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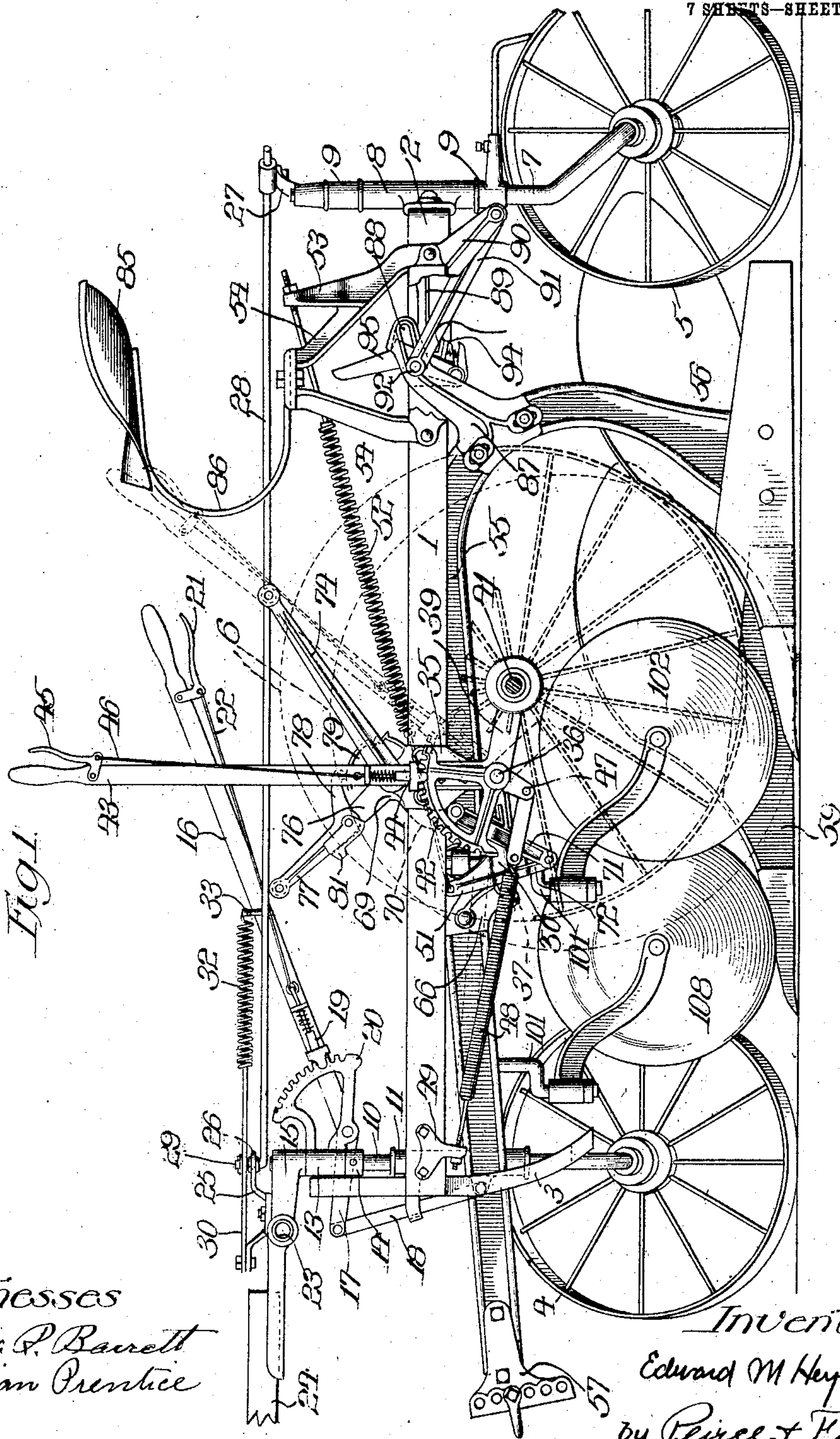
PATENTED APR. 3, 1906.

E. M. HEYLMAN.

PLOW.

APPLICATION FILED JAN. 20, 1906.

7 SHEETS—SHEET 1.



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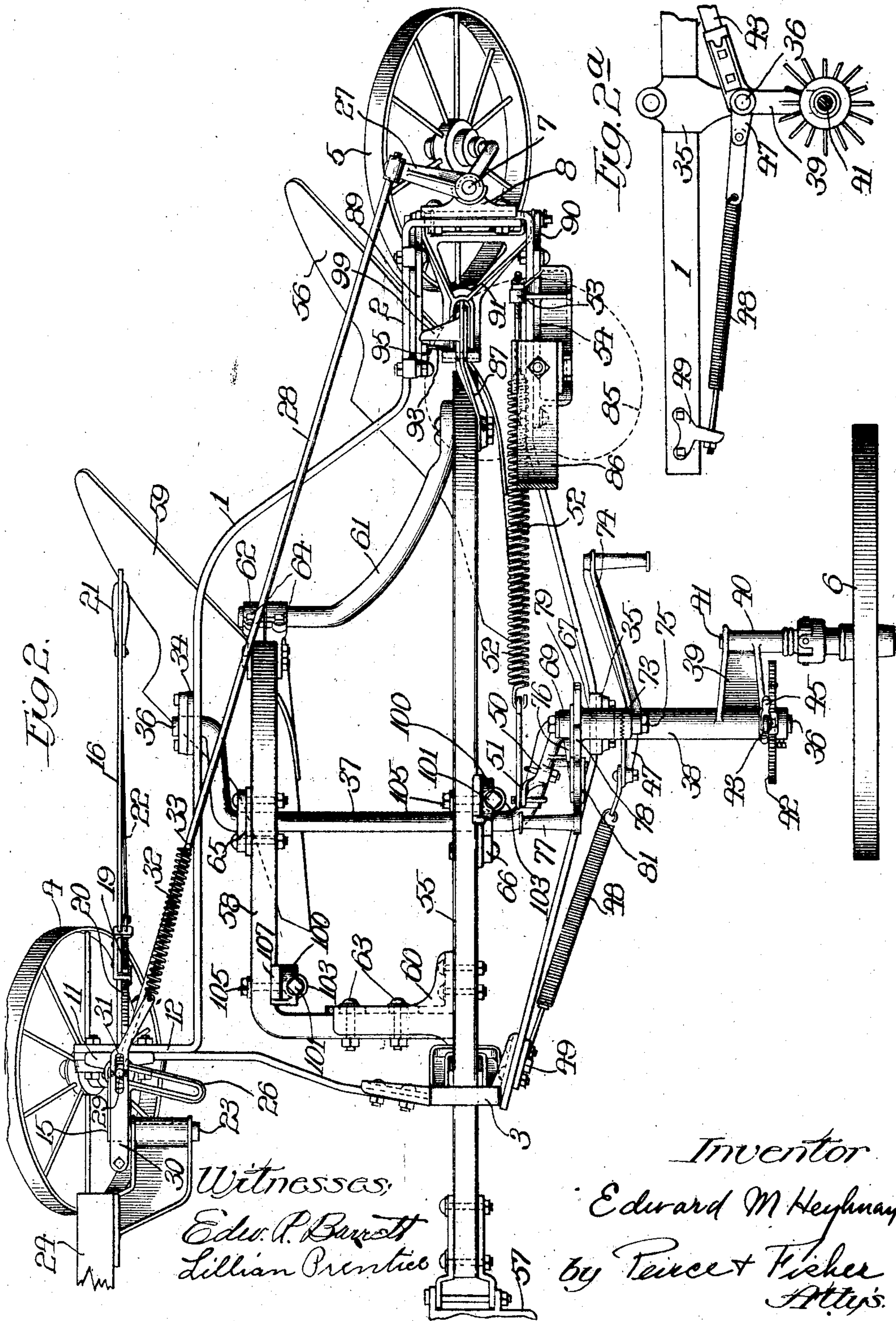
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7 SHEETS—SHEET 2.



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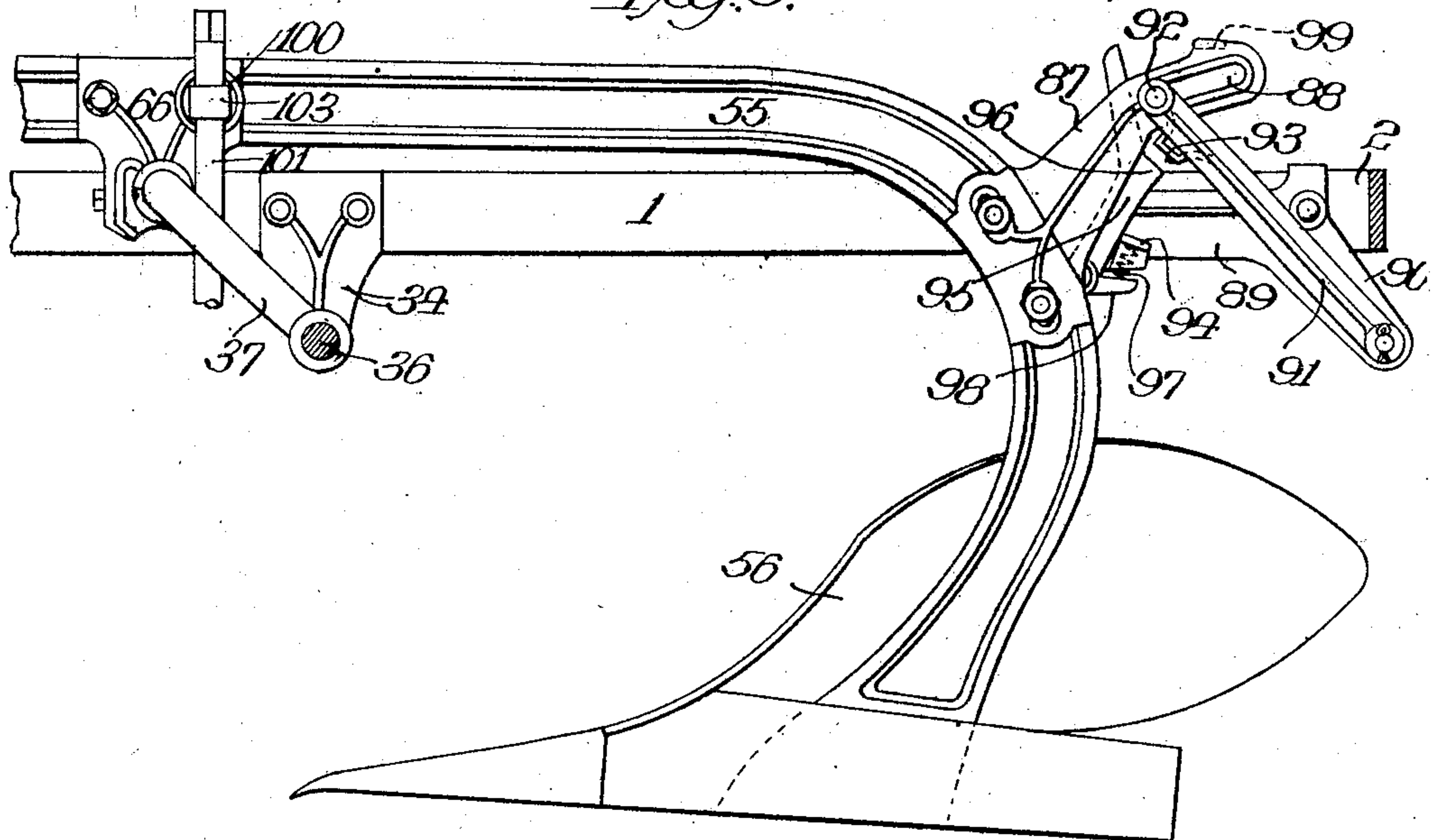
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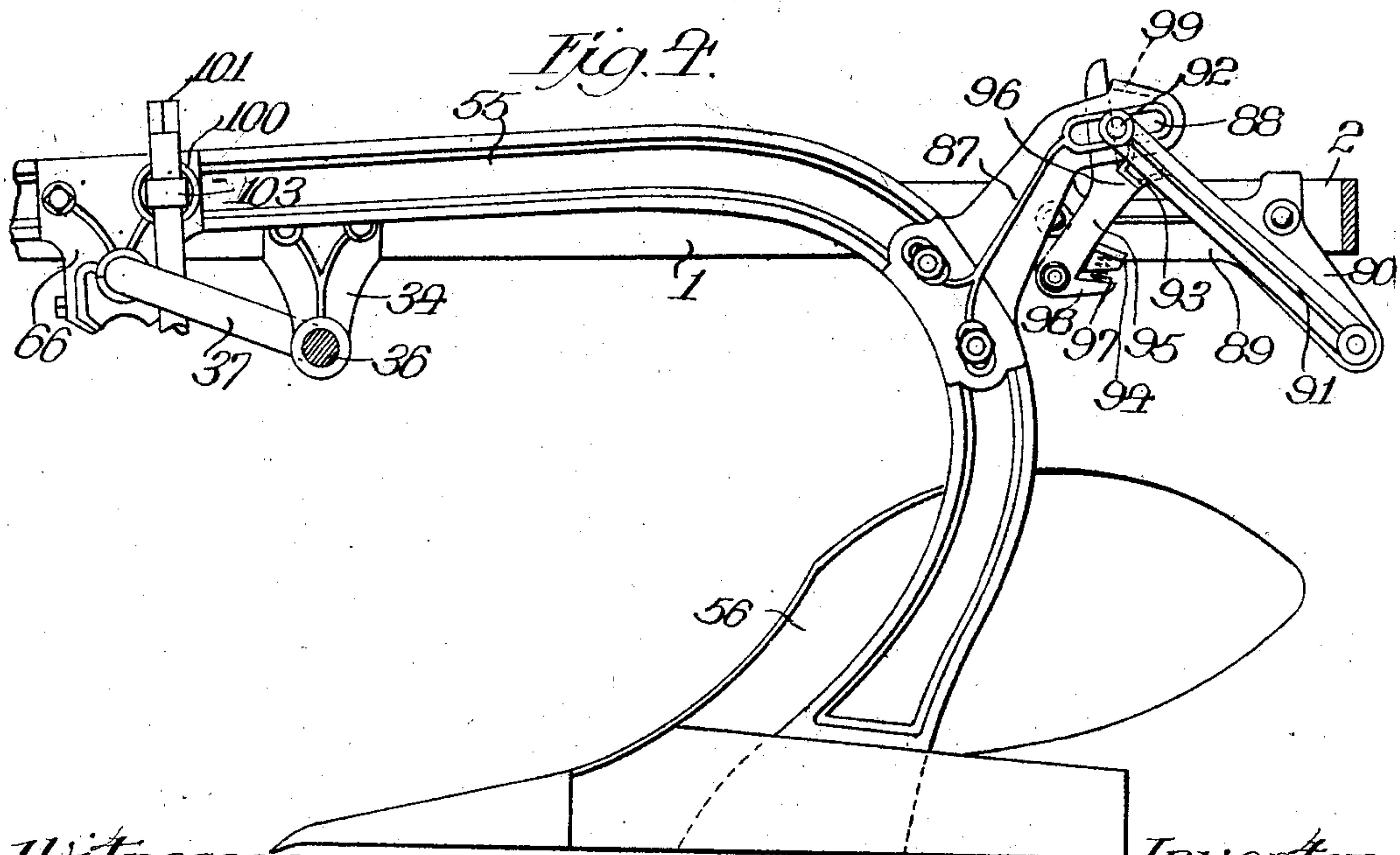
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*Fig. 3.*

7 SHEETS—SHEET 3.



*Fig. 4.*



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7 SHEETS—SHEET 4.

Fig. 5

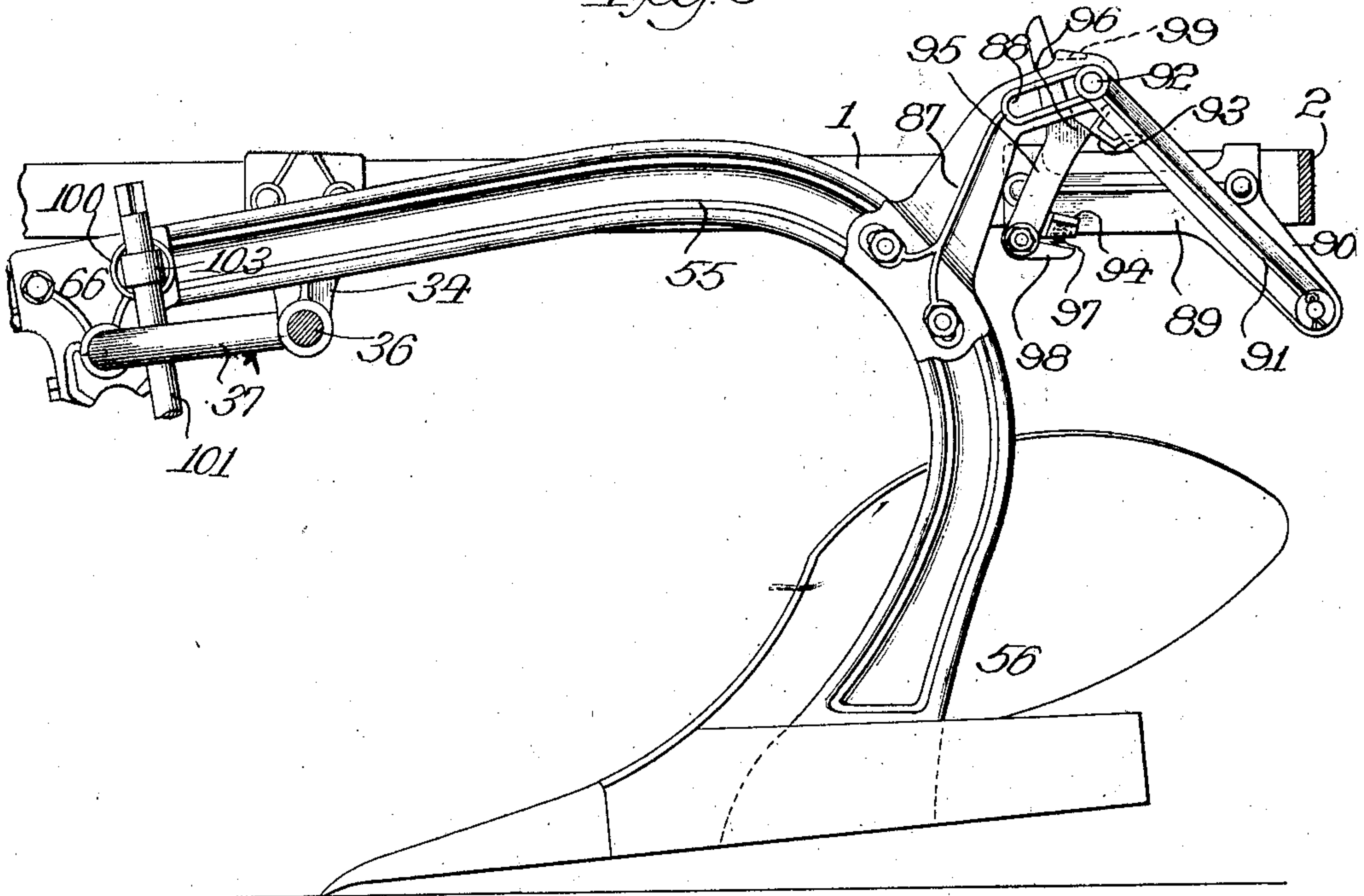
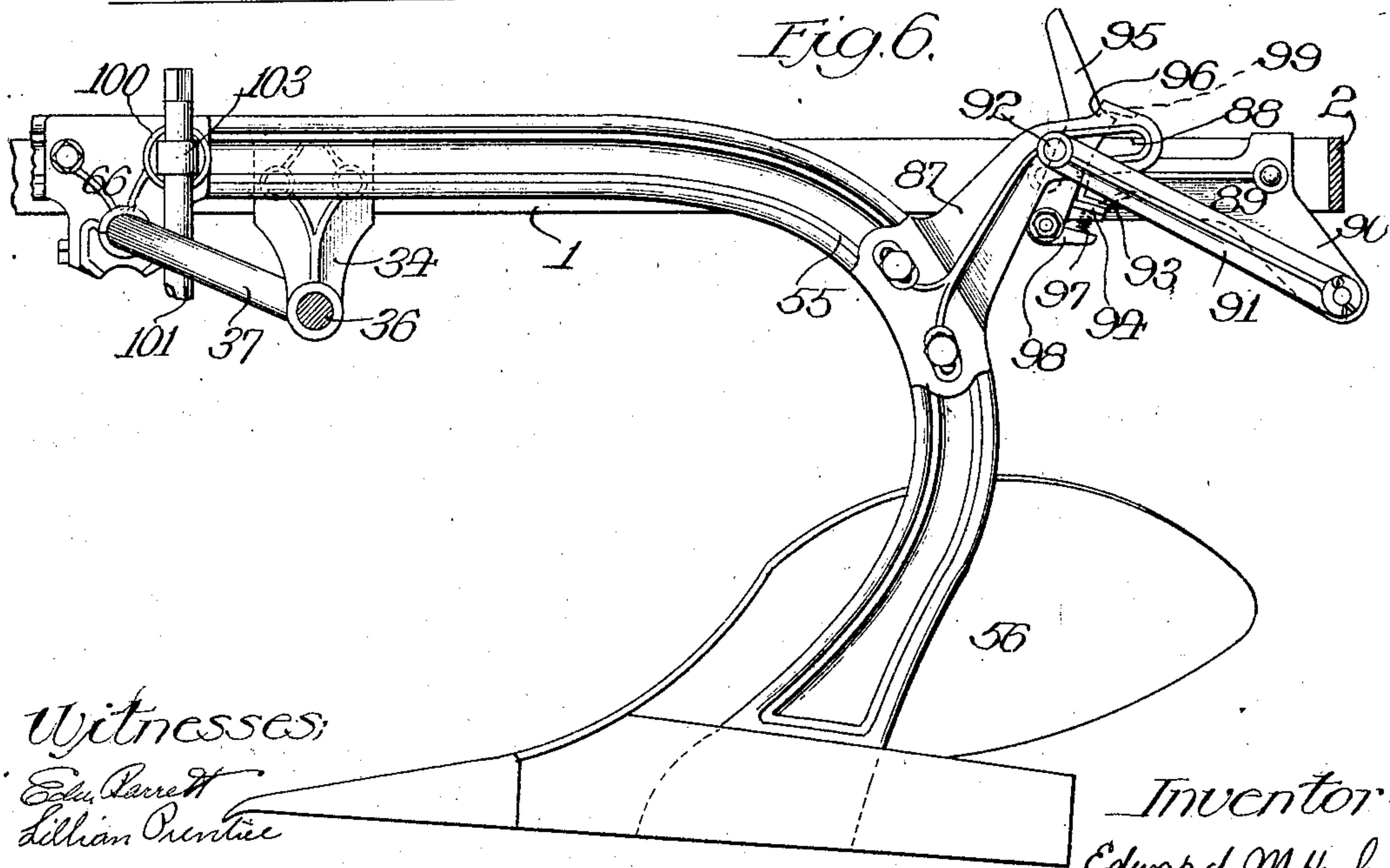


Fig. 6



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Fig. 7

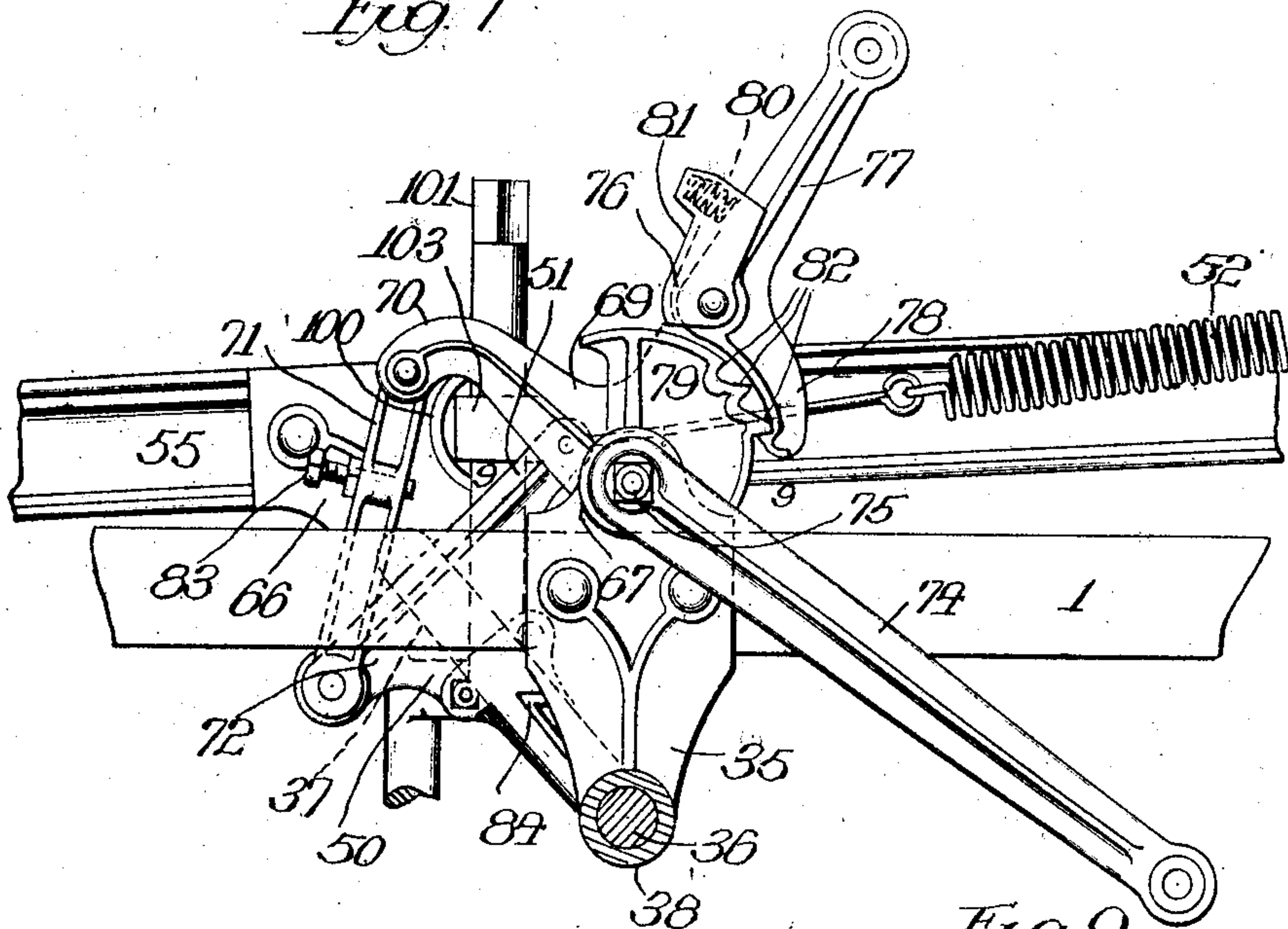


Fig. 9.

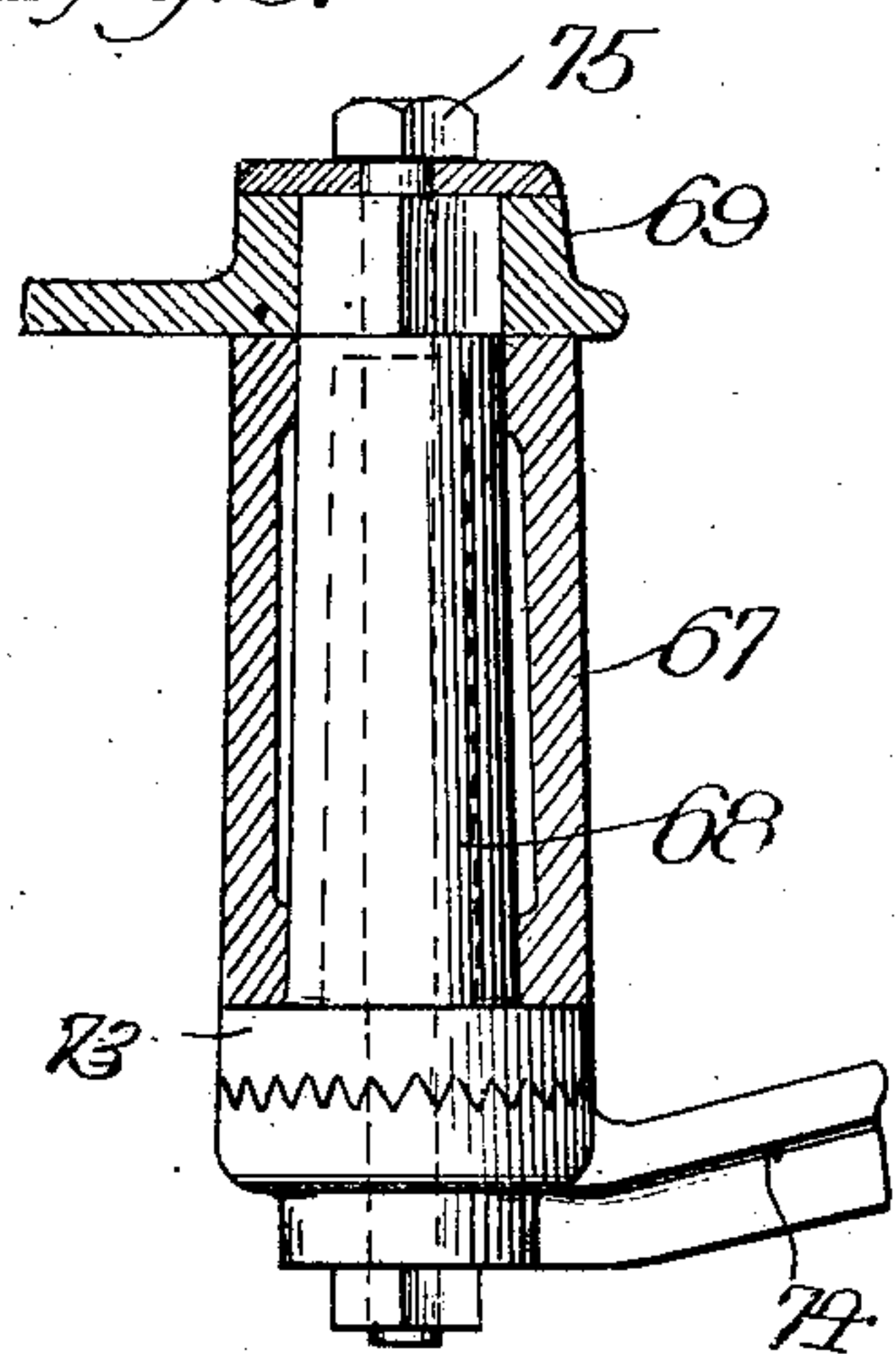
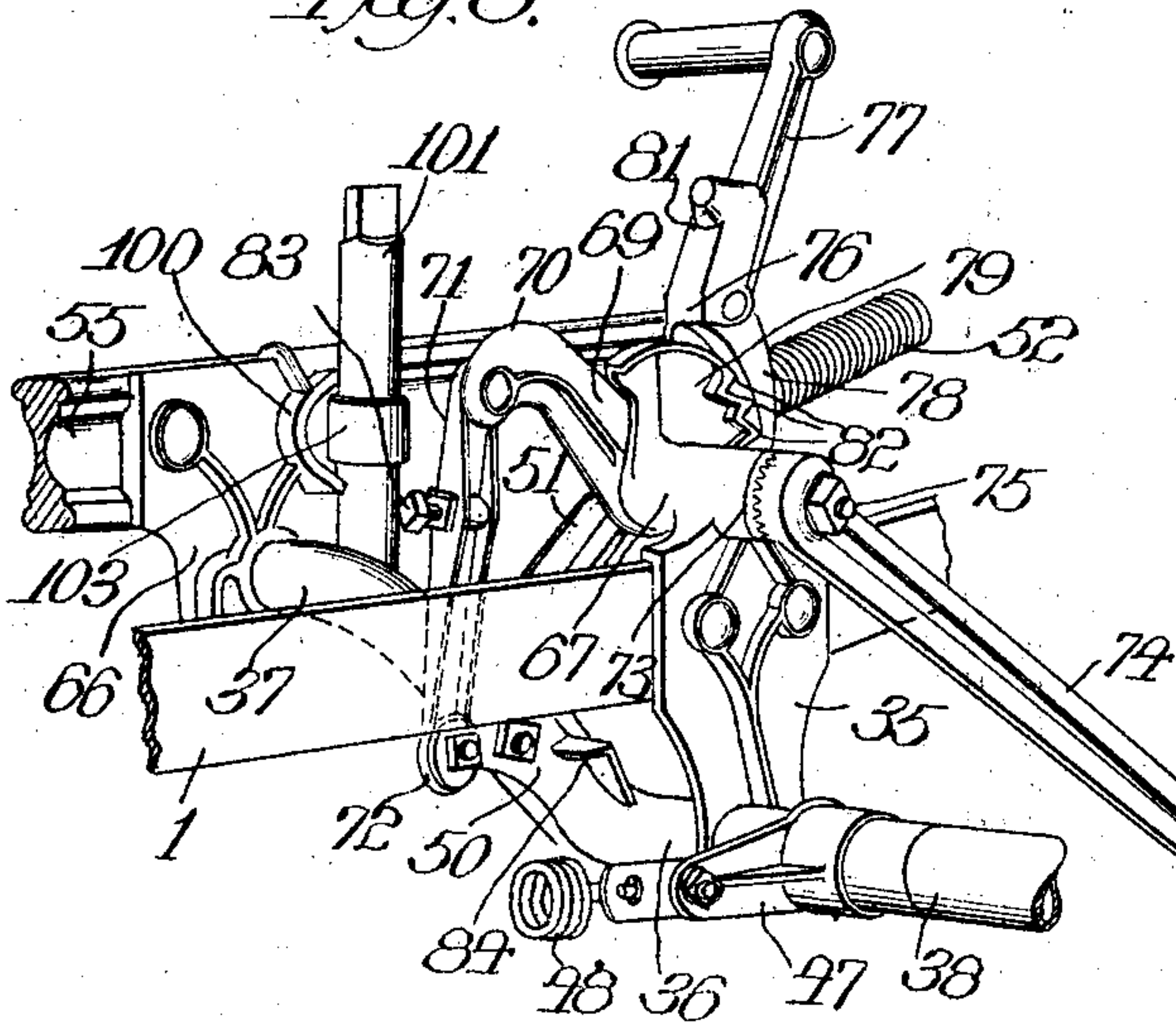


Fig. 8.



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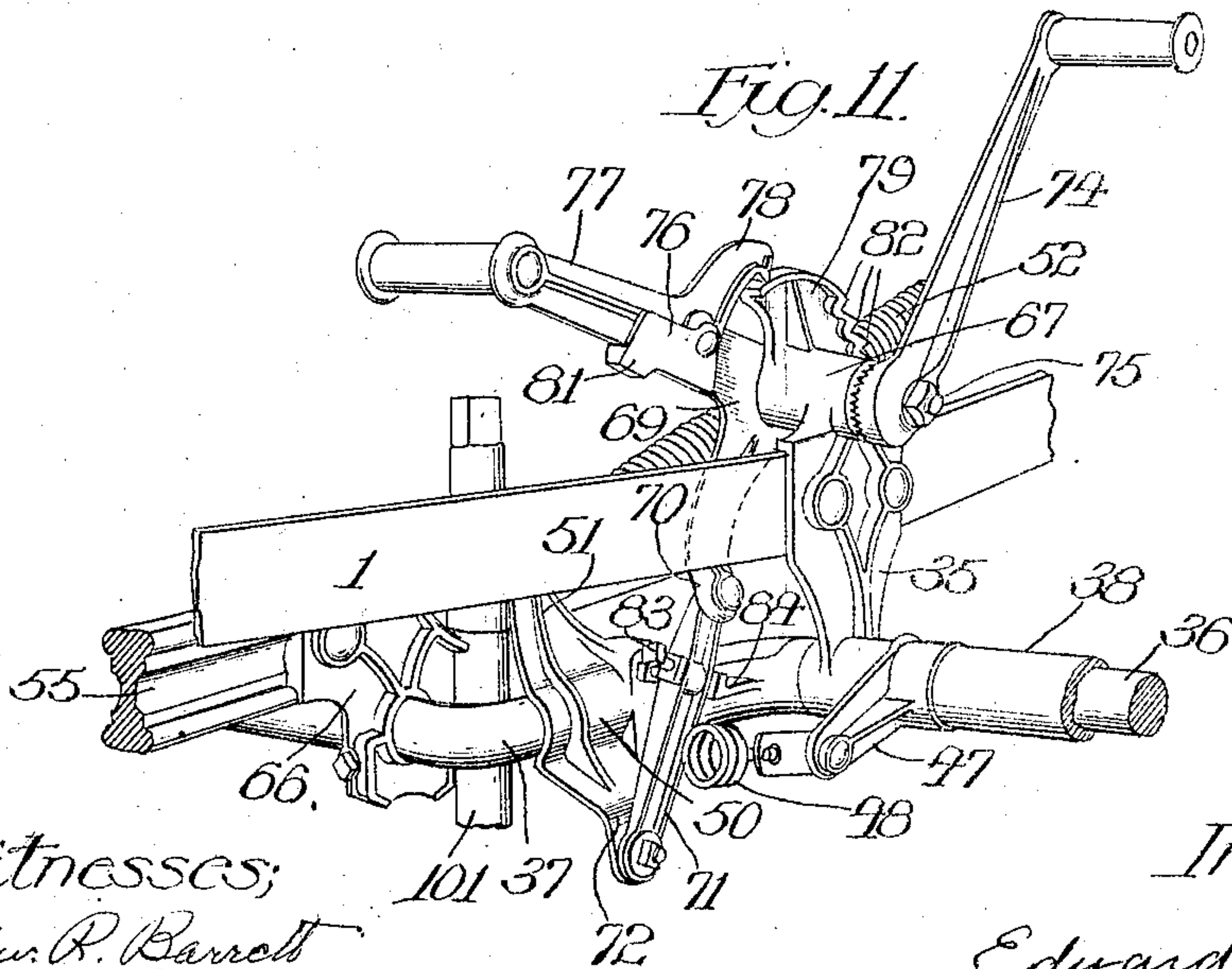
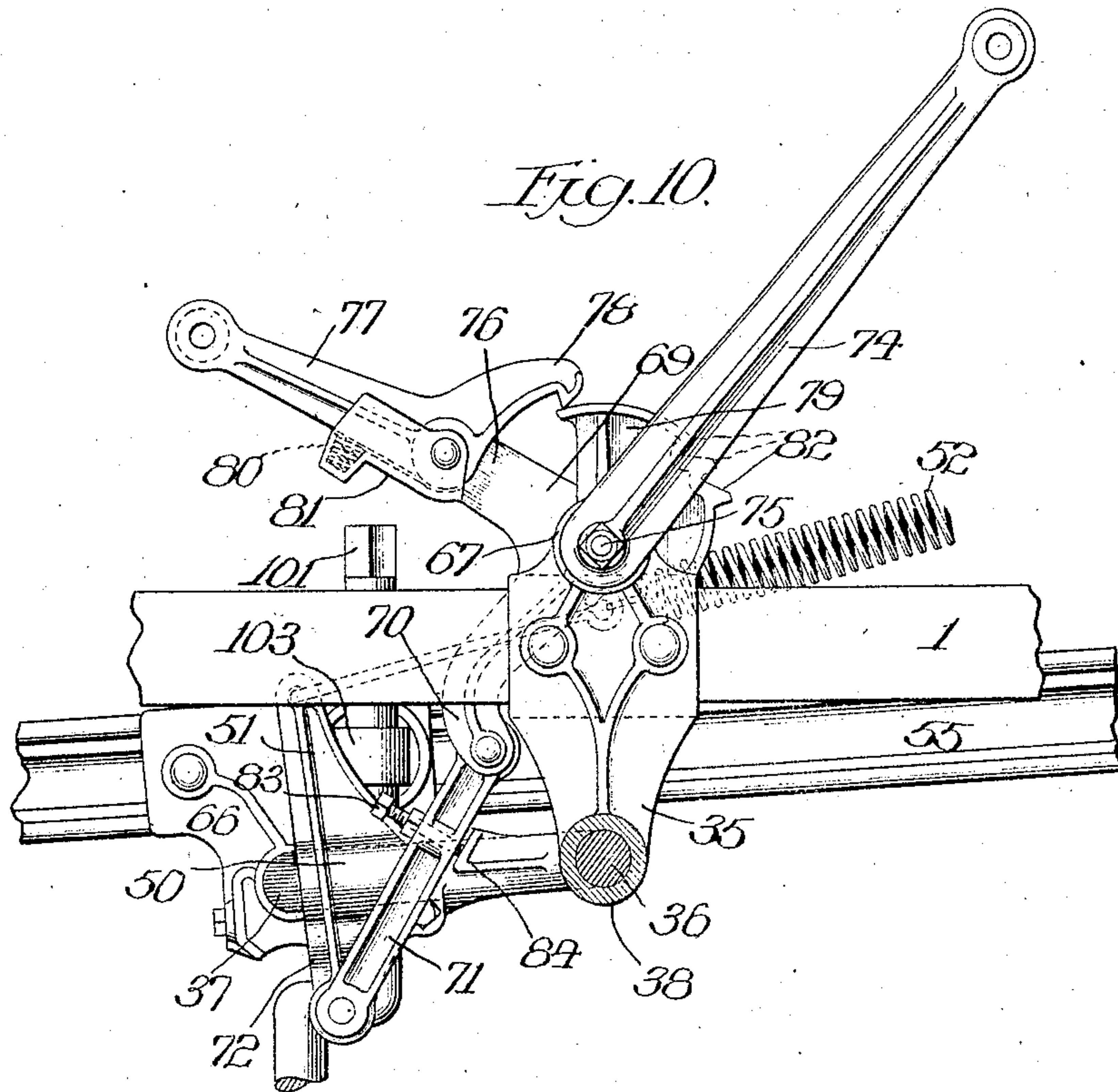
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7 SHEETS—SHEET 6.



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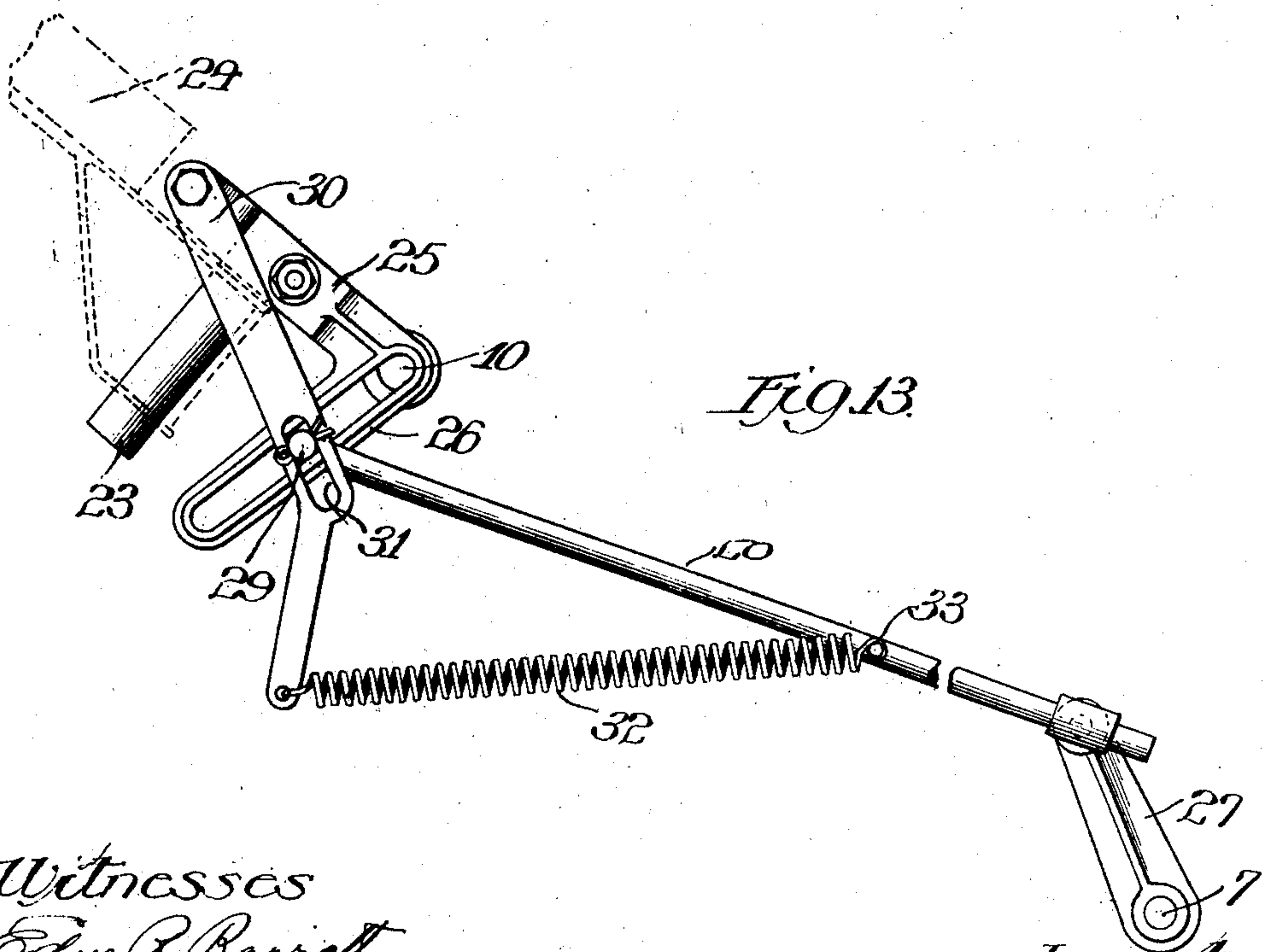
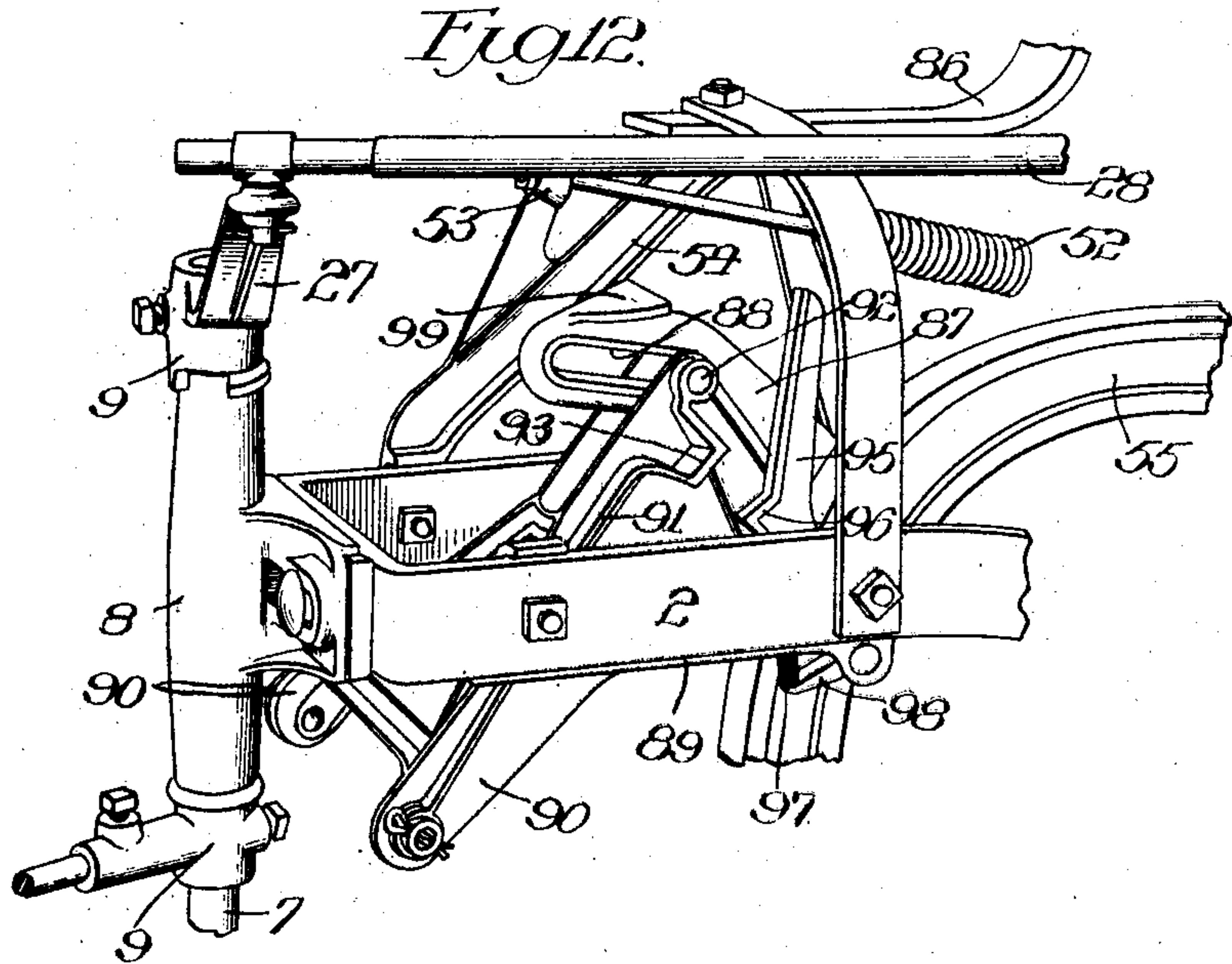
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APPLICATION FILED JAN. 20, 1905.

7 SHEETS—SHEET 7.



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## UNITED STATES PATENT OFFICE.

EDWARD M. HEYLMAN, OF JANESVILLE, WISCONSIN, ASSIGNOR TO THE  
JANESVILLE MACHINE COMPANY, OF JANESVILLE, WISCONSIN, A COR-  
PORATION.

## PLOW.

No. 817,114.

Specification of Letters Patent.

Patented April 3, 1906.

Application filed January 20, 1905. Serial No. 241,923.

*To all whom it may concern:*

Be it known that I, EDWARD M. HEYLMAN, a citizen of the United States, and a resident of Janesville, county of Rock, and State of Wisconsin, have invented certain new and useful Improvements in Plows, of which the following is declared to be a full, clear, and exact description.

The invention relates to improvements in riding-plows and seeks to provide a plow which may be raised and lowered to and from working position by the rider's feet, so that the rider's hands are left free to guide the team.

With a plow which is arranged to be raised and lowered to and from working position by the rider's feet it is desirable that all parts of the plow should be accurately balanced and that the plow should enter and leave the ground point first, so as to be drawn into and out of the ground by the draft of the team.

Further objects of the invention are to provide suitable means by which the plow is caused to enter and leave the ground point first and to provide suitable balancing lift-springs, so that the rider may raise and lower the plow with little effort.

While features of the invention are applicable to other types of plow, the invention more particularly relates to that type in which the plow is hung on a cranked or bail shaft, to which shaft the arm of the land-side wheel is adjustably connected, so that the plow and land-side wheel shift together to and from working position, and the plow is thus automatically leveled as it is raised and lowered.

With these and other objects in view, as will presently appear, the invention consists in the features of construction, combinations, and arrangements of parts hereinafter set forth, illustrated in the accompanying drawings, and more particularly pointed out in the appended claims.

In the drawings, Figure 1 is a side elevation of the improved plow. Fig. 2 is a plan view thereof. Fig. 2<sup>a</sup> is a detail of parts shown in Figs. 1 and 2. Figs. 3, 4, 5, and 6 are detail sections showing the different positions assumed by the plow as it is raised and lowered. Fig. 7 is an elevation of the foot-operated mechanism for raising and lowering the plow shown in its uppermost position. Fig. 8 is a perspective view of the

same. Fig. 9 is a detail section of parts shown in Fig. 7. Figs. 10 and 11 are views similar to Figs. 7 and 8, showing the foot-controlled mechanism for raising and lowering the plow in its lowermost position. Fig. 12 is a perspective view of the rear end of the plow-frame, showing means for controlling the movement of the plow so that it enters the ground point first. Fig. 13 is a plan view of the means for controlling the furrow-wheels.

The frame 1 of the plow is formed of wrought iron or steel bar set on edge and is of irregular outline, as shown in Fig. 2. The rear end of the frame is contracted and provided with a U-shaped extension 2. An arc-shaped slotted yoke 3 is bolted to the front end of the frame in vertical position and is of usual form to permit the vertical play of the plow-beam. The frame is carried upon the front and rear furrow or caster wheels 4 and 5 and on the land-wheel 6.

The rear furrow-wheel 5 is mounted upon the lower bent end of the upright axle or standard 7, which is journaled in a sleeve 8, bolted to the rear end of the U-shaped frame extension 2. Standard 7 is held against longitudinal movement through the sleeve 8 by collars 9, secured to the standard and abutting against the ends of the sleeve.

The front furrow-wheel 4 is mounted upon the lower bent end of the upright axle or standard 10, which is journaled in a sleeve 11, bolted to a laterally-projecting extension 12 at the front of the frame. (See Figs. 1 and 2.) The standard 10 is also arranged to turn through the bracket 13, which is mounted upon its upper end, but is held against longitudinal movement thereon by a collar 14 and a bracket 15, which is secured to the standard below and above the bracket 13. The lever 16, pivoted to the bracket 13, carries a forwardly-extending arm 17, which is connected by a link 18 to the sleeve 11. By adjusting the lever 16 the front end of the frame may be raised and lowered upon the furrow-wheel standard 10. A spring-held dog 19 on the lever is arranged to engage a notched segment 20 on the bracket 13 and hold the lever 16 in adjusted position. A trip 21, pivoted to the end of the lever, is connected to the dog by a rod 22.

The bracket 15, fixed upon the upper end of the front furrow-wheel standard 10, car-



ries a short stud-shaft 23, extending laterally toward the land side of the plow and to which shaft the team-pole 24 is pivoted. A bracket 25, secured to the bracket 15 in front of the standard 10, carries a slotted arm 26, which extends toward the land side of the plow and is so arranged that the outer end of the slot is in vertical alinement with the standard 10. An arm 27, fixed to the upper end of the standard 7 of the rear furrow-wheel, projects laterally away from the land side of the plow, and a rod 28 is pivoted at its rear end to the arm 27. The forward upturned end 29 of the rod extends within the slot of the arm 26. An arm 30, pivoted at its forward end to the forward end of the bracket 25, is provided with a slot 31, which engages the upturned end 29 of the rod 28. The rear end of the arm 30 is bent inwardly, as shown, and is connected to the forward end of a spring 32. Spring 32 extends rearwardly from the arm 30 and is connected to a pin 33 on the rod 28. The arm 30 and spring 32 are so disposed that they tend to hold the end 29 of the rod 28 in line with the vertical standard 10 of the front caster-wheel, so that in the operation of the plow the side sway of the team is not imparted through the tongue to the rear caster-wheel. Moreover, as long as the tongue extends forwardly the slotted arm 26 is held substantially at right angles to the rod 28, and the forward thrust upon the rod, due to the pressure toward the land, cannot move the forward end of the rod in the slot of arm 26, and this forward thrust is not imparted to the tongue. When, however, the plow is turned toward the right, slotted arm 26 is swung forwardly (see Fig. 13) and into such a position as to permit the shift of the forward end of the rod 28 in the slot to permit the rear caster-wheel to swing forwardly. This shift of the rod stretches the spring 32, so that as soon as the parts assume their normal position the upturned end 29 of the rod 28 will be shifted back by the arm 30 and spring 32 into line with the standard 10. In turning in the opposite direction arm 26 is swung rearwardly, and the backward pull on rod 28 shifts the upturned end 29 in the slot of arm 26 and stretches the spring 32, so that as soon as the team and pole are brought into line straight ahead the pull of the spring on arm 30 will shift the end of the rod 28 back to its normal position in line with the vertical standard 10.

To the sides of frame 1 are secured the downwardly-extending brackets 34 and 35, within which the main crank or bail shaft 36 is journaled. Between the sides of the frame shaft 36 is offset or bent laterally to form a bail 37, to which the plow beam or beams are connected. At the land side of the plow shaft 36 extends beyond the frame, and a sleeve 38 is rotatably mounted upon this extended portion of the shaft. An arm 39 on

the outer end of sleeve 38 carries an offset sleeve 40, within which the shaft 41 of the land-wheel is mounted.

A notched segment 42 is fixed to the end of the shaft 36, and a lever 43, fixed to the end of the sleeve 38, carries a spring-pressed dog 44, arranged to engage the notches of segment 42 and adjustably connect the land-wheel sleeve and the bail-shaft. A trip 45, pivoted to the end of the lever 43, is connected to the dog 44 by rod 46. An arm 47, fixed to the inner end of land-wheel sleeve 38, projects forwardly therefrom and is connected to the rear end of a spring 48. The forward end of the spring 48 is connected to a bracket 49 at the front part of the frame.

Arms 39 and 47 and spring 48 are so disposed that when the axle 41 of the land-wheel is directly below sleeve 38 the arm 47 and the spring will be in line, (see Fig. 2<sup>a</sup>), so that if the land-wheel is shifted either forward or back to lower the plow-frame spring 48 will be placed under tension and will tend to swing the land-wheel back beneath the sleeve 38, and thus lift the frame and plow. It should be noted that the land-wheel is normally locked to the bail-shaft 36 and shifts therewith as the plow is raised and lowered; but the land-wheel can also be shifted independently by the lever 43 when dog 44 is released. In either case, however, the land-wheel is always balanced by the lift-spring 48 whatever the position of the arm 39 with reference to the bail 37 may be.

To the land-side arm of the crank 37 is fixed a casting 50, having an upwardly-projecting arm 51, to which is connected the forward end of the main lift-spring 52. The rear end of the main lift-spring 52 is connected to a lug 53 on a bracket 54, which is secured to the landside of the frame and at the rear portion thereof.

Lift-spring 52 is arranged to balance the weight of the plow or plows carried by the bail 37, while the supplemental lift-spring 48, as described, balances the land-side wheel.

In plow constructions of this type, in which the land-side wheel is connected to shift with the bail as the plow is lowered and raised to and from working position, the force necessary to lift the plow varies with the adjustment of the land-side wheel—that is to say, if the land-side wheel is in front of the shaft 36 the weight of the plow on bail 37 tends to swing it rearwardly and lift the frame at this point. If, on the other hand, the land-wheel is in the rear of the shaft 36, the weight of the plow tends to depress the frame at this point, so that the power necessary to lift the plow out of the ground varies considerably to the relative adjustment between the sleeve 38 of the land-side wheel and the shaft 36. This variable force cannot be compensated for by a single lift-spring. In accordance with the present invention, however, the main lift-



spring 52, connected to the bail 37, will always balance the weight of the plow, and the supplemental lift-spring 48, connected to the land-wheel sleeve 38, will always balance the pressure on the land-side wheel whatever the relative adjustment between the land-wheel and the bail. It should be further noted that inasmuch as the land-side wheel is ordinarily locked to the bail-shaft that carries the plow the plow bail-shaft and land-side wheel shift together to and from working position, so that the plow is automatically leveled in the ground. The force necessary to shift the plow varies with the adjustment of the land-side wheel. By employing the supplemental lift-spring, the tension of which varies with the adjustment of the land-side wheel, this compensates for the different force required to lift the plow, and the supplemental lift-spring thus not only balances the pressure on the land-side wheel, but also coöperates and assists in turning the bail-shaft to lift the plow where its use has been found that the main lift-spring can be weaker than is ordinarily employed. It is of particular importance with a foot mechanism for raising and lowering the plow that all parts should be accurately balanced and capable of being shifted with little effort, since it is not possible to employ long powerful levers, as with the ordinary hand mechanism. It should be further noted that the plow and land-side wheel are, in a way, balanced between the main lift-spring 52 and supplemental lift-spring 48—that is to say, as the bail swings forwardly and downwardly to lower the plow into the ground the tension of the main lift-spring 52 is increased, but its leverage is necessarily diminished. The leverage of the supplemental spring 48 is, however, increased, since the arm 47, to which it is attached, swings from the position shown in Fig. 2<sup>a</sup> when the plow is raised to the position shown in Fig. 1 when the plow is lowered. Greater power must be exerted to start the plow from its lowermost position than at any other time, and in this position both the tension and leverage of the supplemental lift-spring are greatest, so that the supplemental lift-spring compensates for the diminished leverage of the main lift-spring. If the main lift-spring were used alone, it would have to be very heavy to start the plow from the ground, and it would be difficult to push the plow into the ground against the tension of such a heavy spring. By employing the supplemental lift-spring, the tension and leverage of which is greatest when the plow is lowered and which tension and leverage rapidly diminishes as the plow is raised, a light main lift-spring may be employed, and in consequence the plow may be very easily forced into the ground.

In the drawings a gang-plow is shown having two plow-beams; but it is obvious that a

single plow could be employed, if desired. The main plow-beam 55 carries the plow 56 and extends forwardly through the yoke 3 and carries a suitable clevis 57 at its forward end. The supplemental plow-beam 58 carries the plow 59, and its forward end is bent laterally and connected to a bracket 60, bolted to the plow-beam 55. A brace 61 is bolted to the rear end of the plow-beam 55 and extends laterally through a bracket 62, bolted to the plow-beam 58. Bolt 63, connecting the forward end of the plow-beam 58 with the bracket 60, extends through slots in the bracket, so that the distance between the plow-beams 55 and 58 may be adjusted. By loosening the bolts 64, which clamp the bracket 62 to the end of the rod 61, the distance between the rear ends of the plow-beams may be adjusted. By means of these adjustments the plows may be set for furrows of different widths.

The plow-beams are pivotally connected to the bail by means of the brackets 65 and 66, securely bolted to the beams, extending downwardly therefrom, and journaled on the bail.

Bracket 35 on the land side of the frame is provided with an upwardly-extending portion 67, within which is mounted a short hollow shaft 68. (See Fig. 9.) The inner end of the hollow shaft 68 is square and carries a bell-crank 69. The lower arm 70 of the bell-crank is connected by a link 71 with the forwardly and downwardly extending lug 72 on the bracket 50. Bracket 50, as above described, is fixed to the land-side arm of the bail 37. The outer end of the hollow shaft 68 is provided with a head 73, having a series of radial notches and engaging a correspondingly-notched head on the end of a foot-lever 74. A bolt 75 extends through the hollow shaft 68 and securely clamps foot-lever 74 and bell-crank 69 thereto.

To the upper arm 76 of the bell-crank 69 is pivoted a foot-lever 77, which carries a locking pawl or dog 78, arranged to engage a segment 79, formed upon the upper end of the bracket 67. In the raised position of the plow a spring 80, interposed between the foot-lever 77 and a lug 81 on the arm 76, holds the dog 78 into engagement with one of the teeth 82 on the segment 79, so that the plow is locked in raised position, as shown in Figs. 7 and 8. By pressing upon the foot-lever 77 it is first shifted into engagement with the lug 81 on the arm 76 to release the dog 78. The continued pressure upon the foot-lever 77 shifts the lever and the arm 78 of the bell-crank 69 together, so that the plow-bail and plows carried thereby are swung forwardly and downwardly into the ground through the medium of the connecting-link 71 and into the position shown in Figs. 10 and 11.

It should be noted that the arm 78 and the



part 77 are, in effect, a single-jointed foot-lever for depressing the plow into the ground, the outer section of which is provided with a locking-pawl and is movable upon the inner section to release the pawl.

A stop-bolt 83 is threaded through the link 71 and when the plow is in lowermost position engages a lug 84 upon the bracket 50 to arrest the downward movement of the shift mechanism. In this lowermost position arm 70 and link 71 are approximately in line, and when bolt 84 is so adjusted that the link and arm are not arrested until they have passed the line of centers a dead-center lock will be formed to hold the plow in the ground. If the bolt 83 is screwed in so as to engage the stop 84 before the arm 70 and link 71 reach the dead-center position, the plow will not be locked in the ground, but will be free to raise when it meets a stone or other obstruction.

The rider's seat 85 is carried upon a spring 86, secured to the bracket 54 at the rear of the frame. In this position the foot-levers 74 and 77 will be in easy reach of the rider. It should be noted that the lifting foot-lever 74 extends rearwardly from its pivot-point toward the rider's seat, so that it is in such a position that the lift mechanism may be easily operated by the direct downward pressure of the rider's foot. When the plow is raised, the spring 80 presses the locking-dog 78 into engagement with the teeth 82 and automatically locks the plow in raised position. Two or more of the teeth 82 are preferably provided and are so arranged that the plow may be held clear of the ground without lifting it to its extreme uppermost position. This latter arrangement is a convenience if the operator desires to hold the plow out of the ground for a little while or if the machine is operated by a boy or other rider with short legs.

It should be noted that the link which connects the foot-levers with the plow-bail is pivoted to the bracket 50 on the bail in front of and below the bail, so that a powerful leverage is obtained in raising and lowering the plow.

The foot mechanism for raising and lowering the plow and the lift-spring are connected to the bail, so that the plow is free to oscillate on the bail when in operation.

To the rear of the main plow-beam 55 is secured a bracket 87, which projects upwardly and rearwardly therefrom and is provided with a slot 88. Bracket 89 is secured to the rear U-shaped portion of the frame opposite the seat-bracket 54. Brackets 54 and 89 are provided at their rear ends with downwardly and rearwardly extending lugs 90, to and between which is journaled the swinging arm 91. The inner end of the arm is forked, as shown in Figs. 2 and 12, and extends on either side of the bracket 87 on the plow-beam. A

cross bolt or pivot 92 extends between the forked portions of arm 91 and through the slot 88 of the bracket 87. The bolt 92, extending through the slot 86 of the bracket, forms a lost-motion connection between the arm 91 and the bracket 87—i. e., a connection which permits of a relative shift between the connected parts, for the purpose hereinafter stated. The arm 91 is provided with a laterally-extending lug 93, which is arranged to cooperate with the fixed stop 94 and movable stop 95, mounted upon the frame. The movable stop 95 is preferably in the form of the arm pivoted to the bracket 89 and having an operating-shoulder 96 above the fixed stop 94. A coiled spring 97, interposed between the stop 94 and the lug 98 on the lower end of the stop 95, normally holds the same into engagement with the stop 94. A laterally-extending lug 99 (see Figs. 2 and 12) on the end of the bracket 87 is arranged to cooperate with the upper end of the stop 95, as hereinafter described.

In Fig. 3 the parts are shown in position with the plow raised. In this position pin 92 on arm 91 is in the forward end of the slot 88 in the bracket 87. As the plow-bail 37 is swung forwardly and downwardly to lower the plow, arm 91 also swings forwardly and downwardly until arrested by the engagement of the lug 93 thereon with the shoulder 96 of the stop 95. (See Fig. 4.) By this means the downward movement of the rear end of the plow is arrested—that is to say, the heel of the plow is held up. The forward movement, however, of the rear end of the plow is not checked when the movement of arm 91 is arrested because of the lost-motion connection between the bracket 87 and the arm 91, and as the plow-bail 37 continues its forward and downward swing the point of the plow is depressed, so that the plow enters the ground point first, as most clearly shown in Fig. 5. This continued forward movement of the plow brings the lug 99 on the bracket 87 into engagement with the upper end of the stop 95, moves it against the resistance of the spring 97, and shifts its shoulder 96 out from beneath the stop 93 on the arm 91, as indicated in Fig. 5. As soon as the shoulder 96 is completely shifted from beneath the stop 93 the rear end or heel of the plow drops until the stop 93 on the arm 91 engages the fixed stop 94 on the machine-frame. In this position the plow is held level in the furrow, as indicated in Fig. 1. As the plow-bail starts to swing upwardly and backwardly the point of the plow will be first raised, as indicated in Fig. 6, so that the plow leaves the ground point first. The continued upward and backward swing will raise the plow to its full height and shift the arm 91 to the position shown in Fig. 3, with the lug 93 thereon above the shoulder on stop 95.

By causing the plow to enter and leave the



ground point first the draft of the team is brought into play to force the plow into the ground and to draw it out, so that little effort is necessary on the part of the operator to raise and lower the plow through the medium of the foot-levers. The foot mechanism is also made very easy to operate, since both the plow and land-wheel are accurately balanced by the peculiar arrangement of main and supplemental lift-springs. In other plows of this structure a differential mechanism has been employed for controlling the movement of the plow and cause it to enter and leave the ground point first; but the essential feature of this part of my invention consists in providing a relatively fixed stop on the frame of the machine, which is arranged to hold up the heel of the plow as the latter is lowered, together with means for automatically releasing the rear end of the plow from the stop, so as to level the plow in the ground. As stated, the features of the invention relate more particularly to the type of riding or wheel plow in which the plow is carried upon a crank shaft or bail, to which shaft the depending arm of the land-side wheel is adjustably connected. The land-side wheel, bail, and plow are shifted together to and from working position, so that the plow is automatically leveled, both in working and riding positions. The force necessary to shift such a plow is greater than if the land-side wheel and plow are moved independently, and considerable difficulty has been encountered in providing foot-lift mechanism (in which the leverage is necessarily less than in the hand-lift mechanism) for manipulating this type of plow. I, however, have provided main and supplemental lift-springs, the tension of which latter varies with the adjustment of the land-side wheel, and which cooperate to balance the entire plow structure and land-side wheel, and both assist in lifting the plow. Moreover, I have provided a suitable stop device for upholding the heel of the plow as the latter is lowered, so that the plow enters the ground point first, and which is automatically tripped on the continued forward movement of the plow to level the plow in the ground and to permit it to leave the ground point first, so that the team assists in shifting the plow to and from working position. By the combination of such devices I have been able to provide a foot-lift mechanism which will readily and easily manipulate a plow of the type mentioned. Moreover, the foot mechanism and lift-spring are connected to the cranked part of the plow-bail, so that the plow is free to oscillate on its pivotal connection with the bail when in the ground. Furthermore, the raising and lifting foot-levers are pivoted on the frame and extend in opposite directions, the lifting foot-lever extending rearwardly toward the rider's seat, so that the operator may nicely

control the plow by placing one foot on each lever and may exert pressure to advantage on either lever, and particularly on the lifting foot-lever to shift the plow.

It is obvious that numerous changes may be made in the details of structure without departure from the essentials of the invention.

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

1. In riding-plows, the combination with the frame, the plow carried thereby and means for raising and lowering the plow, of a lug connected to the rear end of the plow and shifting therewith, a shiftable stop on the frame arranged normally in the path of movement of said lug to hold up the heel of the plow as the latter is lowered, and means engaging said stop for shifting it out of engagement with said lug, substantially as described.

2. In riding-plows, the combination with the frame, the plow carried thereby and means for raising and lowering the plow, of a member connected to and shifting with the rear end of the plow and a shiftable stop on the frame normally held in stationary position and arranged to engage said member and hold up the heel of the plow as the latter is lowered, whereby the plow will enter the ground point first, and means engaging and shifting said stop to release said member and to level the plow in the ground, substantially as described.

3. In riding-plows, the combination with the frame, of a plow shiftable mounted on the frame, a shiftable stop on the frame normally held in stationary position and arranged to hold up the heel of the plow as the latter is lowered and means engaging and shifting said stop to release the heel of the plow, substantially as described.

4. In riding-plows, the combination with the frame, of a plow shiftable hung on the frame, means for raising and lowering the plow, a lug connected to and shifting with the rear end of the plow, a shiftable stop on the frame normally held in stationary position arranged to engage said lug and hold up the heel of the plow as the latter is lowered, and means engaging and shifting said stop out of the path of said lug on the continued downward movement of the plow, substantially as described.

5. In riding-plows, the combination with the frame, of a plow shiftable hung on the frame, means for raising and lowering the plow, a lug connected to and shifting with the rear end of the plow, a stop on the frame normally spring-held in stationary position arranged to engage said lug and hold up the heel of the plow as the latter is lowered, and means for tripping said spring-held stop, substantially as described.



6. In riding-plows, the combination with the frame, of a plow, a swinging support for carrying the plow on the frame, a lug connected to and shifting with the rear end of the plow, a movable stop on the frame normally held in stationary position and arranged to engage said lug as the plow is lowered, whereby the plow will enter the ground point first, and means automatically acting on the continued downward shift of the plow for shifting said stop from beneath said lug to level the plow in the ground, substantially as described.

7. In riding-plows, the combination with the frame, the plow mounted thereon and means for raising and lowering the plow, of a member having a lost-motion connection with the rear end of the plow and a stop arranged to engage and arrest said member to hold up the heel of the plow as the latter is lowered, substantially as described.

8. In riding-plows, the combination with the frame, the plow mounted thereon and means for raising and lowering the plow, of a member having a lost-motion connection with the rear end of the plow, a stop on the frame arranged to engage and arrest said member to hold up the heel of the plow as the latter is lowered and means for releasing said member from said stop, substantially as described.

9. In riding-plows, the combination with the frame, the plow carried thereby and means for raising and lowering the plow, a swinging arm having a lost-motion connection with the plow, a stop arranged to engage and arrest said arm as the plow is lowered and means for tripping said stop, substantially as described.

10. In riding-plows, the combination with the frame, the plow carried thereby and means for raising and lowering the plow, a swinging arm having a lost-motion connection with the plow, a shiftable stop arranged to engage and arrest said arm as the plow is lowered and a lug connected to and shifting with the plow arranged to shift said stop and release said arm, substantially as described.

11. In riding-plows, the combination with the frame and plow, of a swinging bail for carrying the plow on the frame, a bracket fixed to the rear end of the plow-beam, a swinging arm pivoted to the rear end of the frame and having a bolt-and-slot connection with said bracket, a stop pivoted on the frame arranged to engage and arrest said arm as the latter is lowered and a lug on said bracket for tripping said stop, substantially as described.

12. In riding-plows, the combination with the frame, the plow carried thereby and means for raising and lowering the plow, of a stop on the frame for holding up the rear end of the plow in its lowermost position, and a second movable stop on the frame above said

first-mentioned stop arranged to momentarily hold up the heel of the plow as the latter is lowered, whereby the plow will enter the ground point first, substantially as described.

13. In riding-plows, the combination with the frame, the plow carried thereby and means for raising and lowering the plow, of a fixed stop on the frame for holding up the rear end of the plow in its lowermost position, a shiftable stop on the frame above said fixed stop arranged to hold up the heel of the plow as the latter is lowered and means for automatically tripping said shiftable stop on the continued downward movement of the plow, substantially as described.

14. In riding-plows, the combination with the frame and plow, of a swinging support for carrying the plow on the frame, a swinging arm having a lost-motion connection with the rear end of the plow, a fixed stop on the frame for upholding the heel of the plow in lowermost position, a shiftable stop for arresting said arm at an intermediate point as the plow is lowered and a lug connected to the plow for tripping said shiftable stop, substantially as described.

15. In riding-plows, the combination with the frame, plow carried thereby and means for raising and lowering the plow, of a lug connected to and shiftable with the rear end of the plow, a fixed stop on the frame engaging said lug and supporting the rear end of the plow in its lowermost position and a yielding stop on the frame for engaging said lug at an intermediate point as the plow is lowered and momentarily hold up the heel of the plow, substantially as described.

16. In riding-plows, the combination with the frame, the bail journaled on the frame, and the plow hung on the bail, of an arm pivotally mounted on the frame and connected to the rear end of the plow, a stop arranged to engage said arm and hold up the heel of the plow as the latter is lowered, and means for disengaging said arm and stop on the continued downward shift of the plow, substantially as described.

17. In riding-plows, the combination with the frame, the bail journaled on the frame, and the plow hung on the bail, of an arm pivoted on the frame and having a lost-motion connection with the rear end of the plow, a stop on the frame arranged to engage said arm and hold up the heel of the plow as the latter is lowered, and a trip device for shifting said stop on the continued downward movement of the plow to release said arm, substantially as described.

18. In riding-plows, the combination with the frame, of a bail journaled thereon, a plow carried by the bail, a shaft journaled on the frame, a foot-lever for raising the plow connected to the shaft and extending rearwardly therefrom toward the rider's seat, an arm on



said shaft and a link directly connecting said arm with one of the crank-arms of the plow-bail, substantially as described.

19. In riding-plows, the combination with the frame, of a bail journaled thereon, a plow carried by the bail, a shaft journaled on the frame, an arm on said shaft, a link directly connecting said arm and one of the crank-arms of said bail and a pair of foot-levers mounted on said shaft, substantially as described.

20. In riding-plows, the combination with the frame, of a bail journaled thereon, a plow carried by the bail, a shaft journaled on the frame, an arm on said shaft, a link directly connecting said arm and said bail, oppositely-extending foot-levers connected to said shaft, and means for locking said lift mechanism in raised and lowered positions, substantially as described.

21. In riding-plows, the combination with the frame and with the plow carried thereby, of foot mechanism for raising and lowering the plow comprising a shaft journaled on the frame and connected to the plow, a pair of foot-levers connected to said shaft, a locking-dog connected to one of said levers and a series of lugs on the frame with which said locking-dog automatically engages to hold the plow in raised position, substantially as described.

22. In riding-plows, the combination with the frame, of a bail journaled thereon, a plow carried by the bail, foot mechanism for raising and lowering the plow, comprising a shaft journaled on the frame and connected directly to said bail, a pair of foot-levers connected to said shaft and a locking-dog connected to said foot mechanism for holding the plow in raised position and arranged to be released by the shift of one of said foot-levers, substantially as described.

23. In riding-plows, the combination with the frame, of a bail journaled thereon, a plow carried by the bail, foot mechanism for raising and lowering the plow, comprising a shaft journaled on the frame, an arm on said shaft, a link directly connecting said arm and said bail, a pair of oppositely-extending foot-levers connected to said shaft, one of said foot-levers being jointed, a locking-dog on the outer section of said jointed lever, and a segment on the frame having a series of lugs with which said dog automatically engages to hold the plow in raised position, substantially as described.

24. In riding-plows, the combination with the frame, of a bail journaled thereon, a plow carried by the bail, a shaft journaled on the frame, an arm on said shaft, a link directly connecting said arm and said bail, said link and arm being arranged to form a dead-center lock to hold the plow in the ground, a lug on the bail and an adjustable stop on said link

arranged to engage said lug to hold said link and arm off of the dead-center locking position and foot-levers connected to said shaft, substantially as described.

25. In riding-plows, the combination with the frame, of a bail journaled thereon, a plow carried by the bail, a shaft journaled on the frame, an arm on said shaft, an arm on said bail, a link pivotally connected to said arms, the point of connection between said link and the arm on said bail being in front of and below the bail and foot-levers connected to said shaft, substantially as described.

26. In riding-plows, the combination with the frame, the bail journaled thereon and the plow pivoted to the bail, of means for momentarily holding up the heel of the plow as the latter is lowered arranged to be tripped on the continued downward movement thereof and foot mechanism for raising and lowering the plow comprising a shaft journaled on the frame, a crank-arm on said shaft, a link connecting said arm to the plow and a pair of foot-levers fixed on said shaft, substantially as described.

27. In riding-plows, the combination with the frame, the bail journaled thereon and the plow pivoted to the bail, of means for momentarily holding up the heel of the plow as the latter is lowered arranged to be tripped on the continued downward movement thereof and foot mechanism for raising and lowering the plow comprising a shaft journaled on the frame, a crank-arm on said shaft, a link connecting said arm to the bail of the plow, a pair of foot-levers fixed to said shaft and extending in opposite directions, locking devices automatically controlled by said foot mechanism for holding the plow in raised and lowered positions, substantially as described.

28. In riding-plows, the combination with the frame, the bail journaled thereon, and the plow hung on the bail, of a foot-lever for raising the plow pivoted on the frame and extending rearwardly from its pivot, an arm connected to the foot-lever and extending forwardly from the pivot thereof, and a link connecting said arm to the plow-bail, substantially as described.

29. In riding-plows, the combination with the frame, the bail pivoted thereon, and the plow hung on the bail, of a foot-lever pivoted on the frame for raising the plow, said foot-lever extending rearwardly from its pivot-point, an arm connected to the foot-lever at its pivot-point and extending forwardly therefrom, an arm fixed to the plow-bail, and a link connecting said arms, the point of connection between said link and the arm on the plow-bail being in front of and below the bail, substantially as described.

30. In riding-plows, the combination with the frame, the bail pivoted thereon, and the plow hung on the bail, of a rock-shaft jour-



naled on the frame, a rearwardly-extending lift-lever, and a forwardly-extending depressing-lever on said shaft, a forwardly-extending arm on said shaft, a link connecting said arm to the plow-bail, said depressing foot-lever being formed of separate sections pivoted together, a pawl on the outer section, and a lug on the frame with which said pawl engages to hold the plow in raised position, said arm and link being arranged to form a dead-center lock to hold the plow in lowered position, substantially as described.

31. In riding-plows, the combination with the frame, the bail journaled thereon, and the plow hung on the bail, of a rock-shaft journaled on the frame and having a rearwardly-extending lifting foot-lever and a forwardly-extending depressing foot-lever, a forwardly-extending arm on said shaft, a bracket fixed to one of the side arms of the bail, a link pivoted to the arm on said rock-shaft and to said bracket, the point of connection between said link and bracket being in front of and below the bail, said arm and link being arranged to form a dead-center lock for holding the plow in lowered position, a stop on said link, and a lug on said bracket with which said stop engages, substantially as described.

32. In riding-plows, the combination with the frame, the bail journaled thereon, and the plow hung on the bail, of a stop device for upholding the heel of the plow as the latter is lowered, means for automatically tripping said stop on the further downward movement of the plow, a rock-shaft journaled on the frame and having a rearwardly-extending lifting foot-lever and a forwardly-extending depressing foot-lever, a forwardly-extending arm on the rock-shaft, and a link connecting said arm with the plow-bail, substantially as described.

33. In riding-plows, the combination with the frame, the bail journaled thereon, and the plow hung on the bail, of a stop device for momentarily upholding the heel of the plow as the latter is lowered, a rock-shaft on the frame provided with a rearwardly-extending lifting foot-lever and a forwardly-extending depressing foot-lever, a forwardly-extending arm on said shaft, a bracket on the side arm of the bail, a link pivoted to said rock-shaft arm and to said bracket, the point of connection between said link and bracket being in advance of and below the bail, a stop device for arresting said link and arm in dead-center position to hold the plow in the ground, and a catch for holding the plow in raised position, said catch being automatically shifted into and out of operative position by the operation of the foot-levers in raising and lowering the plow, substantially as described.

34. In riding-plows, the combination with the frame, the bail journaled thereon, and the plow hung on the bail, of means for hold-

ing up the heel of the plow as the latter is lowered, a rearwardly-extending lifting foot-lever and a forwardly-extending depressing foot-lever pivoted on the frame, and a rock-arm and link connecting said foot-levers to the plow, substantially as described.

35. In riding-plows, the combination with the frame, the bail journaled on the frame, and the plow hung on the bail, a swinging arm mounted on the frame and having a lost-motion connection with the rear end of the plow, a stop for engaging said arm to hold up the heel of the plow as the latter is lowered, means for tripping said stop, a pair of foot-levers for raising and lowering the plow, and means controlled by said foot-levers for holding the plow in its raised and lowered position, substantially as described.

36. In riding-plows, the combination with the frame, the bail journaled thereon, and the plow hung on the bail, of a stop for holding up the rear end of the plow in its lowermost position, a second stop arranged to momentarily hold up the heel of the plow as the latter is lowered, a pair of foot-levers mounted on the frame and connected to the plow, and means controlled by the foot-levers for holding the plow in its raised and lowered position, substantially as described.

37. In riding-plows, the combination with the frame, the bail journaled thereon, and the plow hung on the bail, of a swinging arm mounted on the frame and connected to the rear end of the plow, a stop for upholding the rear end of the plow in its lowermost position, a second stop arranged to engage said arm and momentarily hold up the heel of the plow as the latter is lowered, a pair of oppositely-arranged foot-levers mounted on the frame, a rock-arm and link connecting said foot-levers with the plow-bail and arranged to form a dead-center lock to hold the plow in its lowermost position, and a latch controlled by said foot-levers for holding the plow in its raised position, substantially as described.

38. In riding-plows, the combination with the frame, of a bail-shaft journaled on the frame, a plow carried by the bail, an arm adjustably fixed on the bail-shaft, a land-side wheel on said arm, a main lift-spring connected to said plow, a supplemental lift-spring connected to said land-side wheel, foot-levers for raising and lowering the plow, and means for upholding the rear end of the plow as the latter is lowered.

39. In riding-plows, the combination with the frame, of the bail-shaft journaled thereon, the plow hung on the bail, an arm fixed to but adjustable on the bail-shaft, a land-side wheel carried by said arm, a main lift-spring connected to the plow, a supplemental spring connected through intermediate means to the land-side wheel, a stop device for upholding the heel of the plow as the lat-



ter is lowered, means automatically tripping said stop device to level the plow in the ground, a rearwardly-extending lifting foot-lever and a forwardly-extending depressing foot-lever journaled on the frame, connections between said foot-levers and the plow, and means for holding the plow in its raised and lowered positions, substantially as described.

40. In riding-plows, the combination with the frame, of the bail-shaft journaled thereon, the plow hung on the bail, an arm hung on the bail-shaft, a land-side wheel carried by said arm, means for adjustably connecting said arm and bail-shaft, a main lift-spring connected to the plow, a supplemental lift-spring connected through intermediate means to the land-side wheel, a swinging arm on the frame connected at its rear end to the plow, a stop device on the frame for upholding the heel of the plow as the latter is lowered, means engaging and shifting said stop device to level the plow in the ground, a rearwardly-extending lifting foot-lever and a forwardly-extending depressing foot-lever journaled on the frame, a rock-arm and link connecting said foot-levers to the plow-bail and arranged to form a dead-center lock for holding the plow in the ground, and a locking-pawl controlled by said foot-levers for holding the plow in its raised position.

41. In riding-plows, the combination with the frame, of the bail journaled thereon, a plow carried by the bail, a cross-shaft journaled on the frame, an arm on said shaft, a link directly connecting said arm and said bail, a lift-spring connected at one end to said bail and at the opposite end to the plow-frame and foot-levers connected to said shaft, substantially as described.

42. In riding-plows, the combination with the frame, of a bail-shaft journaled thereon, a plow carried by the bail, a sleeve on said shaft, an arm on said sleeve, a land-wheel carried by said arm, means for adjustably locking said sleeve to said shaft and a lift-spring connected to said sleeve for balancing the land-wheel, substantially as described.

43. In riding-plows, the combination with the frame, of a bail-shaft journaled thereon, a plow carried by the bail, a sleeve on said shaft, an arm on said sleeve, a land-wheel carried by said arm, means for adjustably locking said sleeve to said shaft, a second arm on said sleeve and a lift-spring connected to said second arm and to the plow-frame, said arms being so disposed that said spring is placed under tension when the land-wheel is shifted on either side of its upright position, substantially as described.

44. In riding-plows, the combination with the frame, of the bail-shaft journaled thereon, the plow carried by the bail, an arm journaled on said shaft, a land-wheel carried by

said arm, means for adjustably locking said land-wheel arm and said shaft together, a main lift-spring connected to said bail to balance the weight of the plow and a supplemental lift-spring connected to said arm to balance the weight upon the land-wheel, substantially as described.

45. In riding-plows, the combination with the frame, of the bail-shaft journaled thereon, a plow mounted on the bail, foot-levers for raising and lowering the plow, an arm journaled on said bail-shaft, a land-wheel on said arm, means for locking said arm and shaft in different positions, a main lift-spring connected to the plow and a supplemental lift-spring connected to the land-wheel, substantially as described.

46. In riding-plows, the combination with the frame, of the front and rear furrow-wheels and vertical furrow-wheel standards, an arm on the rear standard, a slotted arm on the front standard, a rod connected to said arms and having an upturned end slidably engaging said slot, a bracket connected to said front standard, a draft-tongue connected to said bracket, an arm pivoted to said bracket in front of said standard and having slot engaging the upturned end of said rod and a spring connecting said arm and said rod, said arm and spring being arranged to hold the upturned end of said rod in line with the vertical standard of the front furrow-wheel, substantially as described.

47. In wheeled plows, the combination with the plow and means for raising and lowering the same, of an arm mounted on a suitable support and connected to the rear end of the plow, a shiftable stop for engaging and arresting said arm as the plow is lowered to uphold the heel of the plow and means for automatically tripping to level the plow in the ground, substantially as described.

48. In wheeled plows, the combination with the plow and means for raising and lowering the same, of an arm pivoted to a suitable support and having a lost-motion connection with the rear end of the plow, a stop device for engaging and arresting said arm to uphold the heel of the plow as the latter is lowered, and means for automatically tripping said stop device on the continued downward movement of the plow, substantially as described.

49. In wheeled plows, the combination with a plow, of a shaft having a cranked portion on which the plow is hung, a land-side wheel on said shaft, means for raising and lowering the plow, a shifting-arm mounted on a suitable support and connected to the rear end of the plow, a stop device for engaging and arresting said arm as the plow is lowered and means for automatically tripping on the continued downward movement of the plow, substantially as described.



50. In wheeled plows, the combination with the plow, of a shaft having a cranked portion to which the plow is hung, a land-side wheel on said shaft, foot-levers for shifting the plow and land-side wheel together to and from operative position, means for independently adjusting the land-side wheel, means for upholding the heel of the plow as the latter is lowered, a main lift-spring for the plow, and a supplemental lift-spring connected to the land-side wheel and arranged to cooperate with said main spring to raise the plow, substantially as described.

51. In wheeled plows, the combination with the plow and land-side wheel, of means for shifting the plow and land-side wheel together to and from operative position, means for independently adjusting the land-side wheel, means for momentarily upholding the heel of the plow as the latter is lowered, a main lift-spring for the plow and a supplemental lift-spring connected to the adjustable land-side wheel and cooperating with the main lift-spring to raise the plow, substantially as described.

52. In wheeled plows, the combination with the plow, of a shaft having a cranked portion whereon the plow is hung, a land-side wheel on said shaft, means for shifting the plow and land-side wheel together to and from operative position, means for upholding the heel of the plow as the latter is lowered arranged to be automatically tripped on the continued downward movement of the plow, a main lift-spring for the plow and a supplemental lift-spring connected to the land-side wheel and cooperating with the main lift-spring to raise the plow, substantially as described.

53. In riding-plows, the combination with the plow, of the bail whereon the plow is hung, means for momentarily upholding the heel of the plow as the latter is lowered arranged to be automatically tripped on the continued downward movement of the plow, a lifting and a depressing foot-lever connected together and mounted to swing upon a common pivot, said lifting foot-lever extending rearwardly from said pivot toward the rider's seat and said depressing foot-lever extending forwardly therefrom, connections between said foot-levers and the plow-bail and a lift-spring also connected to the bail, whereby the plow is free to swing on said bail, substantially as described.

54. In wheeled plows, the combination with the frame, of the plow hung on said frame foot-levers for raising and lowering the plow, a part connected to and shifting with the rear end of the plow, and a normally stationary, shiftable stop mounted on the frame in the path of movement of said part and arranged to engage and arrest the same as the plow is lowered and means for automatically tripping said stop on the continued down-

ward movement of the plow, substantially as described.

55. In wheeled plows, the combination with the frame, of a plow hung thereon, a land-side wheel connected to shift with the plow as the latter is raised and lowered to automatically level the plow, means for shifting the plow and land-side wheel together to and from working position, means for independently adjusting the land-side wheel, a main lift-spring for the plow and a supplemental lift-spring connected to the adjustable land-side wheel and arranged to cooperate with the main lift-spring to raise the plow, substantially as described.

56. In wheeled plows, the combination with the frame, of a plow hung thereon, a land-side wheel connected to shift with the plow as the latter is raised and lowered to automatically level the plow, means for shifting the plow and land-side wheel together to and from working position, means for independently adjusting the land-side wheel, means for upholding the heel of the plow as the latter is lowered arranged to be automatically tripped on the continued downward movement of the plow, a main lift-spring for the plow and a supplemental lift-spring connected to the adjustable land-side wheel arranged to cooperate with the main lift-spring to raise the plow, substantially as described.

57. In wheeled plows, the combination with the frame, of a plow hung thereon, a land-side wheel connected to shift with the plow as the latter is raised and lowered to automatically level the plow, means for shifting the plow and land-side wheel together to and from working position, means for independently adjusting the land-side wheel, foot-levers for shifting the plow and land-side wheel together, means for independently adjusting the land-side wheel, a stop device for momentarily upholding the heel of the plow as the latter is lowered and a lift-spring extending between the land-side wheel and the plow-frame, substantially as described.

58. In plows, the combination with the frame, of a shaft journaled on the frame having a cranked portion to which the plow is hung, an arm on the shaft a land-side wheel on said arm, means for adjustably locking said arm and shaft together and a lift-spring connected to said arm and to a fixed point on the main frame, substantially as described.

59. In plows, the combination with the frame, of a shaft journaled on the frame having a cranked portion to which the plow is hung, an arm on the shaft a land-side wheel on said arm, means for adjustably locking said arm and shaft together, and a lift-spring connected to said arm and arranged to be placed under tension when said land-side wheel is shifted on either side of its upright position, so that said spring tends to pull the



land-side wheel to upright position when the latter is swung either forwardly or rearwardly of such position, substantially as described.

60. In wheeled plows, the combination with the frame, a bail-shaft journaled on the frame, a plow hung on the bail, means for raising and lowering the plow, a land-side wheel connected to said bail-shaft to shift therewith as the plow is raised and lowered, means for upholding the heel of the plow as the latter is lowered arranged to be automatically tripped on the continued downward movement of the plow, a main lift-spring for the plow and a supplemental lift-spring connected to the land-side wheel and to the plow-frame and arranged to cooperate with the main lift-spring to raise the plow, substantially as described.

61. In wheeled plows, the combination with the frame, of a bail-shaft journaled on the frame, a plow hung on the bail, a land-side wheel connected to said bail-shaft to shift therewith as the plow is raised and lowered, means for momentarily upholding the heel of the plow as the latter is lowered, foot-levers for shifting the plow and land-side wheel together, means for independently adjusting the land-side wheel, a main lift-spring for the plow and a supplemental lift-spring connected to the adjustable land-side wheel arranged to cooperate with the main lift-spring to raise the plow, substantially as described.

62. In wheeled plows, the combination with the frame, of a bail-shaft journaled on the frame, a plow hung on the bail, a land-side wheel connected to said bail-shaft to shift therewith as the plow is raised and lowered, foot-levers pivoted to the plow-frame and extending in opposite directions and connected to the plow-bail to shift said plow and land-side wheel together, means for independently adjusting the land-side wheel, a main lift-spring for the plow and a supplemental lift-spring connected to the land-side wheel and cooperating with said main lift-spring to raise the plow, substantially as described.

63. In wheeled plows, the combination with the frame, of a bail-shaft journaled on the frame, a plow hung on the bail, a land-side wheel connected to said bail-shaft to shift therewith as the plow is raised and lowered, foot-levers for shifting the plow and land-side wheel together, an arm mounted on the frame and connected to the rear end of the plow, a movable stop on the frame for engaging said arm as the plow is lowered, means for automatically tripping said stop on the continued downward movement of the plow, a main lift-spring connected to the plow and a supplemental lift-spring connected to the land-side wheel and arranged to cooperate with the main lift-spring to raise the plow, substantially as described.

64. In wheeled plows, the combination with

the frame, of a bail-shaft journaled on the frame, a plow hung on the bail, a land-side wheel connected to said bail-shaft to shift therewith as the plow is raised and lowered, a forwardly-extending depressing foot-lever and a rearwardly-extending lifting foot-lever, both pivoted on the frame and connected to shift said plow and land-side wheel together, means for independently adjusting the land-side wheel, means for momentarily upholding the heel of the plow as the latter is lowered, a main lift-spring for the plow and a supplemental lift-spring connected to the land-side wheel and to a fixed point on the plow-frame, substantially as described.

65. In wheeled plows, the combination with the frame, of a bail-shaft journaled on the frame, a plow hung on said bail, an arm on said shaft, means for adjustably locking said arm and shaft, a land-side wheel on said arm and a lift-spring connected to said arm and to a fixed point on the plow-frame, substantially as described.

66. In wheeled plows, the combination with the frame, of a bail-shaft journaled on the frame, a plow hung on said bail, an arm on said shaft, means for adjustably locking said arm and shaft, a land-side wheel on said arm, means for shifting said plow and land-side wheel together to and from working position, a main lift-spring for the plow and a supplemental lift-spring connected to the arm of the land-side wheel and cooperating with said main lift-spring to raise the plow, substantially as described.

67. In wheeled plows, the combination with the frame, of a bail-shaft journaled on the frame, a plow hung on said bail, an arm on said shaft, means for adjustably locking said arm and shaft, a land-side wheel on said arm, foot-levers for shifting said plow and land-side wheel together to and from working position to automatically level the plow, a main lift-spring for the plow and a supplemental lift-spring connected to the arm of the land-side wheel and arranged to cooperate with said main lift-spring to raise the plow, substantially as described.

68. In wheeled plows, the combination with the frame, of a bail-shaft journaled on the frame, a plow hung on said bail, an arm on said shaft, a land-side wheel on said arm, means for shifting said plow and land-side wheel together to and from working position, means for upholding the heel of the plow as the latter is lowered, a main lift-spring for the plow and a supplemental lift-spring connected to and balancing the land-side wheel and arranged to cooperate with the main lift-spring to raise the plow, substantially as described.

69. In wheeled plows, the combination with the frame, of a bail-shaft journaled on the frame, a plow hung on said bail, an arm on said shaft, means for adjustably locking



said arm and shaft, a land-side wheel on said arm, foot-levers for shifting the plow and land-side wheel to and from working position to automatically level the plow, means for upholding the heel of the plow as the latter is lowered arranged to be automatically tripped on the continued downward movement of the plow, a main lift-spring for the plow and a supplemental spring connected to the adjustable arm of the land-side wheel and to a fixed point on the plow-frame, substantially as described.

70. In wheeled plows, the combination with the frame, of a bail-shaft journaled on the frame, a plow hung on said bail, an arm on said shaft, means for adjustably locking said arm and shaft, a land-side wheel on said arm, a rearwardly-extending lifting foot-lever and a forwardly-extending depressing foot-lever pivoted on the frame and connected to shift the plow and land-side wheel together to and from working position, a main lift-spring for the plow and a supplemental lift-spring connected to the arm of the land-side wheel and arranged to cooperate with said main lift-spring to raise the plow, substantially as described.

71. In wheeled plows, the combination with the frame, of a bail-shaft journaled on the frame, a plow hung on said bail, an arm on said shaft, means for adjustably locking said arm and shaft, a land-side wheel on said arm, means for shifting the plow and land-side wheel together to and from working position to automatically level the plow, an arm pivoted on the frame and connected to the rear end of the plow, a stop device for engaging said arm to uphold the heel of the plow as the latter is lowered, means for automatically tripping said stop on the continued downward movement of the plow, a main lift-spring for the plow and a supplemental lift-spring connected to the arm of the land-side wheel and to the plow-frame, substantially as described.

72. In wheeled plows, the combination with the frame, of a bail-shaft journaled on the frame, a plow hung on said bail, an arm on said shaft, means for adjustably locking said arm and shaft, a land-side wheel on said arm, foot-levers pivotally mounted on the frame and connected to shift the plow and land-side wheel together to and from working position to automatically level the plow, a stop device for upholding the heel of the plow as the latter is lowered arranged to be automatically tripped on the continued downward movement of the plow, a main lift-spring connected to the plow and a supplemental lift-spring connected to the arm of the land-side wheel and cooperating with the main lift-spring to raise the plow, substantially as described.

73. In wheeled plows, the combination with the frame, of a bail-shaft journaled on the

frame, a plow hung on said bail, an arm on said shaft, means for adjustably locking said arm and shaft, a land-side wheel on said arm, a pair of oppositely-extending foot-levers pivoted on the frame and connected to the plow-bail to shift the plow and land-side wheel to and from working position, means for upholding the heel of the plow as the latter is lowered, a main lift-spring connected to the plow-bail and a supplemental lift-spring connected to the arm of the land-side wheel and to the plow-frame, substantially as described.

74. In wheeled plows, the combination with the frame, of a bail-shaft journaled on the frame, a plow hung on said bail, an arm on said shaft, means for adjustably locking said arm and shaft, a land-side wheel on said arm, means for shifting the plow and land-side wheel together to and from working position to automatically level the plow, a main lift-spring for the plow, an arm connected to the arm of the land-side wheel, a spring connected to said first-mentioned arm and to a fixed point on the plow-frame, said arms being so disposed that said supplemental spring is placed under tension when said land-side wheel arm is shifted on either side of its upright position, substantially as described.

75. In wheeled plows, the combination with the frame and the plow hung on the frame, of a land-side wheel connected to shift with the plow as the latter is raised and lowered to automatically level the plow, a lifting foot-lever pivoted at one end to the frame and extending rearwardly from its pivot toward the rider's seat and a link connecting said lever to one of the crank-arms of the plow-bail to shift the plow and land-side wheel together, substantially as described.

76. In wheeled plows, the combination with a frame and the plow hung on the frame, of a land-side wheel connected to shift with the plow as the latter is raised and lowered to automatically level the plow, means for momentarily upholding the heel of the plow as the latter is lowered arranged to be automatically tripped on the continued downward movement of the plow, a lifting foot-lever and a depressing foot-lever connected together, a common pivot bolt or shaft on the frame whereon said foot-levers are movable, said lifting foot-lever extending rearwardly from the pivot-bolt and the depressing foot-lever extending forwardly therefrom, said foot-levers being connected to shift the plow and the land-side wheel together to and from working position and means for independently adjusting the land-side wheel, substantially as described.

77. In wheeled plows, the combination with the frame and the plow hung on the frame, of a land-side wheel connected to shift with the plow as the latter is raised and lowered to automatically level the plow, foot-levers shift-



ing the plow and land-side wheel together to and from working position, means for independently adjusting the land-side wheel, an arm on the frame connected to the rear end of the plow and a stop on the frame arranged to engage said arm and uphold the heel of the plow as the latter is lowered, substantially as described.

78. In wheeled plows, the combination with the frame and bail-shaft journaled thereon, of a plow hung on the bail, an arm on the bail-shaft, means for adjustably locking said arm and shaft, lifting foot-lever pivoted at one end to the frame and extending rearwardly from its pivot toward the rider's seat and a link connecting said lever to the cranked part of the bail-shaft to shift the plow and land-side wheel together to and from working position, substantially as described.

79. In wheeled plows, the combination with the frame and bail-shaft journaled thereon, of a plow hung on the bail, an arm on the bail-shaft, means for adjustably locking said arm and shaft, a pair of foot-levers, a common pivot bolt or shaft whereon said foot-levers are mounted, said foot-levers extending in opposite directions from said pivot bolt or shaft, a link connected to said foot-levers and to the cranked part of the bail-shaft to shift the plow and land-side wheel to and from working position and a lift-spring connected to said cranked part, substantially as described.

80. In wheeled plows, the combination with the frame and bail-shaft journaled thereon, of a plow hung on the bail, an arm on the bail-shaft, means for adjustably locking said arm and shaft, a stop device on the frame arranged to momentarily uphold the heel of the plow as the latter is lowered, a lifting foot-lever and a depressing foot-lever, said foot-levers being connected together, a common pivot bolt or shaft on the frame whereon said foot-levers are mounted, said lifting foot-lever extending rearwardly from said pivot-bolt and said depressing foot-lever extending forwardly therefrom and a link connecting said levers to the crank part of the bail-shaft to shift said plow and land-side wheel together to and from working position, substantially as described.

81. In wheeled plows, the combination with the frame and bail-shaft journaled thereon, of a plow hung on the bail, an arm on the bail-shaft, means for adjustably locking said arm and shaft, a stop device on the frame arranged to uphold the heel of the plow as the latter is leveled, means for tripping said stop device on the continued downward movement of the plow, a lifting foot-lever, a pivot bolt or shaft on the frame above the journal of said bail-shaft whereon said foot-lever is mounted at its forward end, said foot-lever extending rearwardly toward the rider's seat and a link connecting said lever to the

cranked part of said bail-shaft to shift the plow and land-side wheel together, substantially as described.

82. In wheeled plows, the combination with the frame and bail-shaft journaled thereon, of a plow hung on the bail, an arm on the bail-shaft, means for adjustably locking said arm and shaft, a pair of foot-levers connected together, a common pivot bolt or shaft on the frame whereon said foot-levers are mounted, said foot-levers extending in opposite directions from said pivot bolt or shaft and means connecting said foot-levers to the cranked part of the bail-shaft and a stop device for momentarily upholding the heel of the plow as the latter is lowered, substantially as described.

83. In wheeled plows, the combination with the frame and bail-shaft journaled thereon, of a plow hung on the bail, an arm on the bail-shaft, means for adjustably locking said arm and shaft, a pair of foot-levers for shifting the plow and land-side wheel together to and from working position, an arm on the frame connected to the rear end of the plow, and a stop device on the frame for engaging said arm to uphold the heel of the plow as the latter is lowered, substantially as described.

84. In wheeled plows, the combination with the frame and bail-shaft journaled thereon, of a plow hung on the bail, an arm on the bail-shaft, a land-side wheel on said arm, means for adjustably locking said arm and shaft, foot-levers connected to the bail for shifting the plow and land-side wheel together to and from working position, a stop on the frame for upholding the rear end of the plow in lowest position and a movable stop device for upholding the heel of the plow as the latter is lowered arranged to be automatically tripped on the continued downward movement of the plow, substantially as described.

85. In wheeled plows, the combination with the frame, of a bail-shaft journaled on the frame, a plow hung on the bail, a land-side wheel mounted on said bail-shaft, means for shifting the plow and land-side wheel together to and from working position, a main lift-spring for said parts and a supplemental lift-spring therefor, the leverage of which increases as that of the main lift-spring diminishes when the plow is lowered, substantially as described.

86. In wheeled plows, the combination with the frame, of a bail-shaft journaled on the frame, a plow hung on the bail, a land-side wheel mounted on said bail-shaft, means for shifting the plow and land-side wheel together to and from working position, a main lift-spring connected at its rear end to the frame and at its forward end to the bail, an arm on the bail-shaft, a supplemental lift-spring connected at its rear end to said arm and at its forward end to the frame, said arm being so arranged that the leverage and ten-



sion of the supplemental lift-spring is greatest when the plow is in its lowered working position, substantially as described.

87. In wheeled plows, the combination with  
5 the frame, of the bail-shaft journaled on the  
frame, a plow hung on the bail, a main lift-  
spring for the plow, a sleeve on the bail-shaft,  
an arm on said sleeve, a land-side wheel car-  
ried by said arm, means for shifting the plow  
10 and land-side wheel together to and from  
working position, means for adjustably lock-  
ing said sleeve to said shaft, a second arm on  
said sleeve, a supplemental lift-spring con-  
nected to said second arm, said arms being so  
15 disposed that the tension and leverage of the  
supplemental spring will be greatest when  
the plow is in its lowered working position,  
substantially as described.

88. In wheeled plows, the combination with  
20 the frame, of a bail-shaft journaled on the

frame, a plow hung on the bail, a main lift-  
spring for the plow connected at its rear end  
to the frame, a sleeve on said bail-shaft, an  
arm on said sleeve, a land-side wheel on said  
arm, means for adjustably locking said sleeve 25  
to said shaft, means for shifting the plow and  
land-side wheel together to and from work-  
ing position, a second arm on said sleeve and  
a supplemental lift-spring connected at its  
rear end to said second arm and at its for- 30  
ward end to the plow-frame, said arms being  
so disposed that the leverage of said supple-  
mental lift-spring increases as the plow is low-  
ered to working position, substantially as de-  
scribed.

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Witnesses:

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