weighted levers may obviously move both to and from the center of the shaft 142 until such movement is limited by the lug 136 engaging the edge of the notch 138, thus stopping the movement of the plate 137 and limiting the movement of the weighted levers by the links 139.

The feed governor.—I have provided for controlling the movement of the conveyer and feeding pans, so that when an excessive quantity of stock has accumulated on the retarder, the conveyer and feeding pans will stop until the excessive quantity has been removed and will automatically start again, which mechanism is as follows: Keyed to the shaft 62 is a central disk 140 provided with a hub 141. Rotatably mounted on this hub 141 is a disk 142 having a rim 143 designed to be engaged by the brake shoe 77, before described. A number of eccentric grooves 144 are formed between the periphery of the disk 142 and the rim 143 and at two diametrically opposite sides of the disk 142 are lugs 145, each having a lateral notch 146. Between the lugs 125 are the integral lugs 147. Adjacent to the inner face of the central disk 140 is a disk 148 having a hub 149 rotatably mounted on the shaft 62 and on this hub is a sprocket wheel 150 over which the chain 59, before described, is passed. On the periphery of the disk 148 are the lugs 151, each provided with a radial notch to receive a rounded bolt head 152, which passes through the said lug and through the disk 142 and is provided on its opposite end with a washer 153 having a rounded projection 154 to enter the notch 146, this washer is held in place on the bolt by the nut 155. By this arrangement of parts, the said bolt is permitted to rock slightly, so that it may move from the position shown in Fig. 9 to a position parallel with the shaft. Obviously when in the position shown in Fig. 9, the disks 142 and 148 will be forced toward each other, thus clamping the disk 140 firmly between them, while if the said bolt is parallel to the shaft the central plate may rotate independently of the others.

I have provided for yieldingly holding the disks 142 and 148 in such position relative to each other that they will clamp the central plate firmly between them as follows: Fixed to the plate 148 is an arm 156 projected through one of the slots 140 in the disk 142 and each pair of the arms 156 and the lugs 147 is connected by a contractible coil spring 157 which springs furnish sufficient yielding pressure to cause the two outer plates to clamp the inner plate between them firmly enough so that when the inner plate is rotated, the outer ones will turn with it. However, by applying the brake shoe 77 to the periphery of the rim 143, the rotation of this rim is stopped, the springs are extended and the bolts 152 are thrown to position parallel with the shaft, thus permitting the two outer disks to spread sufficiently to permit the inner one to rotate independently. Hence when the float is elevated the brake shoe 77 stops the rim 143 thus permitting the sprocket wheel 150 to come to a standstill and cease driving the conveyer and feeding pans, and when the brake shoe is again removed from the rim 143, the springs 157 will cause the bolts to assume the position shown in Fig. 9, thus clamping the plate 140 between the others and again driving the sprocket 150.

Having thus described my invention, what I claim and desire to secure by Letters Patent of the United States, therefor is—

1. In a machine of the class described, a main frame, a conveyer frame hinged to the main frame, and comprising a delivery end section, and a receiving end section hinged together, an arm pivoted to the main frame beneath the pivotal point of the delivery end section, said arm being also pivoted to the receiving end section at a point below the hinge joint of the said sections with each other and at a point spaced apart from the hinged center of said sections.

2. In a machine of the class described, a main frame, a conveyer frame hinged to the main frame and comprising a delivery end section and a receiving end section hinged together, an arm pivoted to the main frame beneath the pivotal point of the delivery end section, said arm also pivoted to the receiving end section at a point below the hinge point of the sections with each other and at a point spaced apart from the hinge center of the sections, said parts so proportioned that the weight of the delivery end section combined with the weight of the receiving end section adjacent to the delivery end section will exceed the weight of that portion of the receiving end section beyond the point where the said arm is pivoted thereto.

3. In a machine of the class described, the combination of a main frame, a conveyer frame hinged to the main frame near its receiving end, a cleaner frame fixed at its lower end to the conveyer frame, a link pivotally connected to its upper end and also pivotally connected with the main frame and a toothed sprocket chain in the cleaner frame arranged with the teeth projecting beyond it and adjacent to the edge of the receiving end of the main frame, and means for moving the sprocket chain.

4. In a machine of the class described, a

main frame, a conveyer frame hinged to the main frame and comprising a delivery end section and a receiving end section hinged together, an arm pivoted to the main frame beneath the pivotal point of the delivery end section, said arm also pivoted to the receiving end section at a point below and beyond the hinge point of the two sections with each other and at a point spaced apart from the hinge center of the sections, said parts so proportioned that the weight of the delivery end section combined with the weight of the receiving end section adjacent to the delivery end section will exceed the weight of that portion of the receiving end section beyond the point where the said arm is pivoted thereto, and means for limiting the upward movement of the receiving end section relative to the delivery end section.

5. In a machine of the class described, the combination of a main frame, a conveyer frame hinged to the main frame and comprising a delivery end section and a receiving end section, each having sides, said sides hinged together at their under surfaces and said sides engaging each other when the sections are in line to limit the downward movement of the sections at the joint, two arms fixed to the receiving end section beyond the joint and projected downwardly below the hinge, two arms pivoted to the sides of the main frame below the conveyer frame and extended upwardly and hinged to the arms on the receiving end section, the said conveyer sections so proportioned that the weight of the delivery end section and the adjacent portion of the receiving end section is greater than the weight of the receiving end section beyond the pivotal point of said arm with each other.

6. In a machine of the class described, the combination of a main frame, a conveyer frame hinged to the main frame near its receiving end, a traveling conveyer in the conveyer frame, a shaft for imparting motion to the traveling conveyer, a sprocket wheel on said shaft, a shaft mounted in the conveyer frame adjacent to the receiving end of the main frame, a cleaner frame supported at its lower end on said shaft, a link pivoted to its upper end and also pivoted to the main frame, a sprocket wheel on the shaft of the cleaner frame, a sprocket chain connecting said sprocket wheels for driving them in unison and a toothed sprocket chain in the cleaner frame driven from the shaft that supports the cleaner frame.

7. In a machine of the class described, the combination of a toothed retarder, sides connected with the toothed retarder and having inclined lower ends, rollers mounted on stationary supports to receive the said sides, arms connected with said sides and means for adjusting the said arms to move the inclined lower edges of the sides on their supporting rollers to thereby adjust the position of the toothed retarder upwardly and toward the discharge end of the machine or downwardly and away from the discharge end.

8. In a machine of the class described, the combination of means for advancing stock to the delivery end of the machine, a series of retarder teeth arranged at the delivery end of the machine to project toward a threshing cylinder, and a bundle tilting and straightening tooth arranged at or near the central portion of the stock retarder teeth and projected beyond them toward a threshing cylinder, and means for adjusting said tooth to project different distances relative to the retarder teeth, said means being so arranged that the bundle tilting and straightening tooth will project beyond the retarder teeth when in any position of its adjustment.

9. In a machine of the class described, means for advancing stock to the delivery end of the machine, a toothed retarder designed to receive said stock, a bundle tilting and straightening tooth slidingly mounted at the central portion of the retarder, arms connected to the retarder, an arm connected to the bundle tilting and straightening tooth, a rock shaft having long crank arms pivoted to the arms of the retarder, and having a short crank arm pivoted to the arm of the bundle tilting and straightening tooth, and means for adjustably securing the rock shaft in different positions to thereby cause the bundle tilting and straightening tooth to project greater or less distances beyond the retarder teeth.

10. In a machine of the class described, the combination of a toothed retarder plate, side pieces thereon having inclined lower edges, stationary rollers supporting said sides, the central portion of the retarder plate formed with a longitudinal dove-tailed groove and projected beyond the retarder teeth, a crank shaft having long crank arms at its ends and a short crank arm at its central portion, arms connecting the long crank arms with the sides of the retarder plate, an arm connecting the short crank arm with the sliding tooth, and means for adjustably securing the crank arm in different positions and means for advancing stock to the retarder.

11. In a machine of the class described, the combination of a frame, stock conveying means therein, a governor for controlling the speed of the stock conveying means, a series of rods above the stock conveying means arranged longitudinally of the machine frame, said rods being capable of up and down movement, means connected with the rods for actuating the governor, a crank shaft, a series of toothed bars connected with the crank arms thereof and extended under

said rods and slidingly connected with said rods.

12. In a machine of the class described, the combination of a main frame having upright edges at its receiving end, a conveyer frame adjacent thereto and a cleaner frame supported adjacent to each edge of the main frame at its receiving end, each of said cleaner frames open only at its edge adjacent to the receiving edge of the main frame, a central block in each of said cleaner frames, sprocket wheels mounted in the ends thereof and a toothed sprocket chain in each, passing around the wheels and engaging the block in each, the said teeth projecting beyond the cleaning frame and adjacent to the outer side of the receiving edge of the main frame.

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Witnesses:

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