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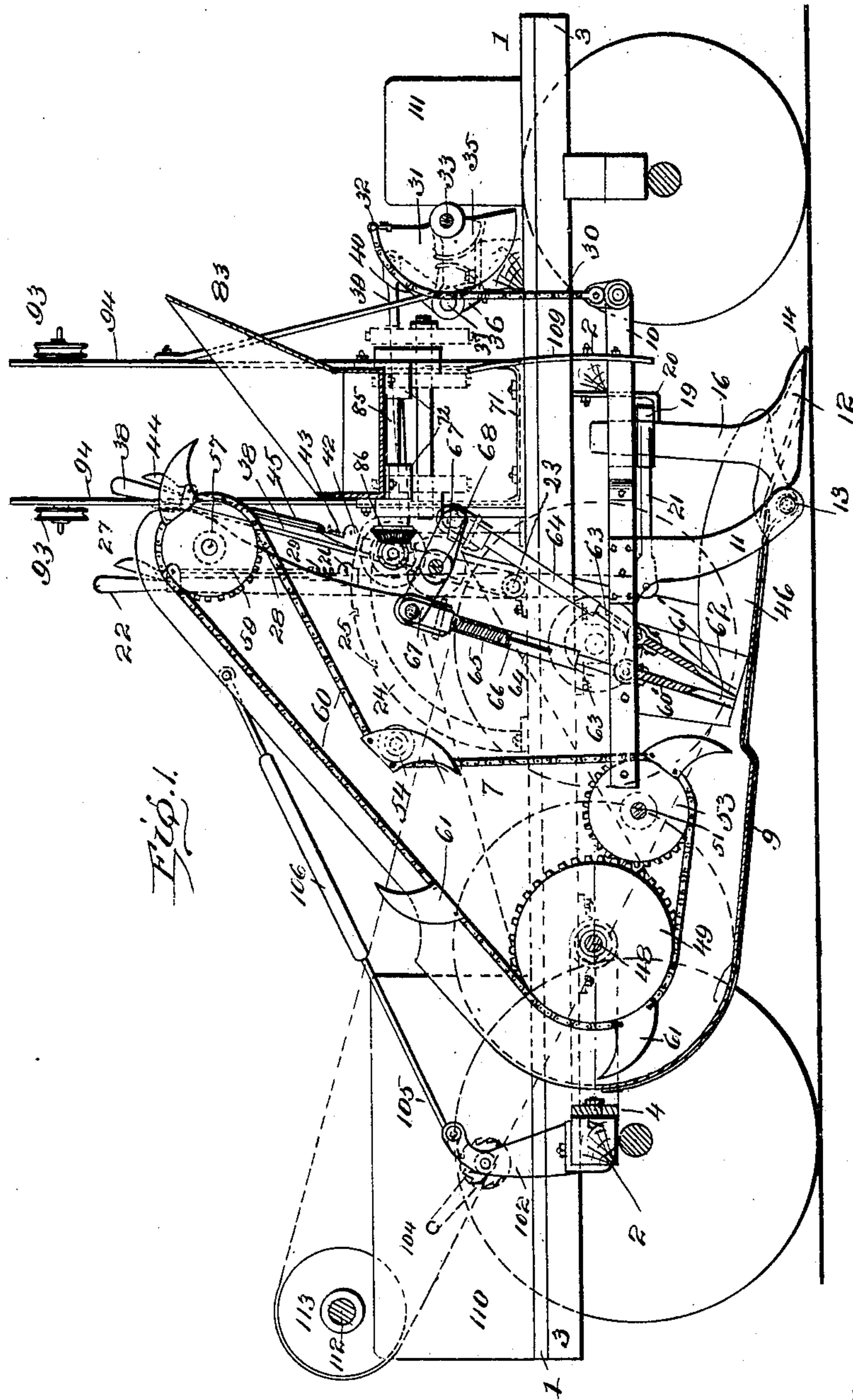
PATENTED JUNE 21, 1904.

T. C. CASWELL.  
GRADING MACHINE.

APPLICATION FILED JULY 30, 1903.

NO MODEL.

6 SHEETS—SHEET 1.



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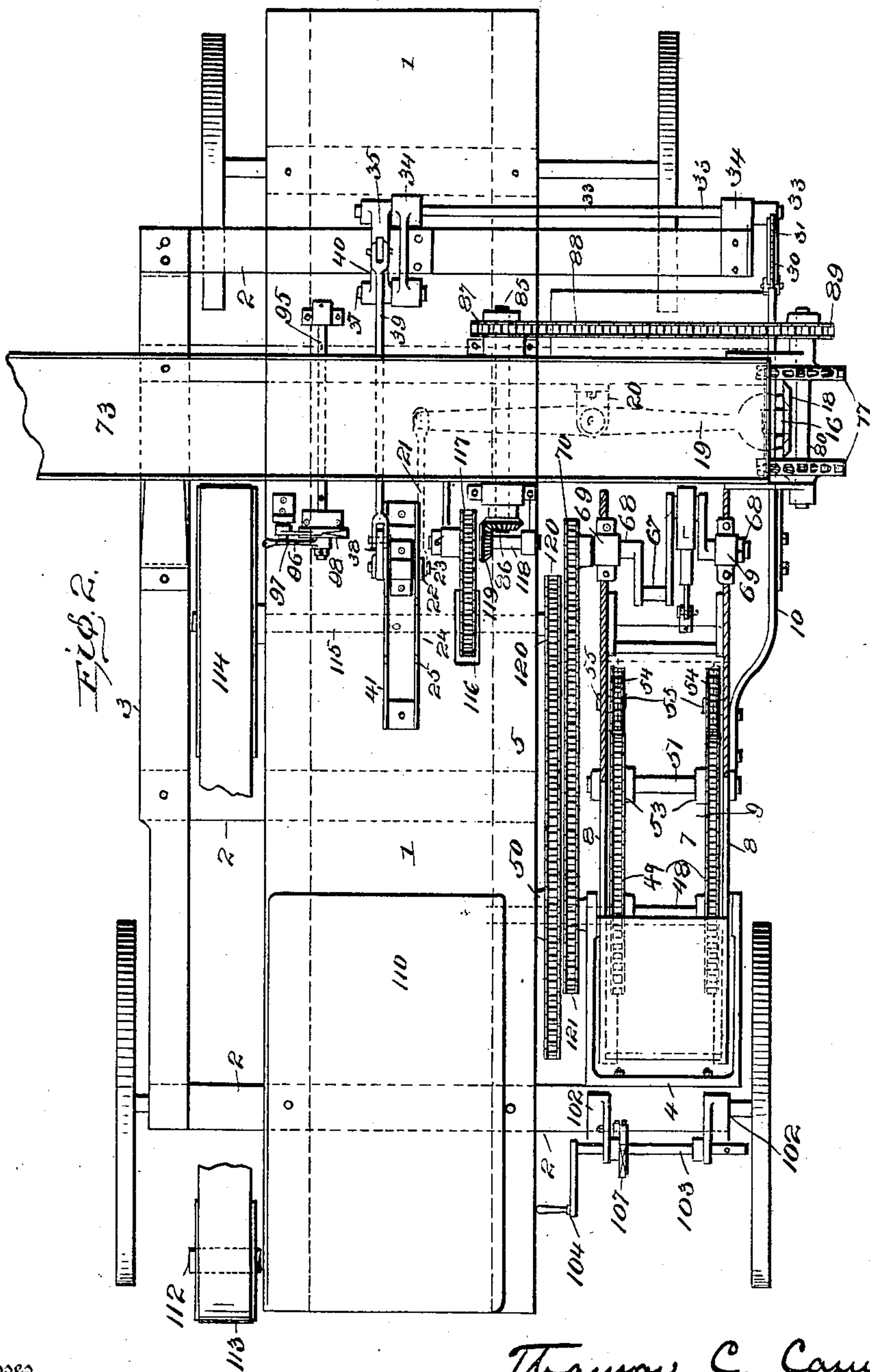
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5 SHEETS—SHEET 2.



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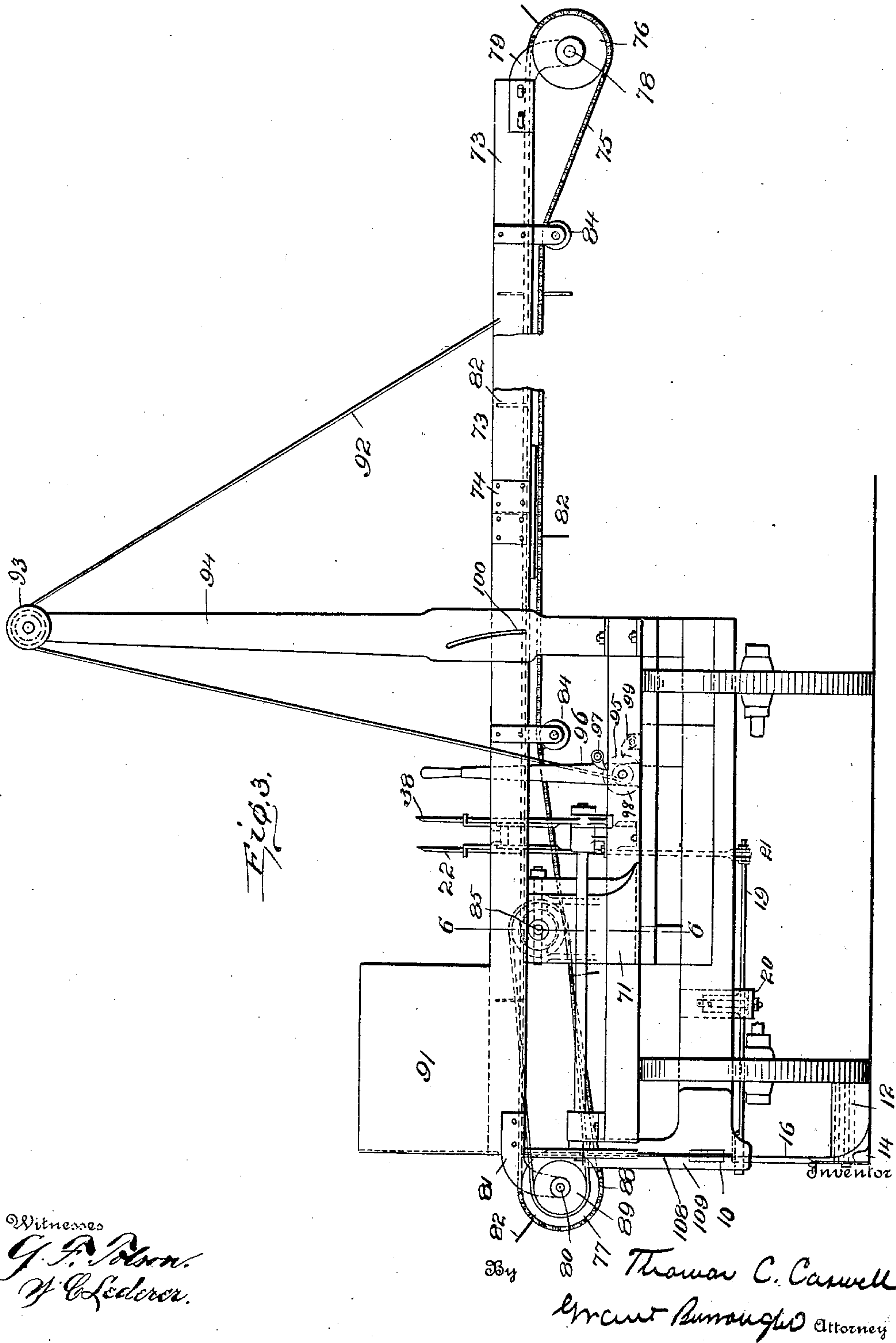
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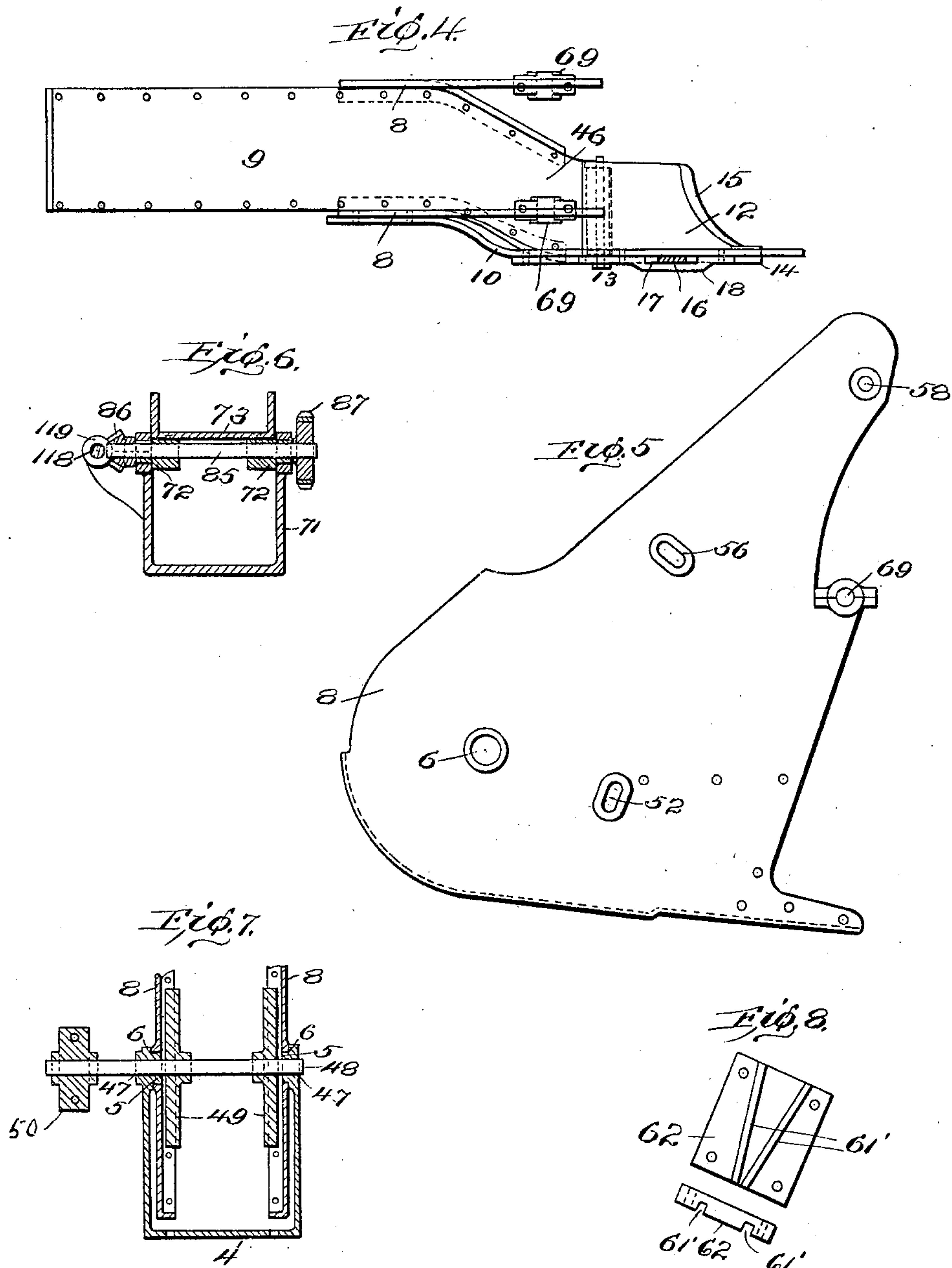
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5 SHEETS—SHEET 4.



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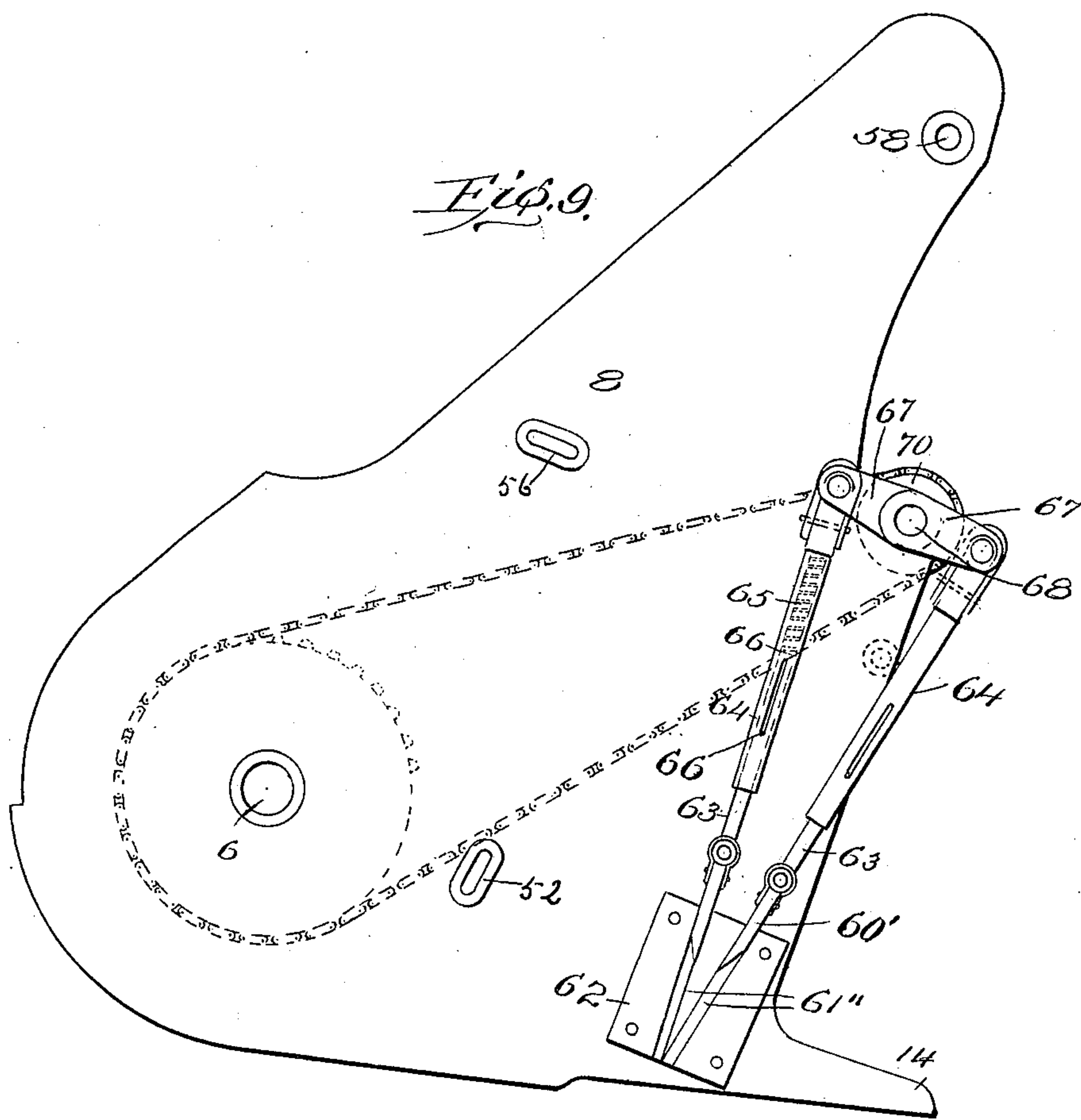
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5 SHEETS—SHEET 5.



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## UNITED STATES PATENT OFFICE.

THOMAS C. CASWELL, OF POTOMAC, MONTANA.

## GRADING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 763,154, dated June 21, 1904.

Application filed July 30, 1903. Serial No. 167,616. (No model.)

*To all whom it may concern:*

Be it known that I, THOMAS C. CASWELL, a citizen of the United States, and a resident of Potomac, in the county of Missoula and State of Montana, have invented certain new and useful Improvements in Grading-Machines, of which the following is a full, clear, and exact description, such as will enable those skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, forming a part of this specification.

The invention consists in the novel construction, combination, and arrangement of parts, such as will be hereinafter fully described, pointed out in the appended claims, and illustrated in the accompanying drawings.

In the drawings, in which similar reference characters designate corresponding parts, Figure 1 is a side elevation, partly in section, of a device embodying the invention. Fig. 2 is a plan view with parts cut away. Fig. 3 is a front elevation. Fig. 4 is a detail plan view of the elevator-casing and the plow. Fig. 5 is a detail view showing one of the side plates of the elevator-casing. Fig. 6 is a detail sectional view through the trunnions and supporting-bracket of the conveyer-chute. Fig. 7 is a detail sectional view through the trunnions and supporting-bracket of the elevator. Fig. 8 is a detail view of one of the guide-plates of the sod-cutting knives, and Fig. 9 is an enlarged detail view of the sod-cutting mechanism. In the several views parts are omitted for the sake of clearness.

The main frame or support of the machine may be of any construction suitable in the premises. In the present instance it consists of the bed-plate 1, secured on the cross-pieces 2, connected by the longitudinal pieces 3. The frame is suitably mounted on wheels adapted to carry the machine while it is in operation.

Secured to the front face of the rear cross-piece 2 is the U-shaped bracket 4, Figs. 2 and 7. Projecting inwardly from the outer ends of the bracket are the trunnions 5, on which turn the bearings 6 of the elevator-casing 7, pivotally mounted between the arms of the bracket. The casing consists of the side plates 8, of cast-steel, and the bottom plate 9, of

chilled steel, suitably bolted or riveted together, Figs. 4 and 7.

Secured to the outer one of the side plates 8 of the elevator-casing is the rear end of the plow-beam 10, projecting to the forward part of the machine. To this beam about midway of its ends is attached the upper end of the standard 11. To the lower end of the latter is pivoted the heel of the plow 12 by the bolt 13. The plow has considerable width and is somewhat shovel-shaped. It is provided with an entering-point 14 and a cutting edge 15 to one side of and retreating at an angle from the point. Extending upwardly from the plow is the stem 16, registering with the slot 17, formed by the plate 18, secured to the beam 10. The slot is somewhat elongated to permit a free movement of the stem therein when the plow is oscillated on its fulcrum. The plow is oscillated on the bolt 13, which forms its fulcrum, by the lever 19, pivoted on the bracket 20, secured to one of the cross-pieces 2. The outer end of this lever is bifurcated and engages with the stem 16 of the plow. By reason of this connection the plow-stem can be moved up and down relatively to the lever, the stem moving freely between the members of the bifurcation of the lever. The inner end of the lever 19 is connected by the rod 21 with the lower end of the operating-lever 22, pivoted on an end of the shaft 23, mounted in supporting-brackets on the bed-plate 1. Concentric with the pivotal point of the operating-lever and adjacent to the plane of oscillation of the same is the segment 24, having notches 25 in its periphery. On the lever is the catch 26, adapted to engage with the notches 25 as the lever is moved and serves to hold the latter in its adjustment. By means of the handpiece 27 and the connecting-rod 28 the catch 26 can be operated against the action of the spring 29, which normally presses the catch, so that it will engage with the notches of the segment. By means of the operating-lever and the intermediate mechanism the pitch of the plow can be regulated to give a deep or shallow cut to suit the requirements.

Mechanism is provided for raising the plow clear of the ground when it is desired to move



the machine from one place of operation to another. To the forward end of the plow-beam is attached the chain 30, which passes over the segmental plate 31, to the upper part of it is attached, as at 32. This segmental plate is fast on the shaft 33, journaled in the brackets 34, secured on the frame of the machine. On the inner end of the shaft is the segmental gear 35, that meshes with the like gear 36 on the shaft 37. The gear 36 is oscillated by the lever 38, pivoted on the shaft 23 opposite to the lever 22. The lever 38 is connected by the rod 39 with the arm 40 of the segmental gear 36. Concentric with the pivotal point of the lever 38 is the segmental plate 41, having notches in its periphery, with which engages the catch 42 on the lever. The catch is normally pressed against the periphery of the segmental plate by the spring 43. By means of the handpiece 44 and the connecting-rod 45 the catch can be moved against the action of the spring. By means of the lever and the intervening mechanism the plow-beam can be raised and lowered, so that the plow can be raised to clear the ground or lowered to engage with the soil. As the plow-beam is rigidly secured to the elevator-casing and as the latter is fulcrumed on the trunnions 5, when the plow-beam is moved both will be oscillated about the trunnions as a center.

To the rear of the plow 12 is an elevator, comprising the casing 7, an endless carrier in said casing, and means for driving said carrier. Immediately back of the plow 12 is the chute 46, forming a continuation of the bottom of the elevator-casing 7. The chute and bottom of the elevator-casing are of the same width as the plow. The soil dislodged by the plow is carried by the chute to the bottom of the elevator, where it is engaged by the endless carrier and deposited in the conveyer hereinafter described.

Concentric in the trunnions 5 of the bracket 4 are the bearings 47, in which are journaled the ends of the shaft 48, Fig. 7. On this shaft within the casing 7 are keyed the sprocket-wheels 49. A chain-wheel 50 on a projecting end of the shaft imparts motion to the same. In front of the shaft 48 and somewhat lower is the shaft 51, with its ends journaled in boxes movable in the slots 52 in the side plates of the casing. On the shaft 51 are the sprocket-wheels 53, respectively, in the same planes as the sprocket-wheels 49. Above the sprocket-wheels 53 and in the same planes, respectively, are the sprocket-wheels 54, journaled on spindles 55, adjustable in the slots 56 in the side plates of the casing. In the upper part of the casing is the shaft 57, journaled at its ends in the bearings 58 in the side plates of the casing. On this shaft are the sprocket-wheels 59, respectively, in the same planes as the sprocket-wheels 54. Over the sprocket-wheels 49, 53, 54, and 59 pass the endless chains 60, carrying buckets 61, forming within the casing 7

the endless carrier of the elevator. These buckets are of such length as to fit between the sides of the casing, and their path of travel in the direction indicated by arrows is such as to take up any soil that might be in the lower part of the casing as they pass from the sprocket-wheels 53 to the sprocket-wheels 49. After leaving the sprocket-wheels 49 the buckets pass over the sprocket-wheels 59 in the upper part of the casing. As the buckets pass the latter wheels they are inverted, and their contents are deposited in the hopper of the conveyer for carrying the soil away from the machine. After leaving the sprocket-wheels 59 the buckets are guided by the wheels 54, so as to clear the mechanism of the device as they pass to the wheels 53. By adjusting the wheels 53 and 54 the tension of the chains can be regulated. By means of the sprocket-wheel 50 on the shaft 48 motion can be given to the chains. As the shaft is concentric with the trunnions 5, motion can be given to the wheel 50 from mechanism on the stationary part of the machine irrespective of the movements of the casing on its trunnions.

It often happens that the nature of the soil is such that it will leave the plow and enter the chute 47, leading to the elevating mechanism, in the form of sods and lumps, which would interfere with the operation of the buckets. Means are provided for reducing these sods and lumps, so that they can be readily taken up by the buckets. In the lower forward part of the casing 7 in advance of the path of travel of the elevator-buckets are the cutters 60'. These cutters are of such a width as to extend across the casing, and their ends move in the guides 61' in the plates 62, secured to the inner faces of the side plates of the elevator-casing, Fig. 8. The inclinations of the guides are such that the blades will strike in substantially the same place on the bottom of the casing. Mechanism is provided for alternately reciprocating the cutters. The latter are respectively hinged to the lower ends of the rods 63, movable in the sleeves 64. The rods are normally pressed downwardly in the sleeves by the springs 65. The movement of the rods within the sleeves is limited by the pins 66 of the rods, projecting through slots in the sleeves. The object of the springs is to permit a yielding of the cutters when they strike a stone or other obstruction in the soil. The upper ends of the sleeves are respectively connected with the opposite cranks 67 of the shaft 68, journaled in bearings 69 in the side plates 8 of the elevator-casing. (For the sake of clearness only one of the cutters is shown in Fig. 2.) The shaft is rotated by the wheel 70 on a projecting end of the same. When the crank-shaft is rotated through the intervening mechanism, the cutters are alternately reciprocated and reduce to small pieces any sods or lumps that pass along the chute to the elevator.



The springs permit the downward movement of the cutters to cease when they come in contact with an obstruction too difficult for them to cut without interfering with the action of their operating mechanism.

A conveyer is provided for carrying the soil raised by the elevator away from the machine. The conveyer comprises a chute, an endless carrier in said chute, and means for driving said carrier. The U-shaped bracket 71 on the base-plate 1 has in its upper ends bearings, in which are journaled the trunnions 72, secured to the under side of the chute 73, Fig. 6. By means of this mounting the chute can be oscillated and adjusted to meet the requirements. The chute is made in sections, so that its length can be varied to suit the distance at which the soil is to be deposited from the machine. The sections are joined together by the overlapping plates 74, bolted to their ends. Traveling in the chute are the endless chains 75, passing over sprocket-wheels 76 and 77, respectively, located at its opposite ends. The wheels 76 are keyed on the shaft 78, journaled in the brackets 79, adjustably mounted on the outer end of the chute. The sprocket-wheels 77 are keyed on the shaft 80, journaled in the brackets 81, secured to the inner end of the chute. By means of the adjustable brackets 79 the tension of the endless chains can be regulated. These chains carry plates 82, placed at regular intervals, and form the endless carrier of the conveyer for transferring to the outer end of the chute the soil deposited therein by the hopper 83, into which the buckets 61 of the elevator empty. Rolls 84 are attached to the under side of the chute to guide the chains of the carrier on their return movement beneath the chute. In the trunnions 72 of the conveyer is journaled the shaft 85, having on one end the bevel-gear 86, by means of which motion is conveyed to the shaft. On the other end of the shaft is the chain-gear 87, connected by the sprocket-chain 88 with the gear 89 on the shaft 80. By this means motion is conveyed from the shaft 85 to the chains of the endless carrier. As the shaft 85 is concentric with the center of oscillation of the conveyer, it will not be affected by the movements of the chute and can receive motion from mechanism mounted on a stationary part of the machine. On the inner end of the conveyer is the receptacle 91 for receiving weights to balance the outer end of the conveyer, so that it can be readily adjusted on its fulcrum. The weights in the receptacle can be varied according to the number of sections in the outer end of the chute. Attached to the conveyer near its outer end are ropes 92, passing over the pulleys 93 on the upper ends of the standards 94 to the roller 95. The latter is rotated by means of the lever 96, the pawl 97 on the lever, and the ratchet-wheel 98 on the roller. A dog 99 en-

gages with the ratchet-wheel to hold the roller during the backward movement of the lever. By means of the winding mechanism and the ropes the outer end of the conveyer can be raised or lowered, as the conditions require. To limit the movement of the conveyer, pins 100 project from the sides of the chute and engage with the curved slots in the standards 94 concentric with the fulcrum of the conveyer.

In brackets 102, mounted on the rear cross-piece 2 of the frame of the machine, is journaled the roller 103, provided with a crank 104 for turning the same. On this roller are wound ends of the ropes 105, attached to the springs 106, connected with the upper part of the elevator-casing. These springs counter-balance the weight of the forward part of the casing and the plow mechanism. The tension of the springs can be regulated by the roller 103. The latter is held against the pull of the springs by the pawl and ratchet-wheel 107. These springs permit the plow to yield to some extent to accommodate itself to the movements of the machine and to pass obstructions in the soil. The forward end of the plow-beam passes through the elongated slot 108 in the plate 109, secured to the frame of the machine. This plate is curved concentrically with the fulcrum of the plow-beam and casing and serves to hold the plow-beam and casing against any sidewise or end strain. The slot permits the plow-beam to be moved up and down in the plate.

The machine is propelled in any suitable manner—by draft-animals, for instance. The endless carriers of the elevator and conveyer are operated by motive power mounted on the machine. On the rear end of the bed-plate 1 is the engine 110, which may be of the explosive type and connected with the oil-tank 111 on the forward end of the bed-plate. On the shaft 112 of the engine is the pulley 113, connected by a belt with the pulley 114 on the counter-shaft 115. On the latter is the sprocket-wheel 116, connected by a chain with the sprocket-wheel 117 on the shaft 118. The bevel-gear 119 on the shaft 118 conveys motion to the bevel-gear on the shaft 85, journaled in the trunnions of the conveyer. Through the intervening mechanism motion is conveyed from the shaft 85 to the endless carrier of the conveyer. On the counter-shaft 115 is a second sprocket-wheel 120, connected by a chain with the sprocket-wheel 50 on the shaft 48, journaled in the trunnions of the elevator-casing. The rotation of the shaft 48 through the connecting mechanism is carried to the buckets of the elevator to operate the same. On the shaft 48 is a second sprocket-wheel 121, connected by a sprocket-chain with the sprocket-wheel 70 on the shaft 68, through the rotation of which motion is given to the cutters 60'. The dimensions of the several pulleys and sprocket-wheels are such as to



meet the requirements of the several mechanisms which they operate.

While the herein-described embodiment of the invention is the preferred one, yet it can be departed from to a considerable extent without departing from the spirit of the invention.

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

1. In a grading-machine, a main frame, an elevator pivoted on said main frame, a plow-beam carried by said elevator, mechanism on said main frame for oscillating said elevator and said plow-beam, a pivoted plow carried by said plow-beam, a lever pivoted to said main frame and having a sliding connection with said plow, and means for operating said lever to move said plow on its fulcrum.

2. In a grading-machine, a main frame, an elevator pivoted on said main frame, a plow-beam carried by said elevator, mechanism on said main frame for oscillating said plow-beam and said elevator, a pivoted plow carried by said plow-beam, a stem extending upwardly from said plow, a lever pivoted to said main frame and having a bifurcated end registering with said stem, and mechanism for operating said lever to move said plow on its fulcrum.

3. In a grading-machine, a main frame, a bracket on said main frame having trunnions, a casing having bearings in which said trunnions are journaled, means for oscillating said casing, a shaft concentrically journaled in said trunnions, means on said main frame for rotating said shaft, an endless carrier mounted in said casing and driven by said shaft, and a plow carried by said casing in advance of said carrier.

4. In a grading-machine, a main frame, an elevator pivoted to said main frame, a yielding counterbalance connecting the elevator with the main frame, and a plow carried by said elevator.

5. In a grading-machine, a main frame, an elevator pivoted to said main frame, a spring-counterbalance connecting the elevator with the main frame, means for regulating the tension of said spring-counterbalance, and a plow carried by said elevator.

6. In a grading-machine, a main frame, a bracket on said main frame having trunnions, a casing provided with bearings in which said trunnions are journaled, means for oscillating said casing, a shaft concentrically journaled in said trunnions, means on said main frame for rotating said shaft, an endless carrier mounted in said casing and driven by said shaft, a plow-beam carried by said casing, a pivoted plow carried by said plow-beam in advance of said carrier, and means for moving said plow on its fulcrum.

7. In a grading-machine, a main frame, a

bracket on said main frame having trunnions, a casing provided with bearings in which said trunnions are journaled, means for oscillating said casing, a shaft concentrically journaled in said trunnions, means on said main frame for rotating said shaft, an endless carrier mounted in said casing and driven by said shaft, a plow-beam carried by said casing, a pivoted plow carried by said plow-beam in advance of said carrier, means on said main frame for moving said plow on its fulcrum, and a chute leading from said plow to said-carrier.

8. In a grading-machine, a main frame, a plow-beam oscillative relatively to said main frame, a pivoted plow carried by said beam, mechanism on said main frame for moving said plow on its fulcrum, and mechanism on said main frame for oscillating said plow-beam.

9. In a grading-machine, a main frame, a plow-beam oscillative relatively to said main frame, a pivoted plow carried by said plow-beam, a lever pivoted on said main frame and having a sliding connection with said plow, means for operating said lever to move said plow on its fulcrum, and mechanism on said main frame for oscillating said plow-beam.

10. In a grading-machine, a main frame, a plow-beam oscillative relatively to said main frame, a pivoted plow carried by said beam, a stem extending upwardly from said plow, a lever pivoted to said main frame and having a bifurcated end registering with said stem, a hand-lever connected with said lever having said bifurcated end for moving the plow through the intervening mechanism on its fulcrum, and means on said main frame for oscillating said plow-beam.

11. In a grading-machine, a main frame, a plow-beam oscillative relatively to said main frame, a plow carried by said beam, a shaft journaled on said main frame, a segmental plate on said shaft, a chain attached to said plow-beam and passing over and attached to said plate, a gear on said shaft, a pivoted gear engaging with said gear on the shaft, and an operative lever connected with said pivoted gear for oscillating said plow-beam through the intervening mechanism.

12. In a grading-machine, a main frame, a plow-beam oscillative relatively to said main frame, a plate on said main frame curved concentrically with the center of oscillation of said plow-beam and provided with an elongated slot registering with the free end of the plow-beam, a plow carried by said beam, and means for oscillating said beam.

13. In a grading-machine, a main frame, an elevator pivoted to said main frame, a plow-beam carried by said elevator, a plate on said main frame curved concentrically with the fulcrum of said elevator and provided with an elongated slot registering with said plow-



beam, a plow carried by said beam, a chute leading from said plow to said elevator, and means for oscillating said elevator.

14. In a grading-machine, a main frame, a bracket on said main frame having trunnions, a casing having bearings in which said trunnions are journaled, means for oscillating said casing, a shaft concentrically journaled in said trunnions, mechanism mounted on the main frame for rotating said shaft, sprocket-wheels on said shaft, chains passing around said sprocket-wheels, buckets carried by said chains, a plow carried by said casing, and a chute leading from said plow to the path of travel of said buckets.

15. In a grading-machine, a main frame, a bracket on said main frame having trunnions, a casing having bearings in which said trunnions are journaled, means for oscillating said casing, a shaft concentrically journaled in said trunnions, mechanism mounted on said main frame for rotating said shaft, sprocket-wheels on said shaft, chains passing around said sprocket-wheels, buckets carried by said chains, a plow-beam carried by said casing, a pivoted plow carried by said beam, a chute leading from said plow to the path of travel of said buckets, and means for moving said plow on its fulcrum.

16. In a grading-machine, a main frame, a bracket on said main frame having trunnions, a casing having bearings in which said trunnions are journaled, means for oscillating said casing, a shaft concentrically journaled in said trunnions, mechanism mounted on the main frame for rotating said shaft, sprocket-wheels on said shaft, chains passing around said sprocket-wheels, buckets carried by said chains, a plow-beam carried by said casing, a pivoted plow carried by said beam, a chute leading from said plow to the path of travel of said buckets, means for moving said plow on its fulcrum, and a yielding counterbalance connecting said casing with said main frame.

17. In a grading-machine, a main frame, a bracket on said main frame having trunnions, a casing having bearings in which said trunnions are journaled, means for oscillating said casing, a shaft concentrically journaled in said trunnions, mechanism mounted on the main frame for rotating said shaft, sprocket-wheels on said shaft, chains passing around said sprocket-wheels, buckets carried by said chains, a plow-beam carried by said casing, a pivoted plow carried by said beam, a chute leading from said plow to the path of travel of said buckets, means for moving said plow on its fulcrum, a spring-counterbalance connecting said casing with said main frame, and means for regulating the tension of said spring-counterbalance.

18. In a grading-machine, a plow, a carrier, a chute leading from said plow to said carrier, and a reciprocating cutter located intermediate

of said plow and said carrier and impinging on said chute.

19. In a grading-machine, a plow, a carrier, a chute leading from said plow to said carrier, reciprocating cutters located intermediate of said plow and said carrier and impinging on said chute, and mechanism for oppositely moving said cutters to impinge on said chute.

20. In a grading-machine, a plow, a carrier, a chute leading from said plow to said carrier, cutters located intermediate of said plow and said carrier and impinging on said chute, a shaft having opposite cranks respectively connected with said cutters to oppositely reciprocate the latter, and means for rotating said shaft.

21. In a grading-machine, a plow, a carrier, a chute leading from said plow to said carrier, a yielding cutter located intermediate of said plow and said carrier and impinging on said chute, and means for reciprocating said cutter.

22. In a grading-machine, a plow, a carrier, a chute leading from said plow to said carrier, a sleeve, a spring-pressed rod in said sleeve, a cutter carried by said rod and adapted to impinge on said chute, and means for reciprocating said sleeve.

23. In a grading-machine, a plow, a carrier, a chute leading from said plow to said carrier, a rotatable crank-shaft, a sleeve connected with said crank-shaft, a spring-pressed rod in said sleeve, a cutter hinged to said rod, guides for said cutter to direct the latter to impinge on said chute, and means for rotating said shaft to reciprocate said cutter.

24. In a grading-machine, a main frame, a casing pivoted to said main frame, a plow-beam carried by said casing, a plow attached to said beam, an endless carrier in said casing, a chute leading from said plow to said endless carrier, a crank-shaft journaled in said casing, a cutter located intermediate of said plow and said carrier and adapted to impinge on said chute, and mechanism mounted on said main frame for rotating said crank-shaft to reciprocate said cutter.

25. In a grading-machine, a main frame, a bracket on said main frame and having trunnions, a casing having bearings in which are journaled said trunnions, an endless carrier in said casing, a shaft journaled concentrically in said trunnions, a plow carried by said casing, a chute leading from said plow to said endless carrier, a crank-shaft journaled in said casing, a cutter located intermediate of said plow and said endless carrier and connected with said crank-shaft, means for conveying motion from the shaft journaled in the trunnions with the crank-shaft to reciprocate said cutter, and mechanism mounted on said main frame for rotating the shaft journaled in the trunnions.

26. In a grading-machine, a main frame, an elevator pivoted on said main frame, a plow-



beam carried by said elevator, a pivoted plow carried by said beam, mechanism on said main frame for oscillating said elevator, mechanism on said main frame for moving said plow on its fulcrum, a conveyer pivoted on said main frame and leading from said elevator, and means on said main frame for adjusting said conveyer on its axis.

27. In a grading-machine, a main frame, an elevator pivoted on said main frame, a plow-beam carried by said elevator, a pivoted plow carried by said plow-beam, mechanism on said main frame for oscillating said elevator, mechanism on said main frame for moving said plow on its fulcrum, a bracket on said main frame provided with bearings, a conveyer-chute leading from said elevator and having trunnions journaled in the bearings of said bracket, an endless carrier movable in said conveyer-chute, a shaft concentrically journaled in the trunnions of the conveyer-chute, mechanism on said main frame for driving said shaft, and means for conveying motion from said shaft to said endless carrier.

28. In a grading-machine, a main frame, a plow, an elevator carried by said main frame back of the plow, a bracket on said main frame provided with bearings, a conveyer-chute having trunnions journaled in the bearings of said bracket, an endless carrier movable in said conveyer-chute, a shaft journaled in the trunnions of the conveyer-chute, mechanism on said main frame for driving said shaft, and means for conveying motion from said shaft to said endless carrier.

29. In a grading-machine, a plow, an elevator, a main frame carrying said plow and said

elevator, a bracket on said main frame provided with bearings, a conveyer-chute having trunnions journaled in said bearings of the bracket, a shaft journaled in the trunnions of the elevator-chute, an endless carrier movable in said conveyer-chute, mechanism on said main frame for driving said shaft, mechanism for conveying motion from said shaft to said endless carrier, standards on said main frame, sheaves on said standards, a windlass on said main frame, and ropes attached to the conveyer-chute and passing over said sheaves to said windlass.

30. In a grading-machine, a main frame, a bracket on said main frame having trunnions, a casing having bearings in which said trunnions are journaled, means for oscillating said casing, a shaft concentrically journaled in said trunnions, an endless carrier mounted in said casing and driven by said shaft, a plow carried by said casing in advance of said endless carrier, a second bracket on said main frame and provided with bearings, a conveyer-chute leading from said endless carrier mounted in said casing and having trunnions journaled in said bearings of the second bracket, a shaft journaled in the trunnions of the conveyer-chute, an endless carrier movable in said chute and driven by the last-mentioned shaft, and means common to both of said shafts for rotating the same.

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

THOMAS C. CASWELL.

Witnesses:

H. L. MYERS,

IRA W. TERRY.