

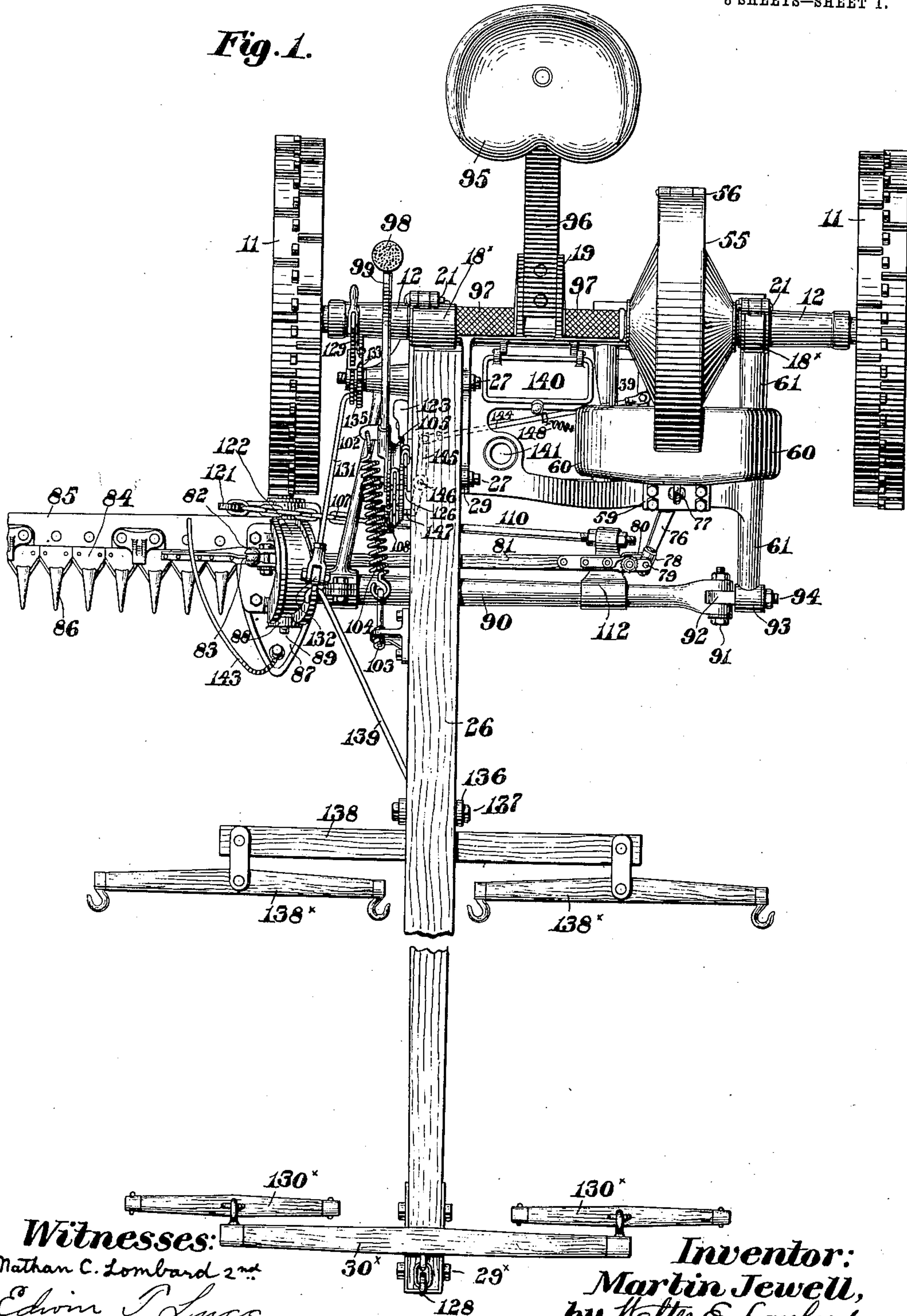
No. 875,353.

PATENTED DEC. 31, 1907.

M. JEWELL.
MOWING MACHINE.
APPLICATION FILED OCT. 5, 1906.

8 SHEETS—SHEET 1.

Fig. 1.



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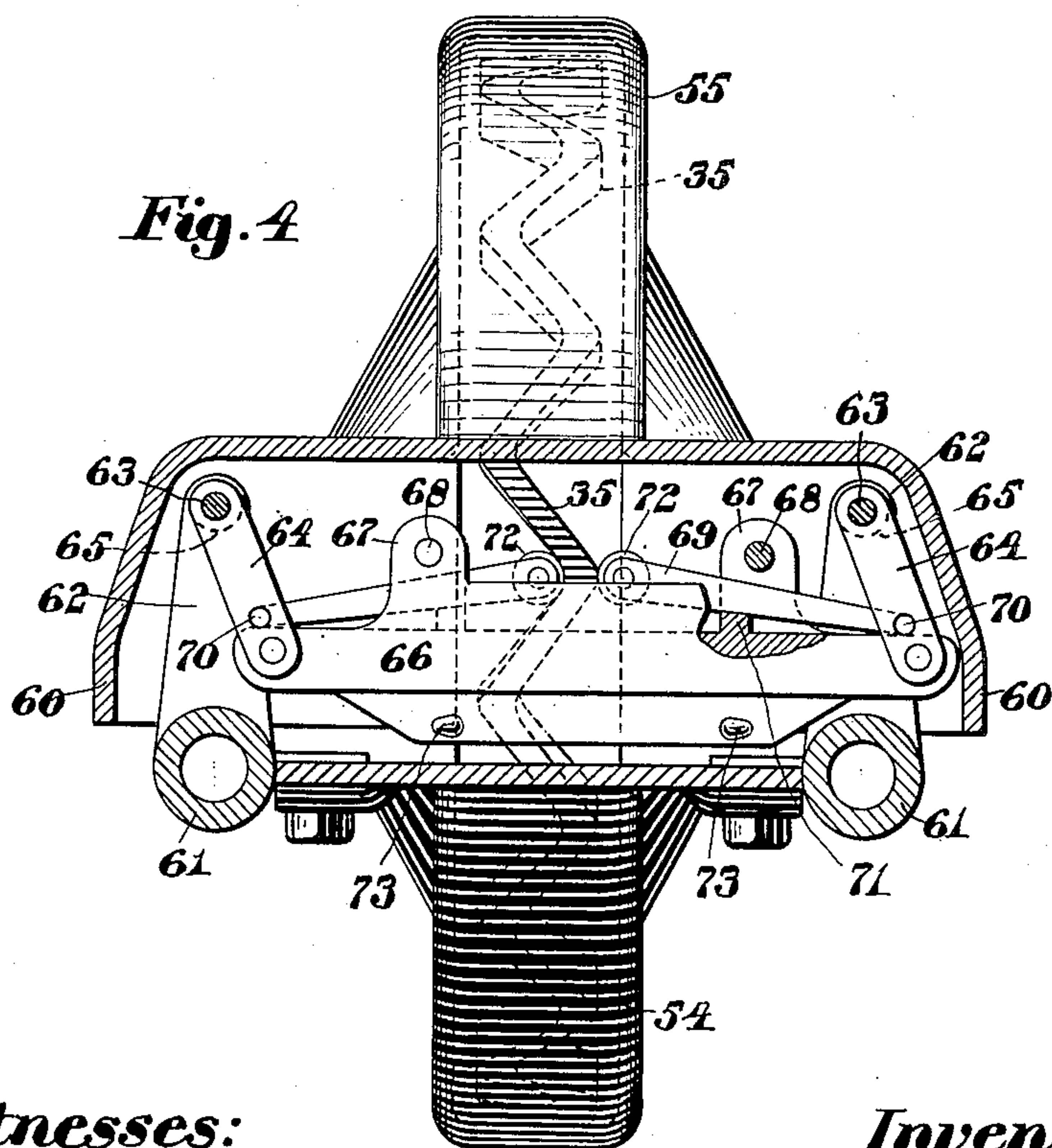
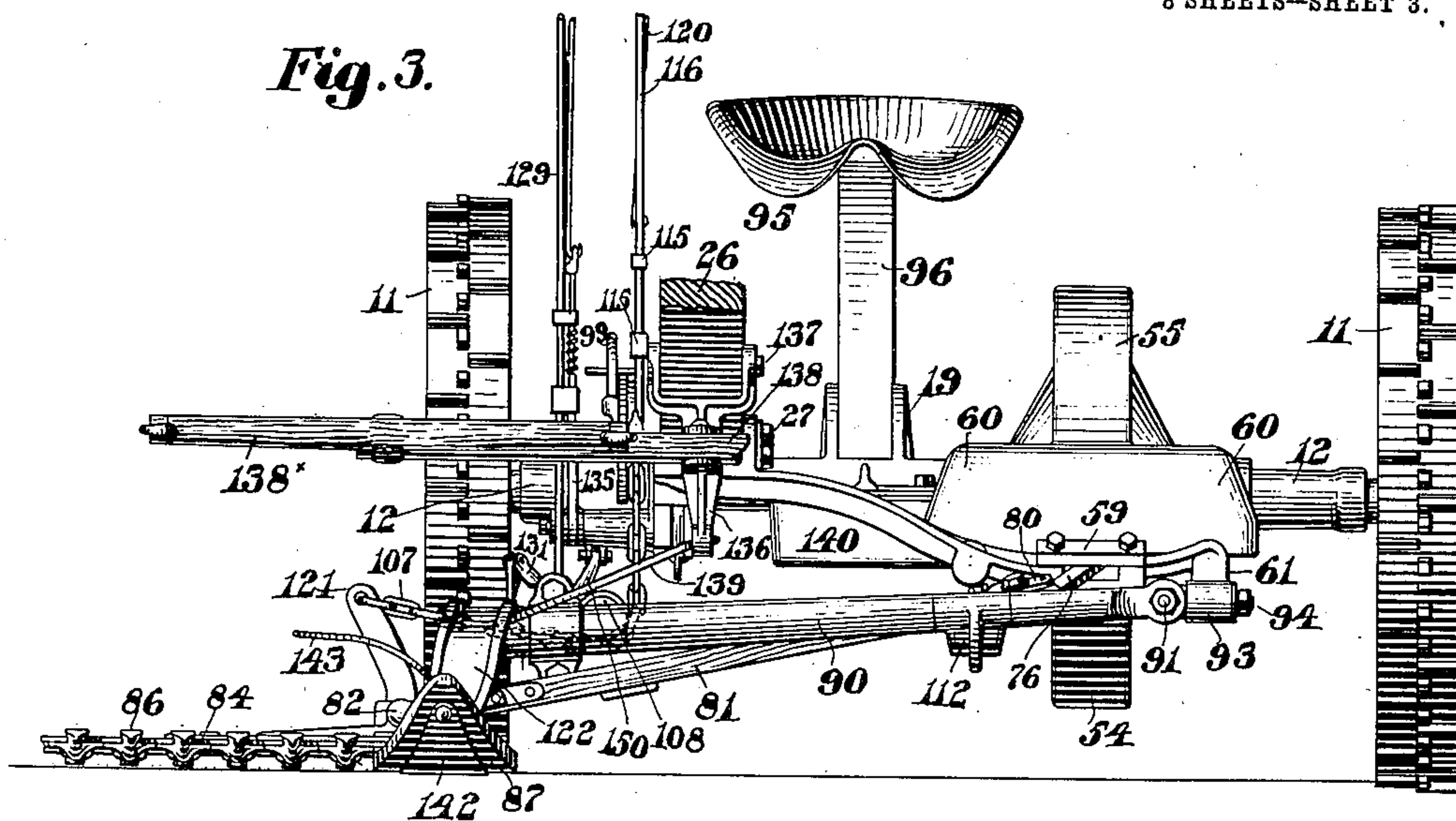
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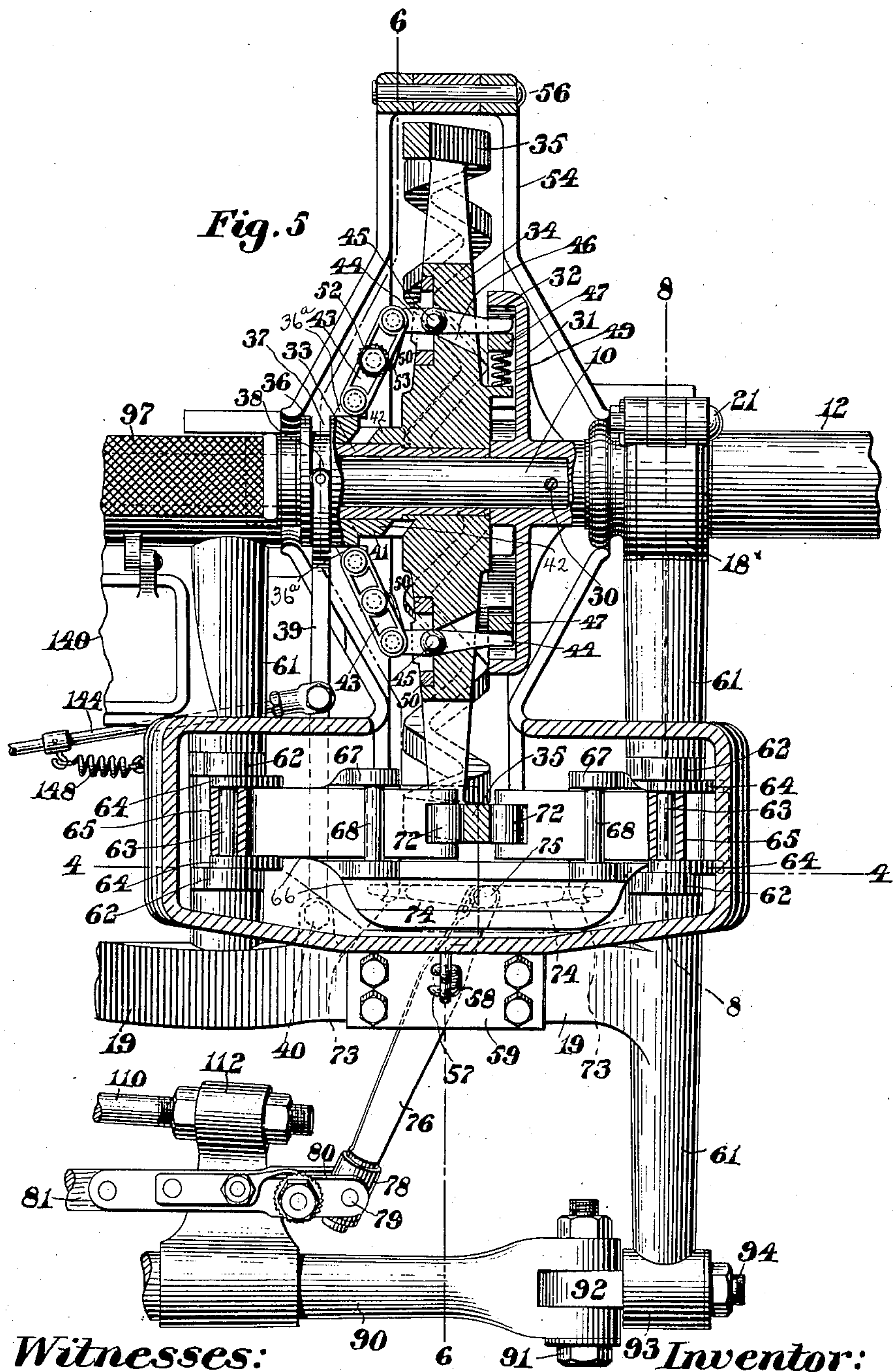
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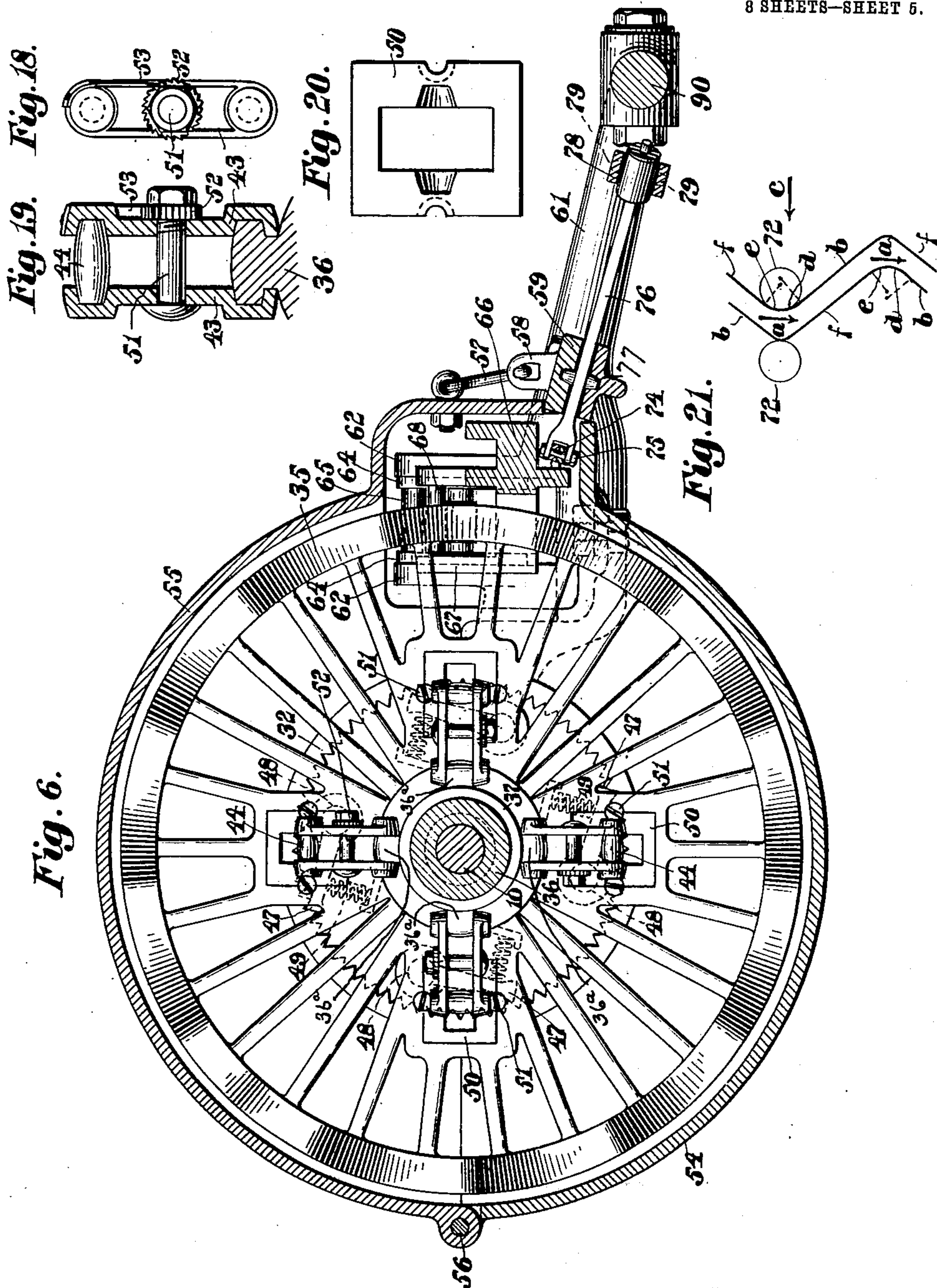
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8 SHEETS—SHEET 5.



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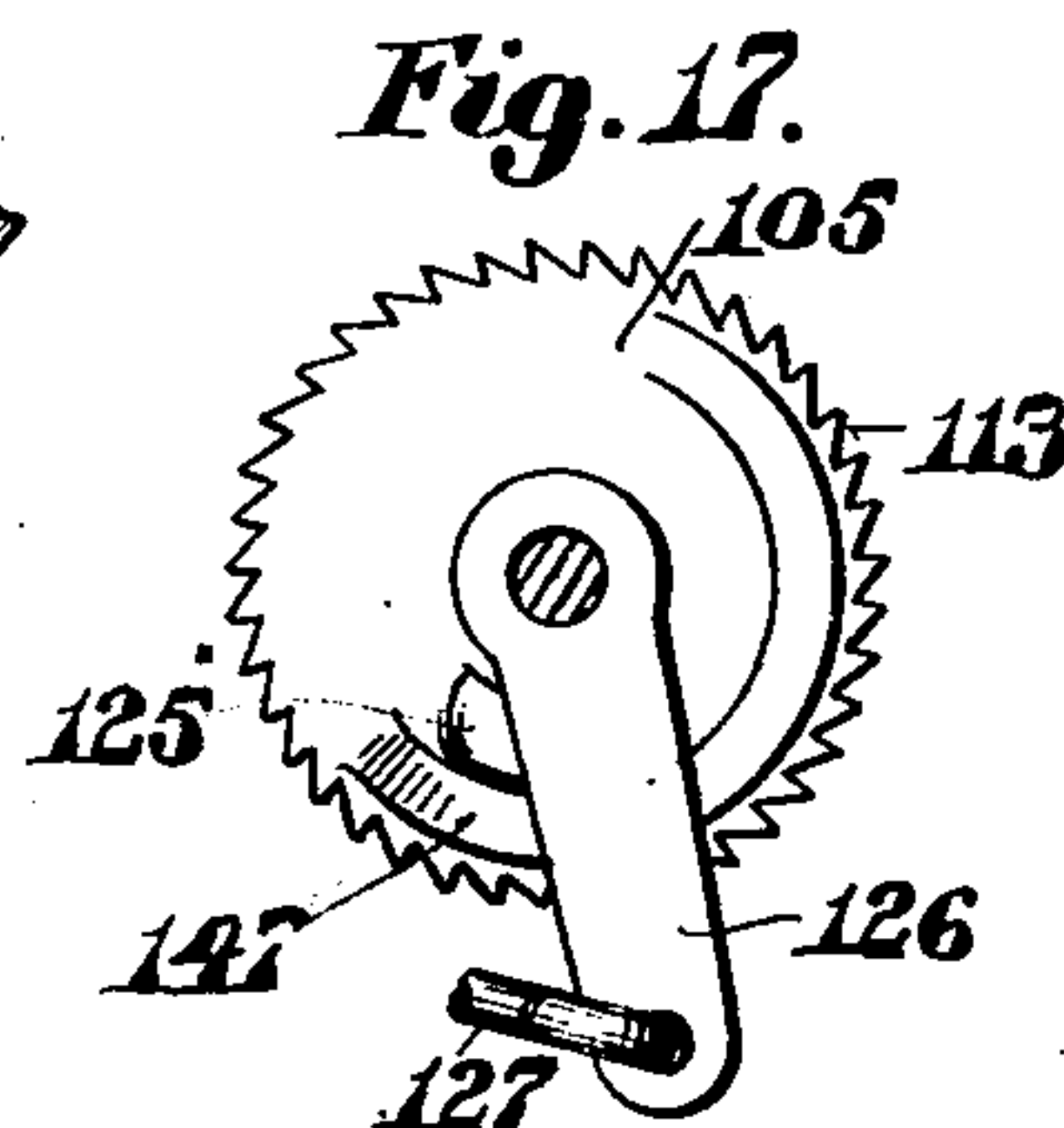
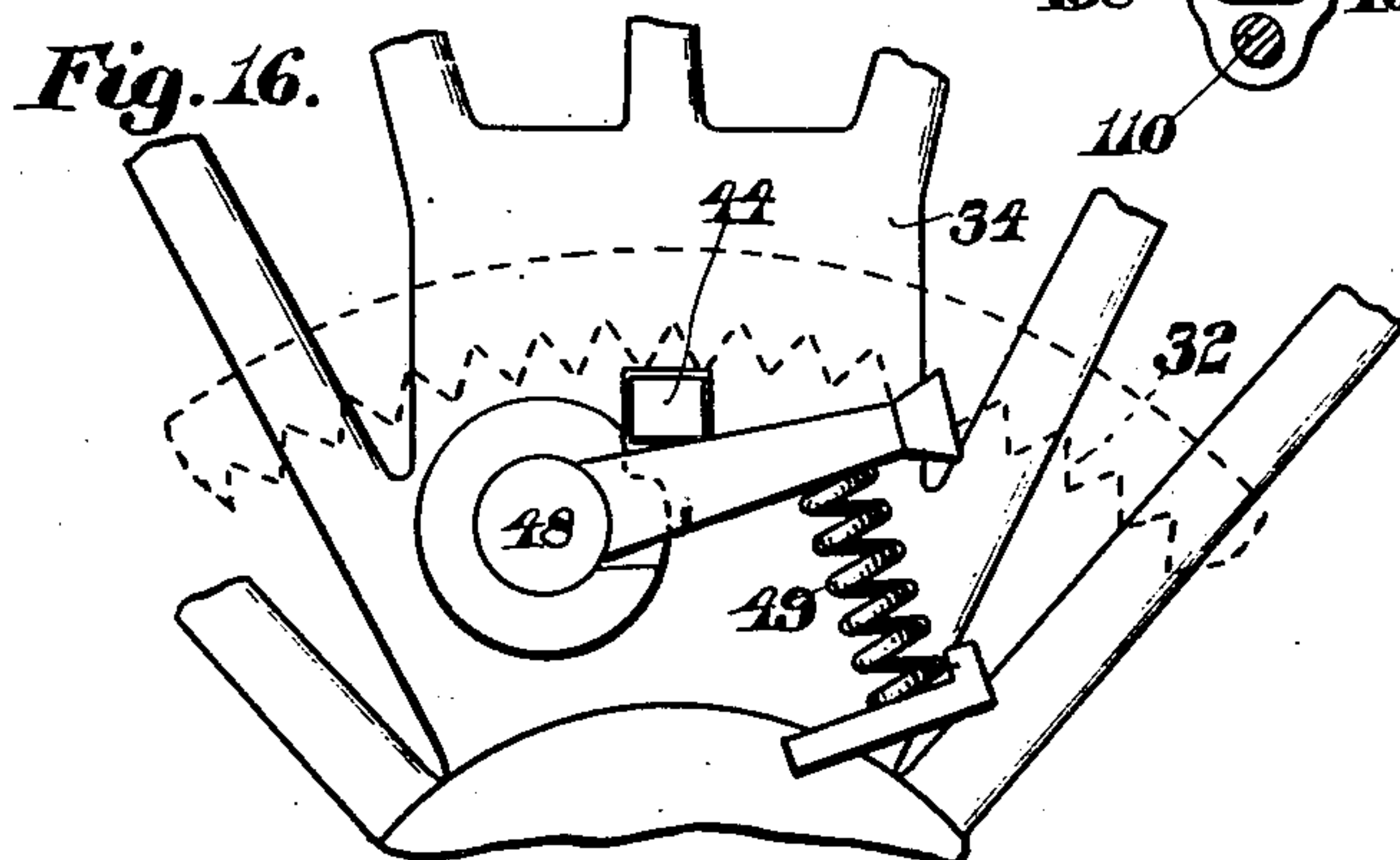
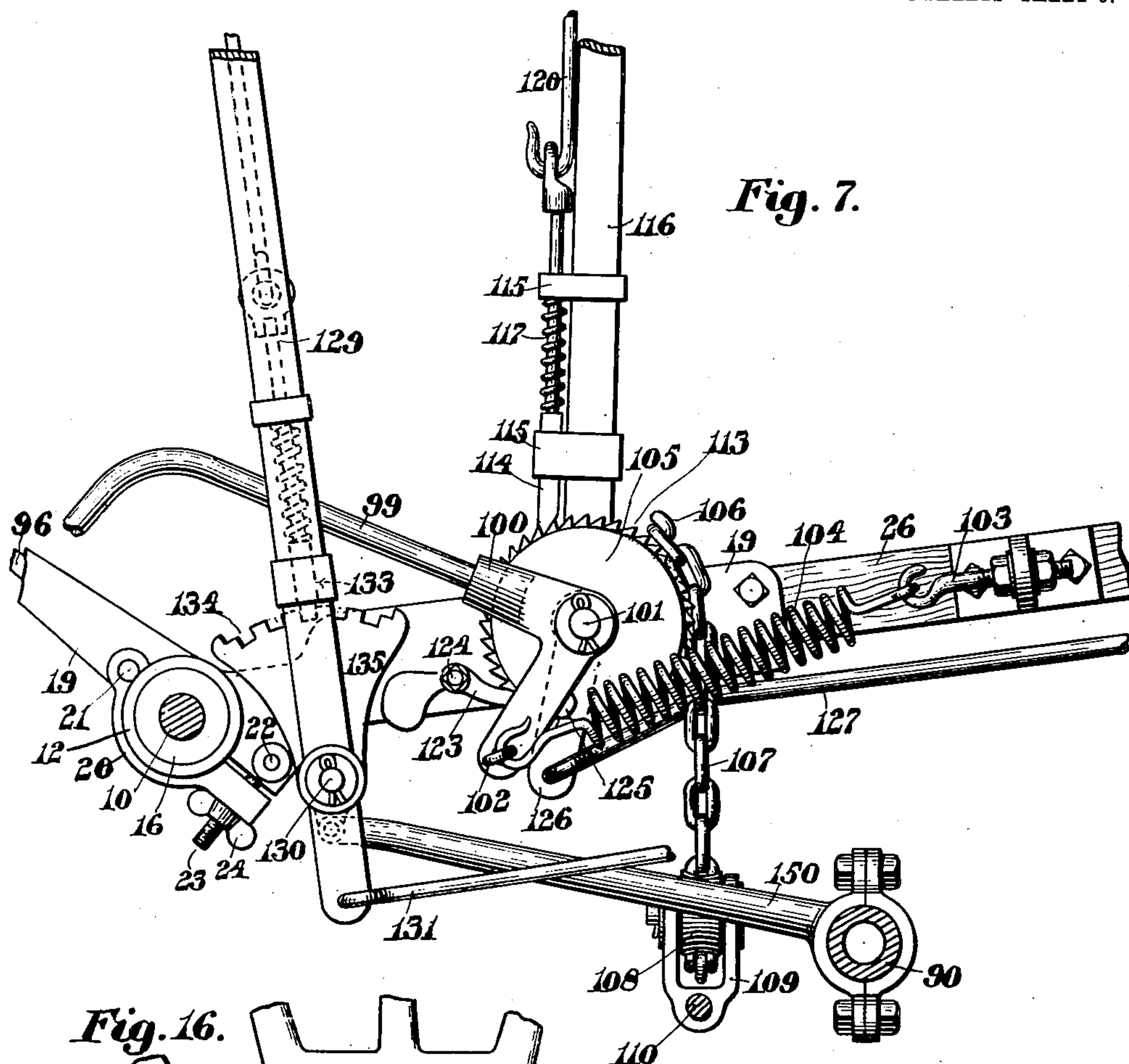
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8 SHEETS—SHEET 6.



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APPLICATION FILED OCT. 5, 1905.

8 SHEETS—SHEET 7.

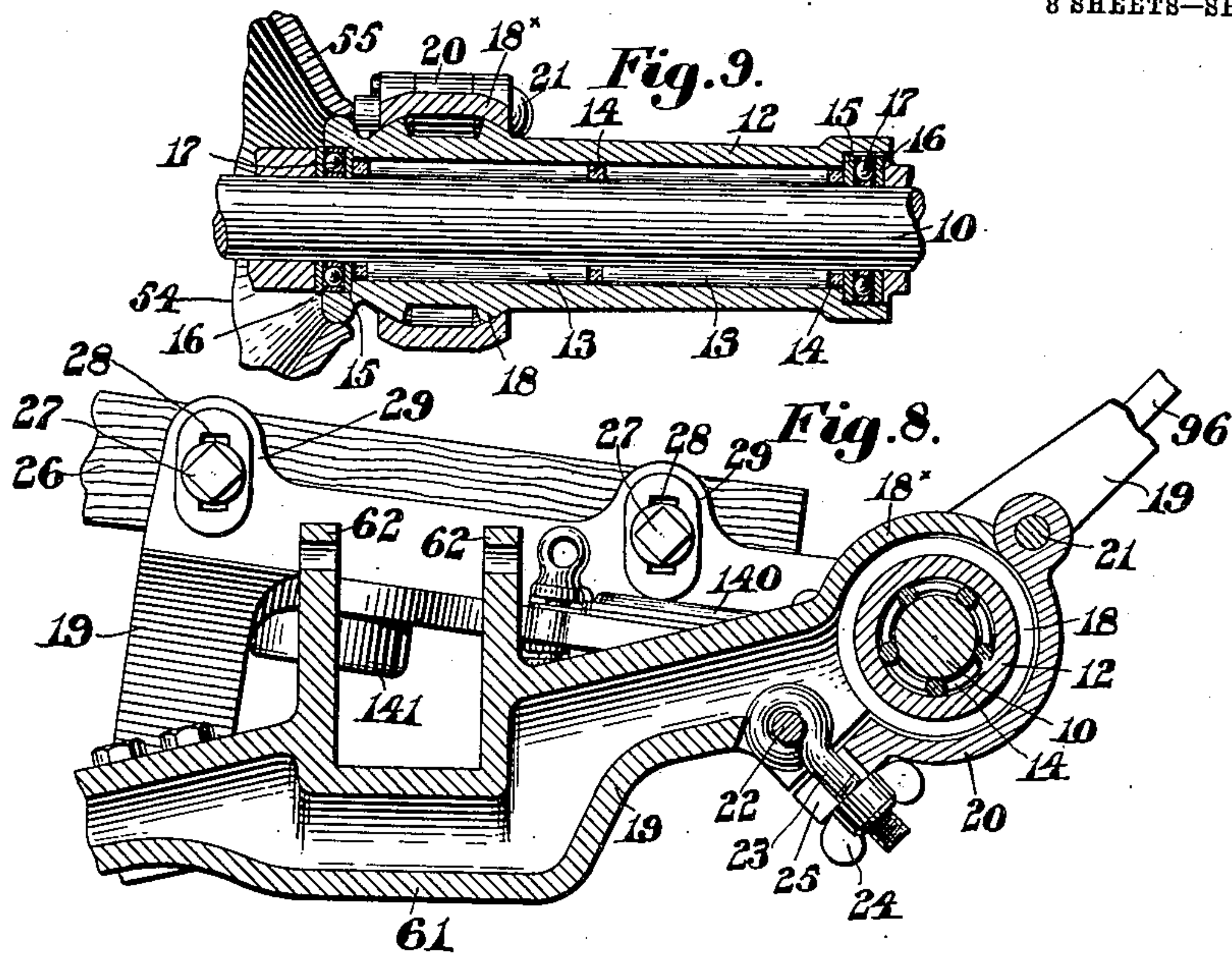


Fig. 11.

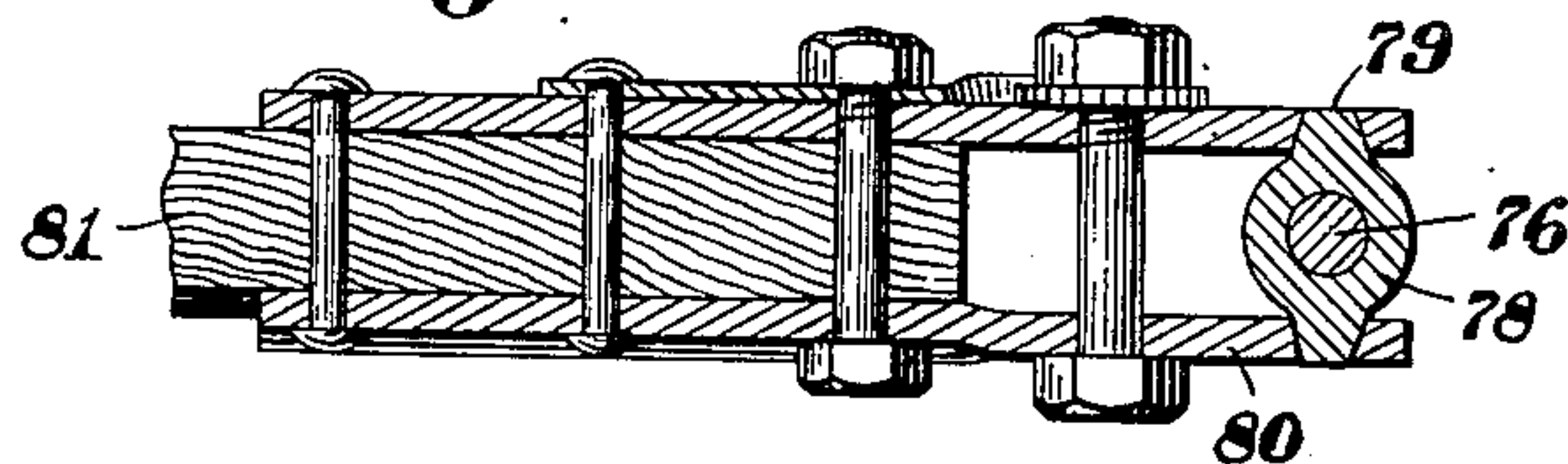


Fig. 10.

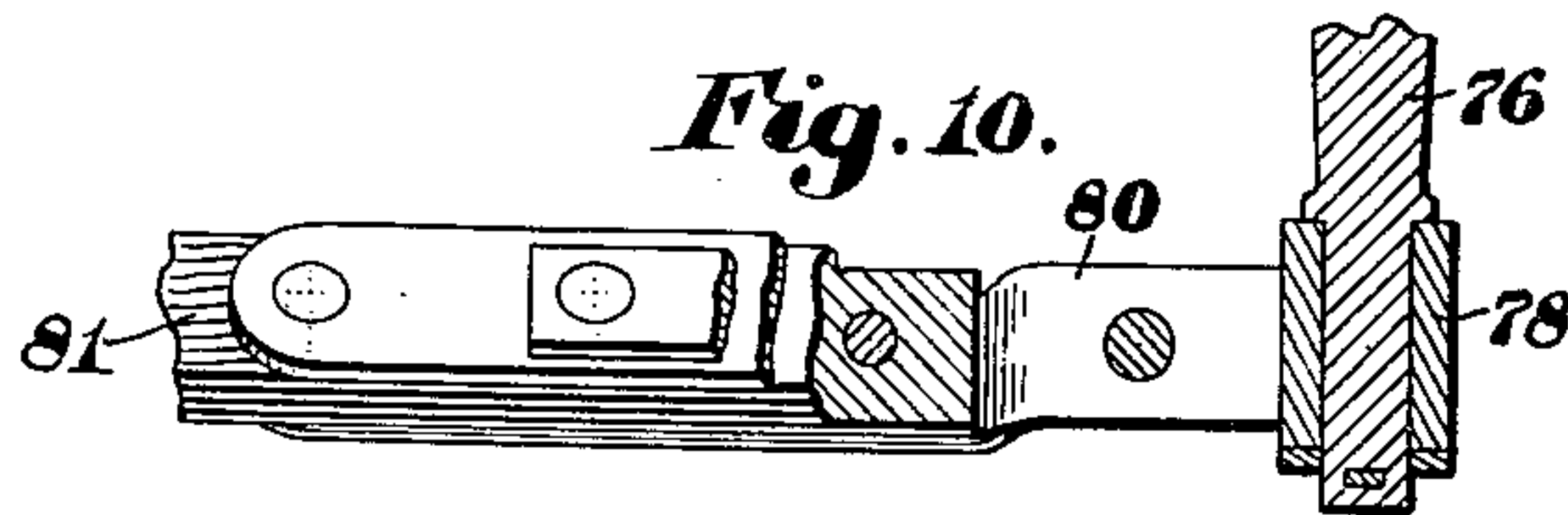
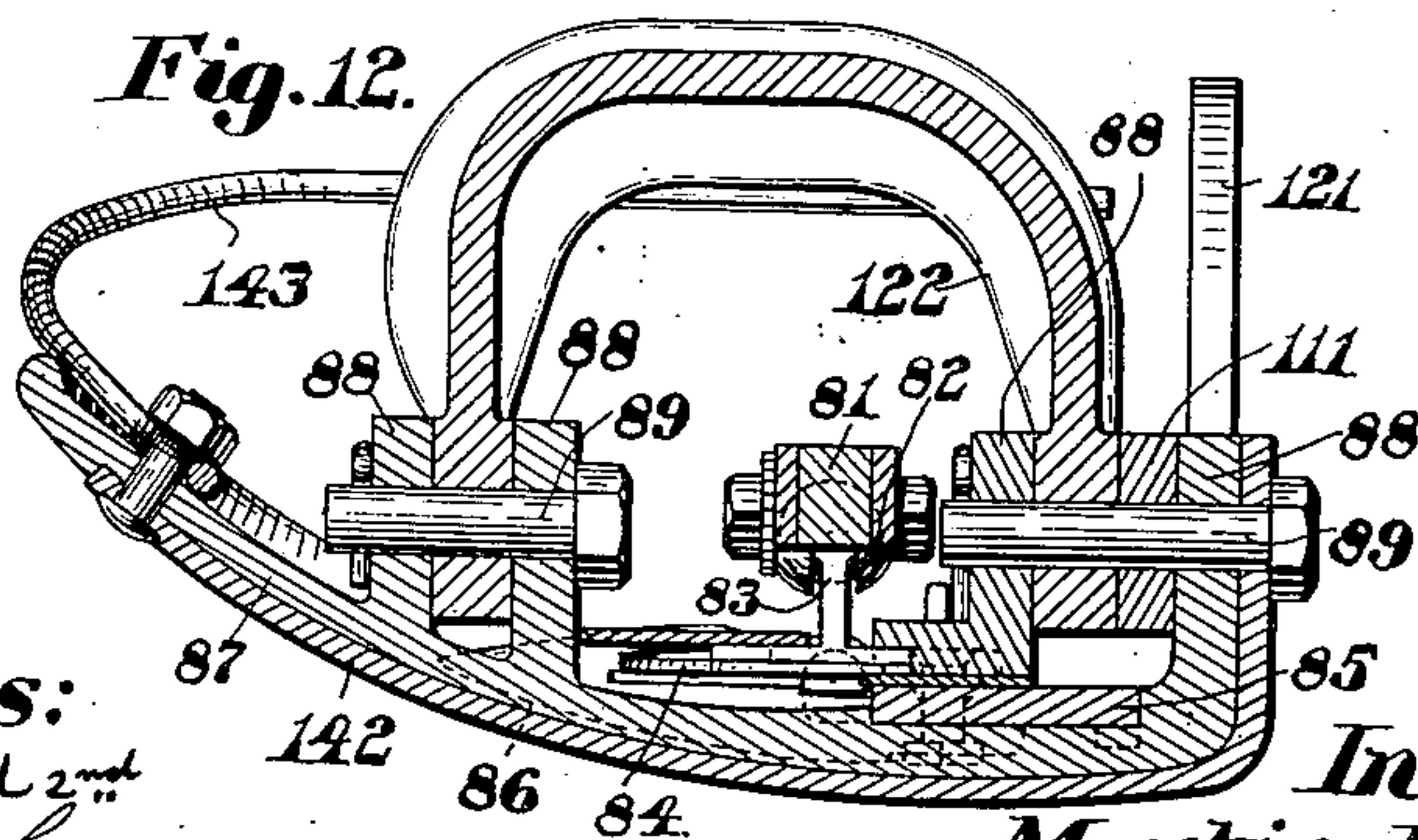


Fig. 12.



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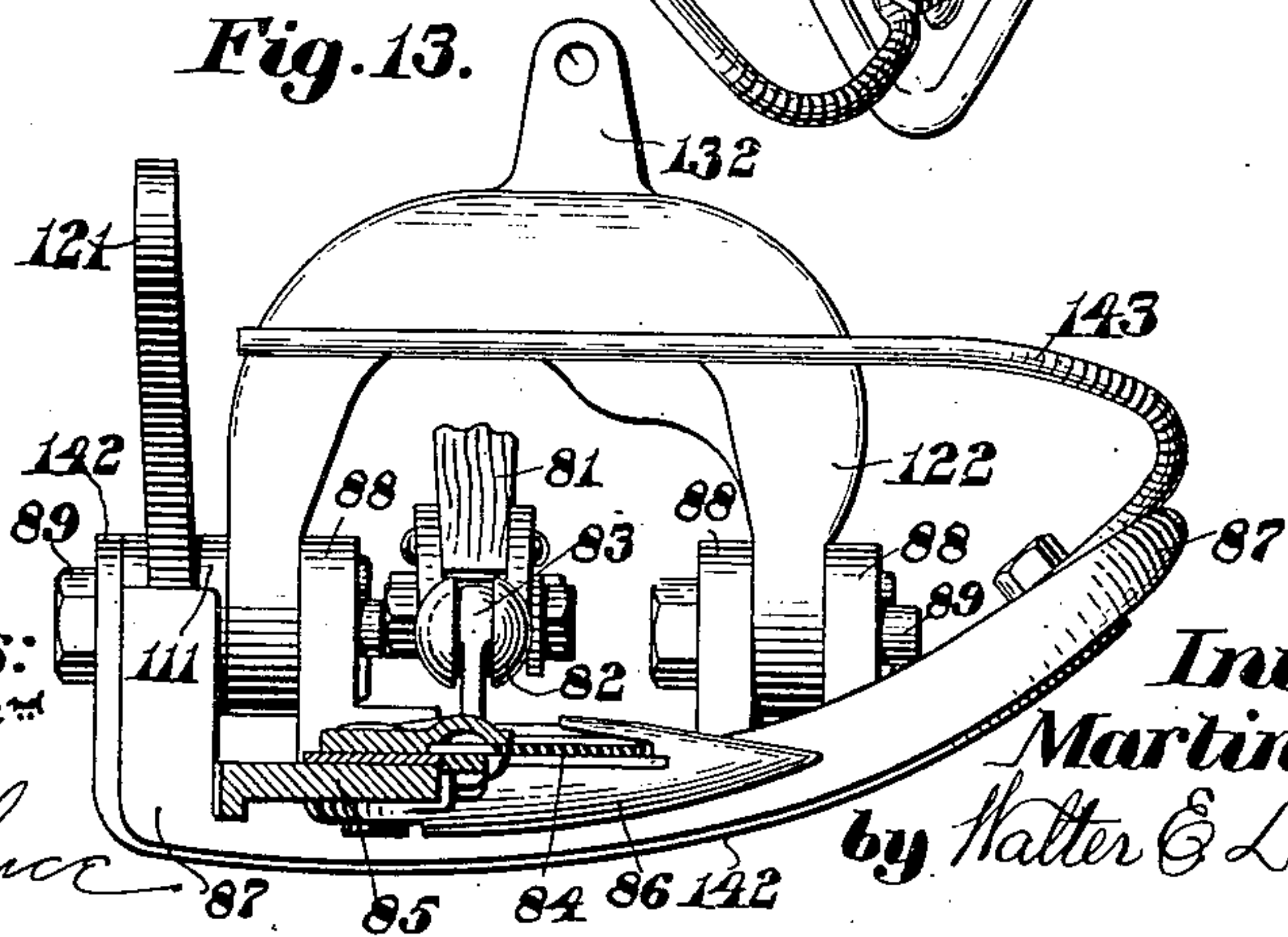
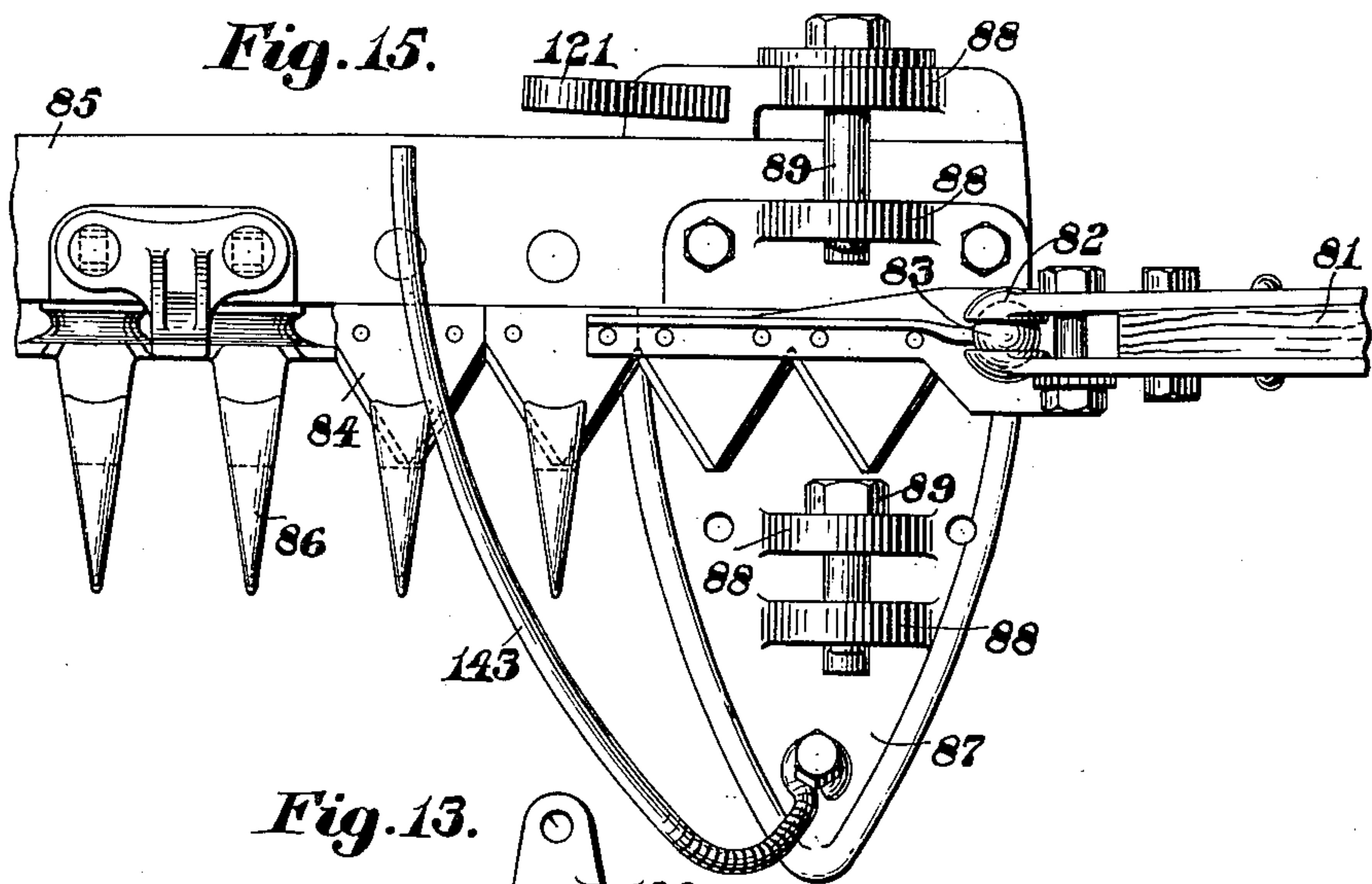
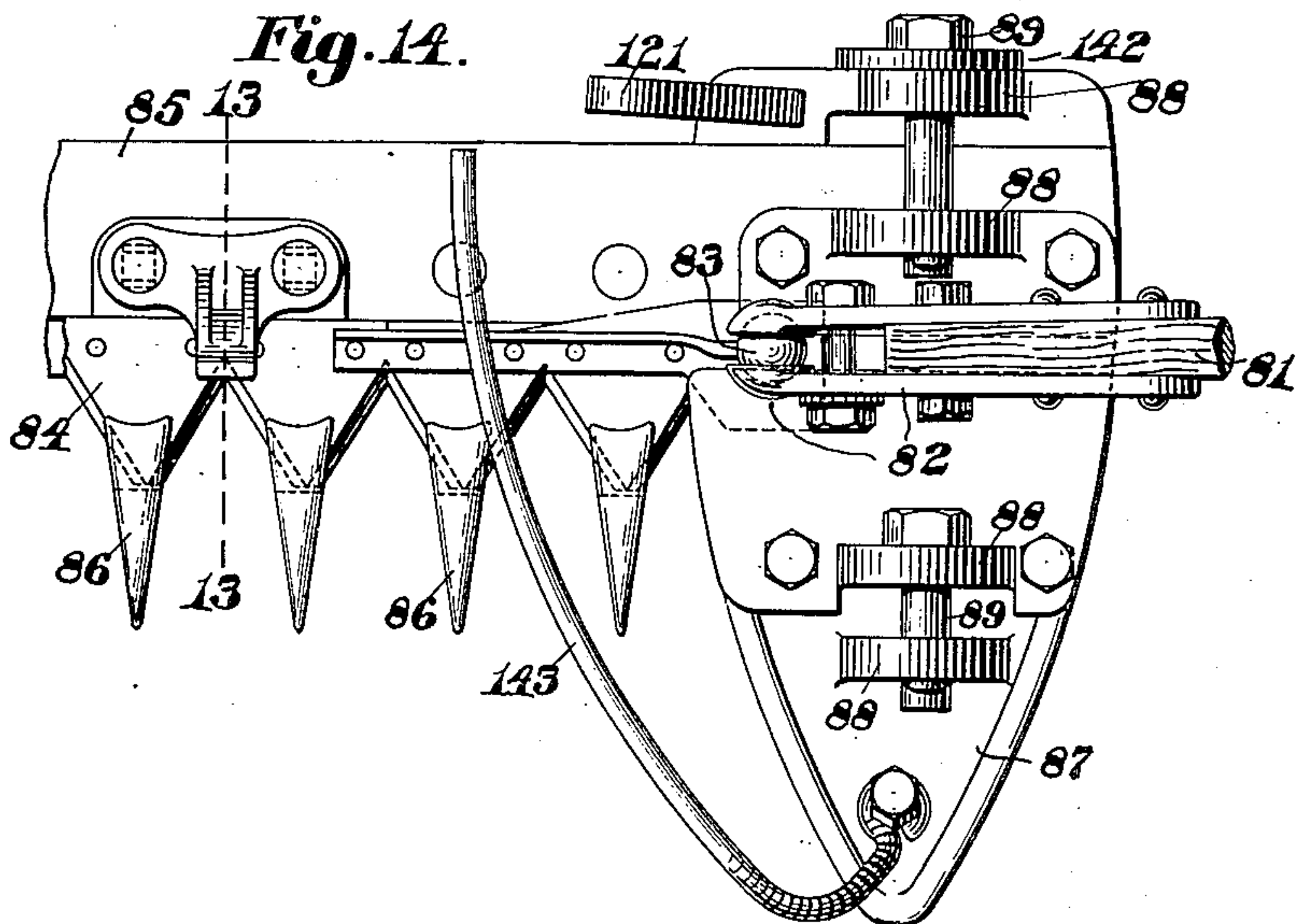
No. 875,353.

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APPLICATION FILED OCT. 5, 1905.

8 SHEETS—SHEET 8.



Witnesses:
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UNITED STATES PATENT OFFICE.

MARTIN JEWELL, OF CLINTON, MAINE.

MOWING-MACHINE.

No. 875,353.

Specification of Letters Patent.

Patented Dec. 31, 1907.

Application filed October 5, 1905. Serial No. 281,419.

To all whom it may concern:

Be it known that I, MARTIN JEWELL, a citizen of the United States of America, and a resident of Clinton, in the county of Kennebec and State of Maine, have invented certain new and useful Improvements in Mowing-Machines, of which the following is a specification.

This invention relates to mowing machines and has for its object the production of a machine which will facilitate the labor imposed during the cutting of grass or grain by reducing to a minimum the friction between the several elements, this desired result being attained by dispensing with gear wheels and employing comparatively few parts to effect the various operations of the machine.

It has for a further object the production of a machine in which the finger bar may be automatically lifted when the machine is backed or may be lifted by the operator through the medium of either a foot lever or a hand lever, as desired.

Another object in view is the production of a machine in which gear wheels or their equivalents are entirely dispensed with and the reciprocation of the knife is derived entirely from a revoluble zigzag wheel, so constructed as to avoid dead centers.

The invention consists in several features of construction and combination of elements which will be thoroughly understood by the description and claims to be hereinafter given.

Of the drawings: Figure 1 represents a plan of a mowing machine embodying the features of this invention, the extreme end of the finger bar being broken away. Fig. 2 represents a side elevation of the same. Fig. 3 represents a front elevation of the same with the tongue or pole cut in section. Fig. 4 represents a sectional elevation of the casing inclosing the actuating wheel and showing in elevation the swinging members actuated by said wheel and from which a reciprocatory movement is imparted to the cutter bar, the cutting plane being on line 4—4 on Fig. 5. Fig. 5 represents a sectional plan of a portion of the main frame showing the actuating wheel, the clutch for operating the same and the elements operated by said actuating wheel to transmit reciprocatory movement to the cutter bar. Fig. 6 represents a sectional elevation of the same, the cutting plane on line 6—6 on Fig. 5. Fig. 7 represents a side elevation of the devices for

lifting the finger-bar. Fig. 8 represents a sectional elevation of a portion of the main frame showing its attachment to the tongue or pole and the means for supporting axle bearings, the cutting plane being on line 8—8 on Fig. 5. Fig. 9 represents a section of one of the bearings of the main axle. Figs. 10 and 11 represent, respectively a sectional plan and a sectional elevation of the connection between the actuating lever and the pitman for reciprocating the knife blade. Fig. 12 represents a sectional elevation of the main shoe for the finger bar. Fig. 13 represents a sectional elevation of the cutter bar looking toward the main shoe, the cutting plane being on line 13—13 on Fig. 14. Fig. 14 represents a sectional plan of the portion of the cutter bar and the main shoe showing the knife blades at one extreme of their movement. Fig. 15 represents a similar section with the front guard blade removed and showing the cutting blade at the opposite extreme of its movement. Fig. 16 represents an elevation of one of the actuating pawls. Fig. 17 represents an elevation of the inner side of the finger bar lifting drum. Figs. 18 and 19 represent, respectively, an elevation and section of the link for operating the clutch pawl actuating lever. Fig. 20 represents a rear elevation of the cap for the trunnions of the clutch pawl actuating lever, and Fig. 21 represents a diagram showing the operation of the waved rim on its rollers at the turning points to prevent dead centering.

Similar characters designate like parts throughout the several figures of the drawings.

In the drawings, 10 represents a main axle or shaft of this improved mowing machine, the ends of said shaft having secured thereon the supporting wheels 11 of usual construction. The axle 10 is supported in two bearings 12, each of which is provided with a plurality of roller members 13 for the purpose of reducing to a minimum the friction upon said axle in its revolution in said bearings 12. The rolls 13 are mounted in a cage 14 of any suitable construction. The ends of the bearings 12 are provided with recesses having shoulders against which rests a washer 15 between which and a washer 16 bearing against the hub of the wheel 11 are interposed a series of balls or other anti-friction elements 17 to prevent any thrust of the wheels or other devices turning with the axle 10 from acting upon

the roller cage 14. One portion of the bearing 12 has a spherical enlargement at 18 the spherical sides of which are adapted to fit a bearing 18* formed in the end of the main frame 19 and a cap 20 pivoted thereto at 21. To the main frame at 22 is attached an eye bolt 23, the free end of which has threaded thereto a nut 24. The shank of said eyebolt 23 is adapted to enter a slot 25 in the free end of the cap 20. By means of this device the bearings 12 may be securely clamped to the main frame 19 and owing to the conformation of the enlargement 18 they will readily align themselves with the main axle 10. The main frame 19 is secured to the poll or tongue 26 by means of bolts 27 passing through slots 28 in the ears 29 of said frame 19. This provides for a ready means for adjusting the angle of said pole or tongue 26 to the main frame to adapt it to different heights of horses.

Secured to the main axle 10 by a pin 30 is a clutch wheel 31 provided with a plurality of inwardly projecting teeth 32. Loosely mounted upon the shaft 10 adjacent to the hub of the clutch wheel 31 is a sleeve 33 upon which is securely mounted the actuator wheel 34 provided with a continuous zigzag rim 35. The sleeve 33 also has mounted thereon a member 36 provided with a groove 37 which is engaged by anti-friction rollers 38 in the end of a forked lever 39 pivoted to the frame 19 at 40.

The hub of the member 36 is provided with a projection 41 which engages with a similar projection 42 on the hub of the actuating wheel 34, the whole being constructed to provide for the revolution together of the wheel 34 and the member 36, while at the same time said member 36 is free to be moved toward and from said wheel 34. This member 36 is provided with ears 36^a to which are articulated links 43, the opposite ends of which are articulated to levers 44 pivoted at 45 in chambers 46 in the wheel 34. The chamber 46 is provided with walls to limit the movement of said levers 44 in either direction. The free end of the lever 44 engages with a pawl 47 pivoted at 48 to the wheel 34 and held in engagement with the teeth 32 by means of a spring 49. The wheel 34 is provided with a plurality of pawls 37 and these pawls are so arranged relative to the teeth 32 that when one pawl is in full engagement with said teeth other pawls are in partial engagement therewith, this arrangement being for the purpose of insuring an engagement with the teeth 32 for a shorter distance than the width of a tooth, as it is very desirable in the operation of any mowing machine to start the operation of the cutter bar as soon as the mowing machine is moved forward. This clutch mechanism accomplishes this object and causes the reciprocation of the knife as soon as the wheels 11 are moved forward.

The trunnions 45 of the pawl-operating lever 44 are tapered and are provided with bearings in the wheel 34 and the caps 50 (see Fig. 20) secured thereto. The ends of the pawl-operating levers 44 articulated to the links 43 are also provided with tapered trunnions, each of which has a bearing in a link 43, said links 43 being secured together by means of a bolt 51 one end of which is headed and provided on its other end with a nut 52 threaded thereto, said nut being provided with a toothed flange which is engaged by means of a spring pawl 53 to prevent said nut from unlocking, (see Figs. 18 and 19). The zigzag wheel or waved wheel 34 is inclosed by a casing formed in two parts, 54—55, pivoted together at 56. This casing surrounds the clutch mechanism and the upper portion 55 of the casing is held normally in a closed position by means of the hook or any suitable fastening device 57 engaging with the eye 58 forming a part of the cap 59 bolted to the main frame 19.

The upper portion 55 of the actuating wheel casing is provided at its front end with lateral hollow extensions 60 in which is inclosed the elements which assist in changing the revoluble motion of the actuating wheel 34 into a reciprocatory movement to actuate the knife bar. This movement is effected as follows: On either side of the casing 54 and immediately beneath the lateral extensions 60 are two substantially parallel members 61 forming a part of the main frame 19. These members 61 are each provided with two ears 62 projecting upwardly into the lateral extension 60 of the wheel casing. Upon a pin 63 interposed between said ears are mounted links 64 separated by a sleeve 65. The lower end of said links have articulated therewith the swinging member 66 which is provided with upwardly projecting ears 67, each pair of which are connected by a pin 68 adapted to limit the movement in one direction of the struts or arms 69 pivoted at 70 to the links 64. Upwardly projecting lugs 71 from the member 66 limit the movement of the arm or strut 69 in the opposite direction. Each of the arms or struts 69 has pivoted at its free end rollers or other suitable bearing surfaces 72 which are adapted to engage with the walls of zigzag or waved rim 35 which will form radial shoulders adapted to cooperate with said struts 69 to swing the device to which they are pivoted about the pivots 63. It is obvious that a revolution of the wheel 34 will cause the zigzag or waved rim 35 to act upon the rollers 72 in the ends of the struts 69 to swing the links 64 about their pivots 65 and thereby cause a reciprocatory movement of the member 66.

The turning point of the inner face of the rim 35 is made of a peculiar construction, the curve on either side of the center being of a different diameter, as shown in Fig. 21,

in which the rim is moving in the direction of the arrow *a*, and as the roll 72 moves down the inclined face *b* its movement in the direction of the arrow *c* is gradually retarded on the curve *d* of the greatest diameter. As soon as the roll reaches the center it engages the curve *e* of the smaller diameter and quickly regains an inclined face *f* thereby securing a constant movement of the swinging member 66. This peculiar construction of the turning points obviates to some degree the noise which usually occurred when the roll 72 reached the turning point before this construction was provided and causes a smoother and more effective operation of the knives, or cutting devices. This operation prevents any dead centering of the mechanism and insures a continuous swinging movement of the member 66 as long as the actuating wheel 34 continues to revolve. The member 66 is provided with hooks 73 on which are mounted members 74 which by means of a pin 75 are pivoted together and to a lever 76 pivoted at 77 between the main frame 19 and the plate 59. The opposite end of the lever 76 is provided with a revolvable sleeve 78 provided with trunnions 79 having bearings in the arms 80 of the pitman 81 the opposite end of which is provided with arms 82, the ends of which are provided with sockets to engage a ball 83 secured to the knife 84 of the finger bar 85. The finger bar 85 is provided with the usual fingers or guards 86. The movement of the pitman 81 is such as to cause a sufficient reciprocation of the knives 84 to cause each knife section to pass through two guards 86, thus doubling the efficiency of the knife in each reciprocation it may make.

The inner shoe 87 provides a suitable support for the finger bar 85 and has secured thereto upwardly projecting ears 88 to which by means of pins 89 is connected a drag bar 90 pivoted at 91 to a member 92 freely revolvable in a bearing 93 in the end of one of the members 61 of the main frame 19. In lifting the finger bar to pass obstacles the drag bar is moved about the pivot 91 and to adjust the finger bar for various cuttings the drag bar is moved about the axis of the shank 94 in an obvious manner.

A seat 95 is provided for the operator suitably supported by an arm 96 extending upwardly to the rear from the main frame 19 and on either side of this arm foot rests 97 are provided. To the right and front of the seat 95 is a foot pad 98 on the end of the bent rod 99 secured to one arm of a bell-crank lever 100, loosely mounted upon a stud or shaft 101. The other arm of said lever 100 is provided with an eye 102 between which and an adjustable hook 103 on the tongue or pole 26 is interposed a counterbalance spring 104. On the stud or shaft 101 is loosely mounted a drum 105 to which at 106

is secured a chain 107 which passes under a pulley 108 secured in a bifurcated member 109 mounted upon a stay rod 110, provided with an eye 111 through which a pin 89 passes. The opposite end of said stay rod 110 is threaded and passes through a bearing in the arm 112 secured to the drag bar 90. The threaded ends of said rod 110 are provided with nuts on either side of said member by adjusting which the cutter bar may be alined.

The drum 105 is provided on its periphery with a plurality of teeth 113 with which engages a bolt or other fastening device 114 mounted in bearings 115 on a hand lever 116 loosely mounted upon the shaft 101. A spring 117 operates upon said bolt or fastening device to normally cause it to engage with said teeth 113 while a hand grip 118 pivoted at 119 operates through the medium of a connecting rod 120 to withdraw said bolt from engagement with said teeth 113 as desired.

It is obvious that the operator by grasping the handle 116 and pulling it towards him will cause the drum 105 to be moved about its supporting stud or shaft 101 thereby carrying therewith the chain 107 the opposite end of which is secured to the lifting arm 121 secured to the inner shoe 87. This operation of the handle 116 will wrap the chain 107 around the drum 105 and cause the inner shoe 87 with the finger bar 85 to be lifted, and when the shoe 87 has been lifted to its greatest height a further movement of the chain will cause the finger bar to be tilted around the axle of the pins 89 having bearings in the bifurcated end 122 of the drag bar 90. If a sufficient inclination of the finger bar is not secured by the first movement of the handle 116 the operator may push the same forward and secure a second purchase upon the ratchet 113 and by a second movement to the rear a further lift of the cutter bar will be secured. This operation may be repeated as many times as is necessary to lift the finger bar to any desired inclination, even to the point of a practically vertical position as is often desired in moving from one point to the other when the knives are not in operation.

A weighted stop pawl 123 pivoted at 124 prevents any return movement of the drum 105. The drum 105 has a laterally projecting lug 125 with which the bell-crank lever 100 engages when the operator places his foot upon the foot pad 98 to cause the drum 105 to be rotated about its axis to cause a lifting of the shoe 87 and the finger bar 85, the spring 104 assisting in this operation. The opposite side of the drum is provided with a laterally projecting shoulder or lug 125* which is engaged by an arm 126 mounted upon the stud or shaft 101 the outer end of said arm being articulated to a connecting

rod 127 the other end of which is articulated to the end of a lever 128 pivoted at 29* to the front end of the tongue or pole.

The upper end of the lever 128 has secured thereto the whiffletree support 30* carrying the whiffletrees 130* to which, when in operation, the horses are secured. It is obvious that any backing of the horses will pull upon these whiffletrees in such a manner as to move the lever 128 about its pivot and cause the rod 127 to move the arm 126 about its pivot thereby through the medium of the lug or shoulder 125* moving the drum 105 to cause a wrapping thereon of the chain 107 and as a result secure the lifting of the shoe 87 and the finger bar 85. By this construction a lifting of the finger bar is effected by either a hand lever, foot-operated lever, or through mechanism operated by the backing of the horses. The mechanism which causes the lifting of the finger bar by the backing of the horses is provided to lift the shoe 87 and the finger bar 85 a sufficient distance to disengage it from the ground to prevent accident while moving the machine to the rear. The foot lever is arranged so as to lift the finger bar so that it will pass ordinary obstacles but when stumps or other high obstacles are in the path of the finger bar and when it is desired to return to the barn after the mowing has been completed the finger bar may be lifted to an extreme height and even into a vertical position by means of the hand lever 116.

To the rear of the hand lever 116 is another lever 129 pivoted at 130, the lower end of which has connected therewith a rod 131 the opposite end of which is secured to a lug 132 on the drag bar head 122. The lever 129 is provided with a spring-operated locking bolt 133 which engages with detent notches 134 in a quadrant 135. A movement of the lever 129 in either direction about its fulcrum 130 will tilt the drag bar 122 and 90 about the axis of the shank 94 thereof in the bearing 93. The tilting of the drag bar causes a similar tilting of the finger bar 85 to secure a variation in the height of the cutting above the surface of the ground. Somewhat in advance of the inner shoe 87 is a bifurcated lever 136 pivoted to the pole or tongue 26 at 137, this lever being provided with a whiffletree support 138 carrying whiffletrees 138* to which the horses are harnessed. The lower end of the lever 136 is connected by a draft rod 139 to the inner shoe 87 so that the draft is equalized between the tongue 26 and the rod 139.

By this mechanism the inner shoe receives a direct pull thereby permitting of better efficiency and a better operation thereof. In front of the seat 95 the main frame is provided with a tool box 140, said frame being also provided at 141 with a recess for the oil can. The inner shoe is provided with a

supplemental plate 142 secured to the under surface thereof to prevent undue wear. The shoe 87 is also provided with a bent arm or guard 143 to force the material cut out of the way of the operating parts of the machine.

The clutch actuating lever 39 has articulated thereto a rod 144 the opposite end of which is articulated to a lever 145 pivoted at 146 to the frame 19. The opposite end of said lever 145 bears against a cam 147 on the inner face of the drum 105 the lever being held normally in engagement therewith by a spring 148. The cam 147 is so constructed and positioned that as soon as the drum 105 is moved to lift the shoe 87 it will immediately act upon the levers 147 to disconnect the clutch mechanism and thereby prevent further reciprocation of the knives 84.

It is believed that the operation of this invention will be readily understood without further description.

Having thus described my invention, I claim:

1. In a mowing machine, the combination of a revoluble wheel provided with substantially parallel radiating zigzag walls; a device swinging in a vertical plane transverse to the direction of travel in front of said wheel; a strut connected thereto at a point removed from the pivots on which said device swings and engaging one of said walls to operate said swinging device; a knife blade; and a connector between said knife blade and said swinging device.

2. In a mowing machine, the combination of a revoluble wheel provided with substantially parallel radiating zigzag walls; a device adapted to swing in a vertical plane transverse to the direction of travel in front of said wheel; two struts connected thereto at points removed from the pivots on which said device swings, one on each side of said wheel and each engaging with one of said walls to operate said device; a knife blade; and a connector between said knife blade and said device.

3. In a mowing machine, the combination of a revoluble wheel, provided with substantially parallel radiating zigzag walls; a device adapted to swing in a vertical plane transverse to the direction of travel in front of said wheel; two struts each connected thereto at points removed from the pivots on which said device swings, on opposite sides of said wheel and engaging with one of said walls to operate said device; means for limiting the movement of said struts about their fulcrums; a knife blade; and a connector between said knife blade and said device.

4. In a mowing machine, the combination of a revoluble wheel provided with substantially parallel radiating zigzag walls; two links pivoted to the frame of the machine; a member connecting the free ends of said links; two struts each pivotally connected to one

of said links and engaging with one of said walls to operate said member; means for limiting the movement of said struts about their pivotal connections; cutting mechanism; and connections whereby it is operated by the movement of said member.

5. In a mowing machine, the combination of a revoluble wheel provided with substantially parallel radiating zigzag walls; two links pivoted to the frame of the machine; a member connecting the free ends of said links; two struts each pivotally connected to a link and engaging with one of said walls; means for limiting the movement of said struts about their pivotal connections; cutting mechanism; and connections whereby it is operated by the movement of said member.

6. In a mowing machine, the combination of a revoluble wheel provided with substantially parallel radiating zigzag walls; a horizontal member suspended from the frame of the machine and adapted to swing back and forth in a vertical plane transverse to the direction of travel; arms movable therewith and pivoted on axes removed from the pivots on which said member swings and provided with rolls adapted to engage with both of said walls to impart a swinging motion to said member; cutting mechanism; and connections whereby it is operated by the movement of said member.

7. In a mowing machine, the combination of a revoluble wheel provided with substantially parallel radiating zigzag walls; a horizontal member suspended from the frame of the machine and adapted to swing back and forth in a vertical plane transverse to the direction of travel; arms movable therewith and pivoted on axes removed from the pivots on which said member swings and provided with rolls adapted to engage with both of said walls to impart a swinging motion to said member; a knife blade; and a connector between said blade and said member.

8. In a mowing machine, the combination of a revoluble wheel provided with substantially parallel radiating zigzag walls; a horizontal member suspended from the frame of the machine and adapted to swing back and forth in a vertical plane transverse to the direction of travel; arms on pivots removed from the points of suspension, movable with said suspended member and provided with rolls adapted to engage with both of said walls to impart a swinging motion to said member and each acting to retain the roll on the other arm in contact with one of said shoulders; a knife blade; and a connector between said blade and said swinging member.

9. In a mowing machine, the combination of a revoluble wheel provided with substantially parallel radiating zigzag walls; a member suspended from the frame of the

machine and adapted to swing in a vertical plane transverse to the direction of travel in front of said wheel; a strut on a pivot movable with said member and engaging with said walls on said revoluble wheel and adapted to swing said member; means for limiting the movement of said strut about its pivot; a finger bar; a reciprocating knife blade therefor; a connector between said knife blade and said swinging member; and means for lifting said finger bar.

10. In a mowing machine, the combination of a revoluble wheel provided with substantially parallel radiating zigzag walls; a member suspended from the frame of the machine and adapted to swing in a vertical plane transverse to the direction of travel; struts movable therewith and mounted on pivots removed from the pivots on which said member swings and engaging both of said walls to swing said member; a finger bar; a reciprocating knife blade therefor; a lever pivoted to the frame of the machine operated by said swinging member; and a connector between said lever and said knife blade.

11. In a mowing machine, the combination of a revoluble wheel provided with a zigzag rim; a horizontal member swinging in a vertical plane transverse to the direction of travel in front of said wheel; a strut movable therewith and mounted on a pivot removed from the pivots on which said member swings and engaging said rim to operate said swinging member; a knife blade; and a connector between said knife blade and said swinging member.

12. In a mowing machine, the combination of a revoluble wheel provided with a zigzag rim; a member movable in a vertical plane transverse to the direction of travel in front of said wheel; two struts movable therewith and mounted on pivots removed from the pivots on which said member swings and engaging opposite sides of said rim to operate said member; a knife blade; and a connector between said knife blade and said member.

13. In a mowing machine, the combination of a revoluble wheel provided with a zigzag rim; a member movable in a vertical plane transverse to the direction of travel in front of said wheel; two struts movable therewith and mounted on pivots removed from the pivots about which said member swings and engaging opposite sides of said rim to operate said member; means for limiting the movement of said struts about their fulcrums; a knife blade; and a connector between said knife blade and said member.

14. In a mowing machine, the combination of a revoluble wheel provided with a zigzag rim; two links pivoted to the frame of the machine; a member connecting the free ends of said links; two struts on pivots movable

with said member engaging opposite sides of said rim to operate said member; means for limiting the movement of said struts about their pivots; cutting mechanism; and connections whereby it is operated by the movement of said member.

15. In a mowing machine, the combination of a revoluble wheel provided with a zigzag rim; two links pivoted to the frame of the machine; a member connecting the free ends of said links; two struts each pivoted to a link and engaging opposite sides of said rim on said revoluble wheel and adapted to swing said member; means for limiting the movement of said struts about their pivots; cutting mechanism; and connections whereby it is operated by the movement of said member.

16. In a mowing machine, the combination of a revoluble wheel provided with a zigzag rim; a horizontal member suspended from the frame of the machine and adapted to swing back and forth in a vertical plane transverse to the direction of travel; arms movable with said member and mounted on pivots removed from the pivots on which said member swings and provided with rolls adapted to engage with both sides of said rim to impart a swinging motion to said member; cutting mechanism; and connections whereby it is operated by the movement of said member.

17. In a mowing machine, the combination of a revoluble wheel provided with a zigzag rim; a horizontal member suspended from the frame of the machine and adapted to swing back and forth in a vertical plane transverse to the direction of travel; arms on pivots which are removed from the points of suspension and are movable with said member; said arms being provided with rolls adapted to engage with both sides of said rim to impart a swinging motion to said member; a knife blade; and a connector between said blade and said swinging member.

18. In a mowing machine, the combination of a revoluble wheel provided with a zigzag rim; a horizontal member suspended from the frame of the machine and adapted to swing back and forth in a vertical plane transverse to the direction of travel; arms on pivots which are removed from the points of suspension and are movable with said member, said arms being provided with rolls adapted to engage with both sides of said rim to impart a swinging motion to said member; means for limiting the movement of said arms about their pivots; a knife blade; and a connector between said blade and said swinging member.

19. In a mowing machine, the combination with a finger bar; of a lifting drum therefor and connections between said bar and drum, said drum being provided with a shoulder; a lever provided with a portion en-

gaging with said shoulder; a whiffle-tree; and a connector between said lever and said whiffle-tree.

20. In a mowing machine, the combination with a cutter bar; of a lifting mechanism therefor; a foot lever; a hand lever; a shaft; whiffletrees at the front of said shaft in advance of the draft animals; a lever connected to said whiffletrees operable by the backing of said draft animals; and mechanism interposed between each of said levers and said lifting mechanism whereby the latter may be operated by either lever.

21. In a mowing machine, the combination of a revoluble wheel provided with a zigzag rim; a member adapted to swing in a vertical plane transverse to the direction of travel; members interposed between said swinging member and rim mounted on pivots movable with said swinging member but removed from the pivots about which it swings; a lever pivoted to the frame of the machine and operated by said swinging member; a knife bar; and a pitman connecting said knife bar and lever.

22. In a mowing machine, the combination of a revoluble wheel provided with a zigzag rim; a member adapted to swing in a vertical plane transverse to the direction of travel; members interposed between said swinging member and rim and mounted on pivots movable with said swinging member and removed from the pivots about which said member swings; a lever pivoted to the frame of the machine and operated by said swinging member; a trunnioned sleeve on the outer end thereof; a knife bar; and a pitman connecting said knife bar and trunnioned sleeve.

23. In a mowing machine, the combination of a revoluble wheel provided with a zigzag rim; a member adapted to swing in a vertical plane transverse to the direction of travel; members interposed between said swinging member and rim and mounted on pivots movable with said swinging member and removed from the pivots about which said member swings; a lever pivoted to the frame of the machine and operated by said swinging member; a trunnioned sleeve on the outer end thereof; a knife bar; and a pitman connected at one end to said knife bar and adapted at the other end to engage with the trunnions of said sleeve.

24. In a mowing machine, the combination of a revoluble wheel provided with substantially parallel radiating zigzag walls; a member suspended from the frame of the machine and adapted to swing back and forth; arms on pivots movable with said swinging member and provided with rolls adapted to engage with said walls to impart a swinging motion to said swinging member; hooks on said member; members secured to said hooks; an actuator pivoted to both of said members;

cutting mechanism; and connections whereby it is operated by said actuator.

25. In a mowing machine, the combination of a revoluble wheel provided with substantially parallel radiating zigzag walls; a member suspended from the frame of the machine and adapted to swing back and forth; arms on pivots movable with said member and removed from the pivots on which said member swings provided with rolls adapted to engage with said walls to impart a swinging motion to said member; a knife blade; an actuator for said blade; and members pivoted to said actuator and connected to said swinging member.

26. In a mowing machine, the combination with a finger bar; of a revoluble lifting drum therefor; a ratchet thereon; a lever; a spring-operated bolt carried thereby and engaging said ratchet; a lug on the drum; an arm en-

gaging therewith; a whiffletree; and a rod connecting said arm and the whiffletree whereby an operation of said drum is caused by the backing of the horses.

27. In a mowing machine, the combination with a finger bar; of a revoluble lifting drum therefor; a ratchet thereon; a hand lever; a spring-operated bolt carried thereby and engaging said ratchet; a lug on the drum; an arm engaging therewith; a lever pivoted to the tongue of the machine; a rod between one end of said lever and said arm; and whiffletrees connected to the other end of said tongue lever.

Signed by me at Clinton this 9th day of 35
January 1905.

MARTIN JEWELL.

Witnesses:

RICHARD F. ELDRIDGE,
CORA A. DODGE.