

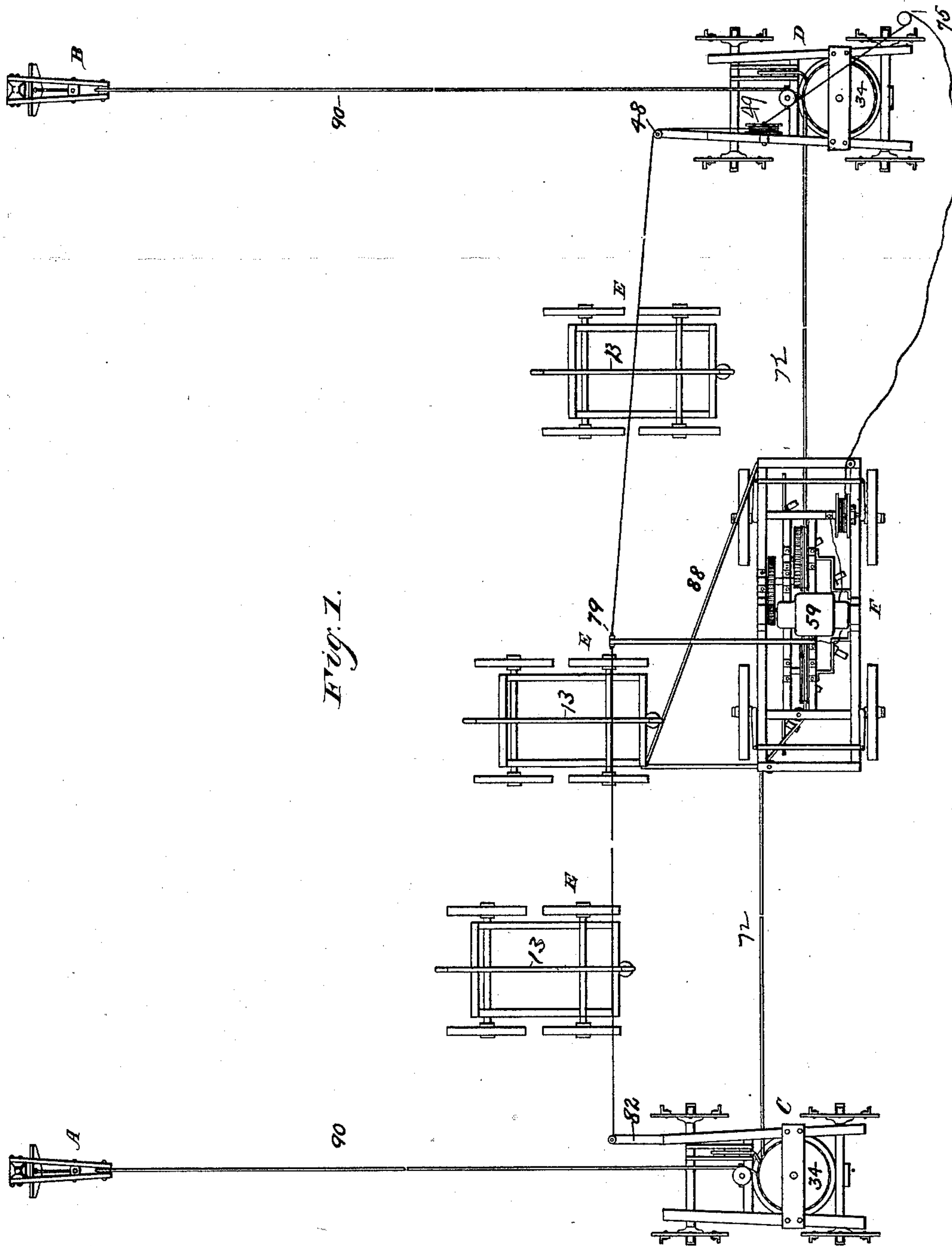
(No Model.)

4 Sheets—Sheet 1.

C. H. ROBERTS.
ELECTRIC PLOW.

No. 509,556.

Patented Nov. 28, 1893.



Witnesses;

J. M. Thompson
J. H. Diggers

By *his* Attorneys,

C. A. Snow & Co.

Inventor,
Chas. H. Roberts

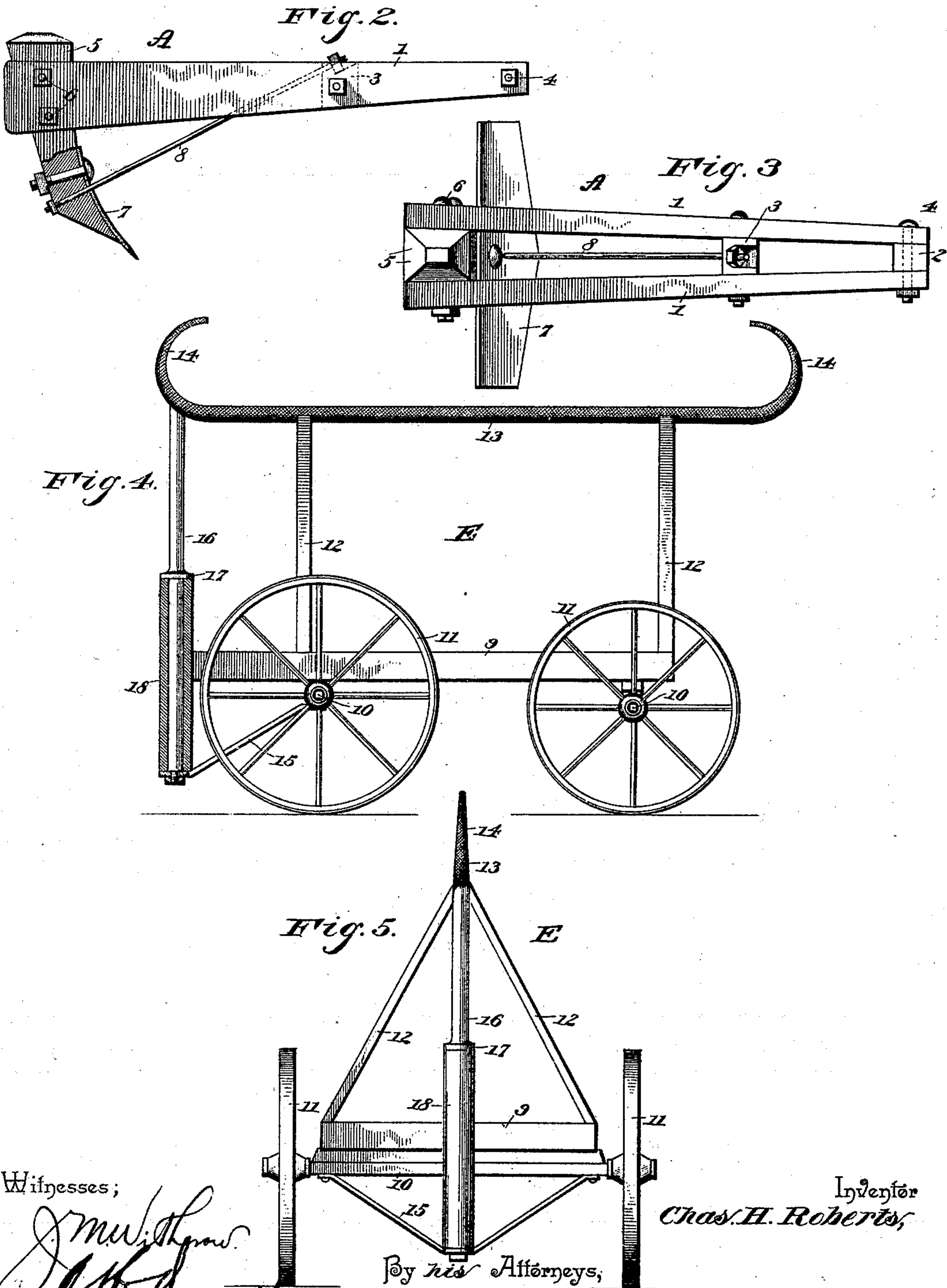
(No Model.)

4 Sheets—Sheet 2.

C. H. ROBERTS.
ELECTRIC PLOW.

No. 509,556.

Patented Nov. 28, 1893.



Witnesses;

J. M. Withers
J. B. Giggas

By his Attorneys,

C. A. Snow & Co.

Inventor
Chas. H. Roberts,

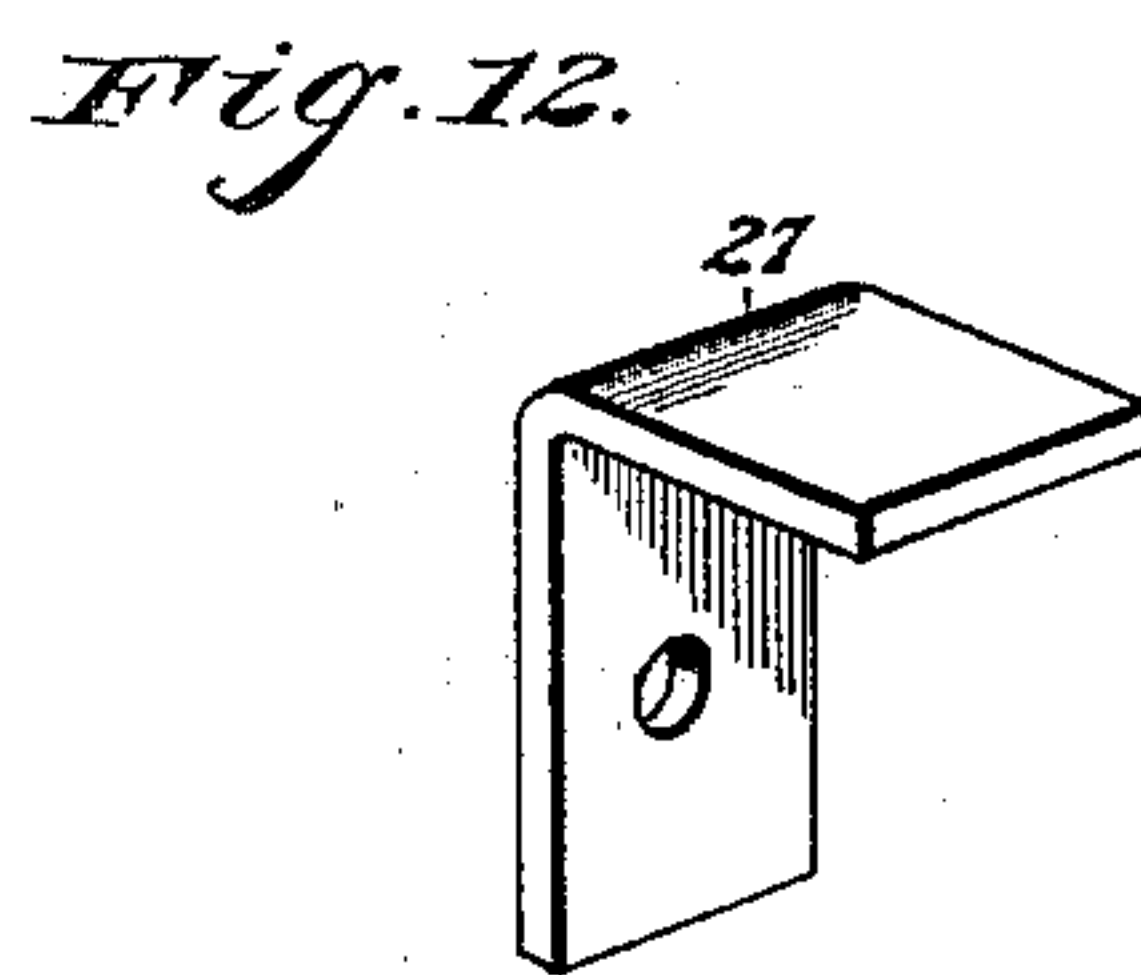
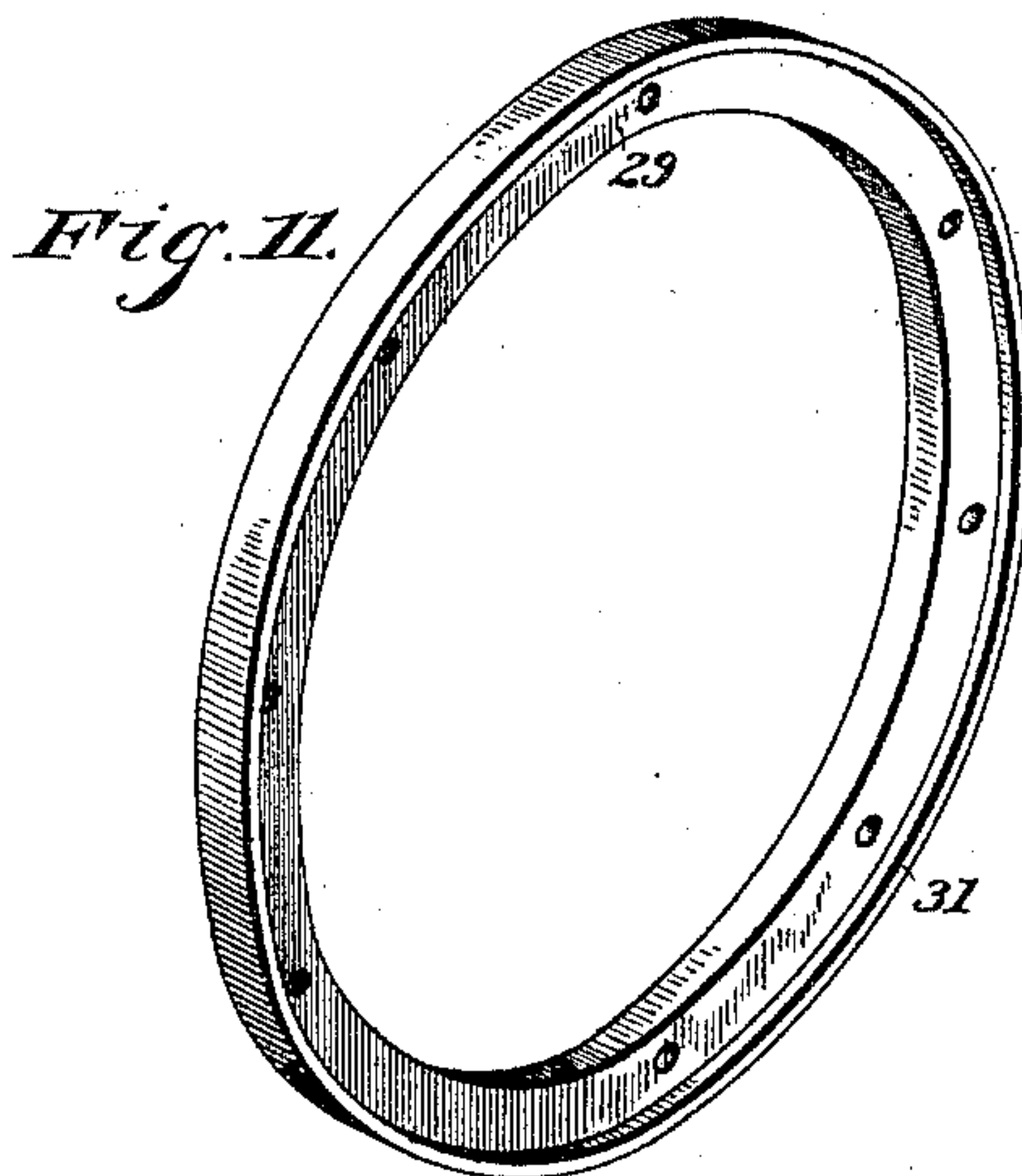
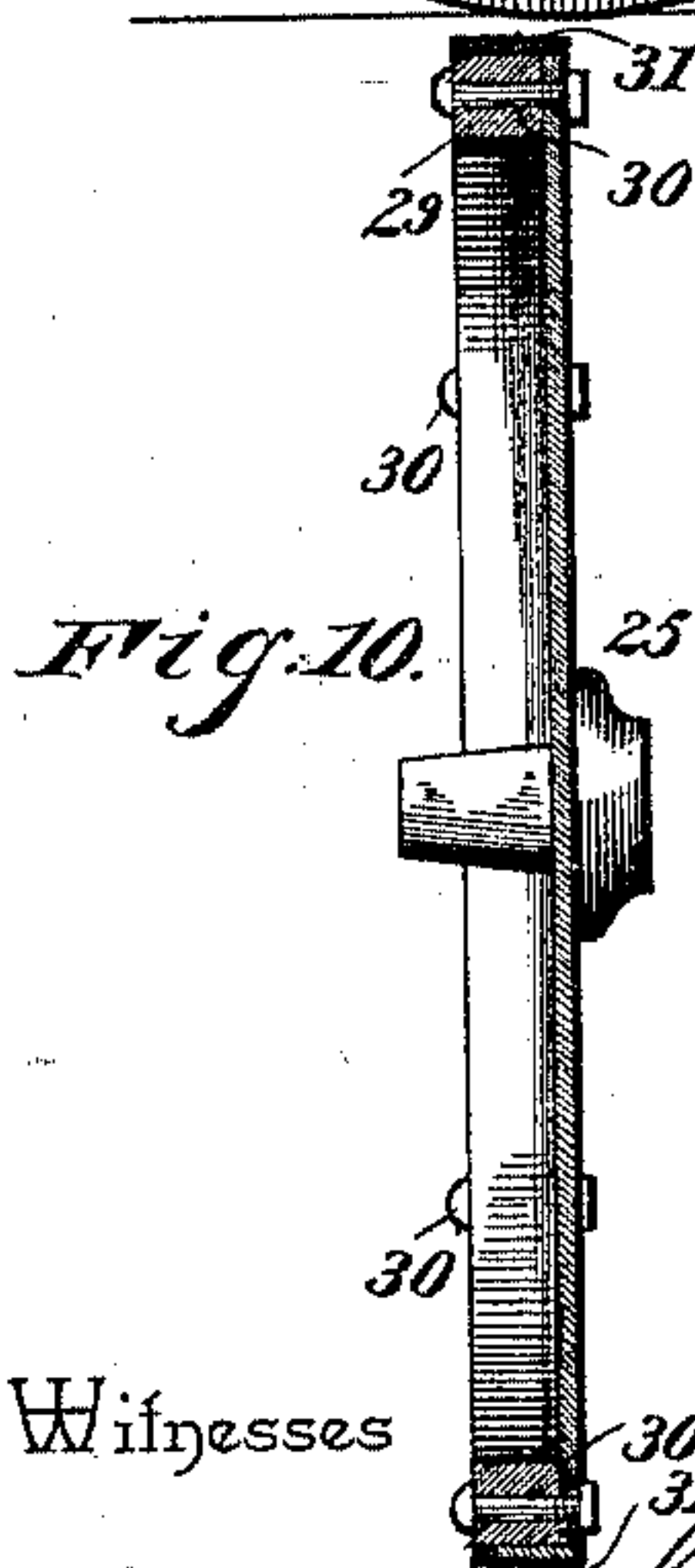
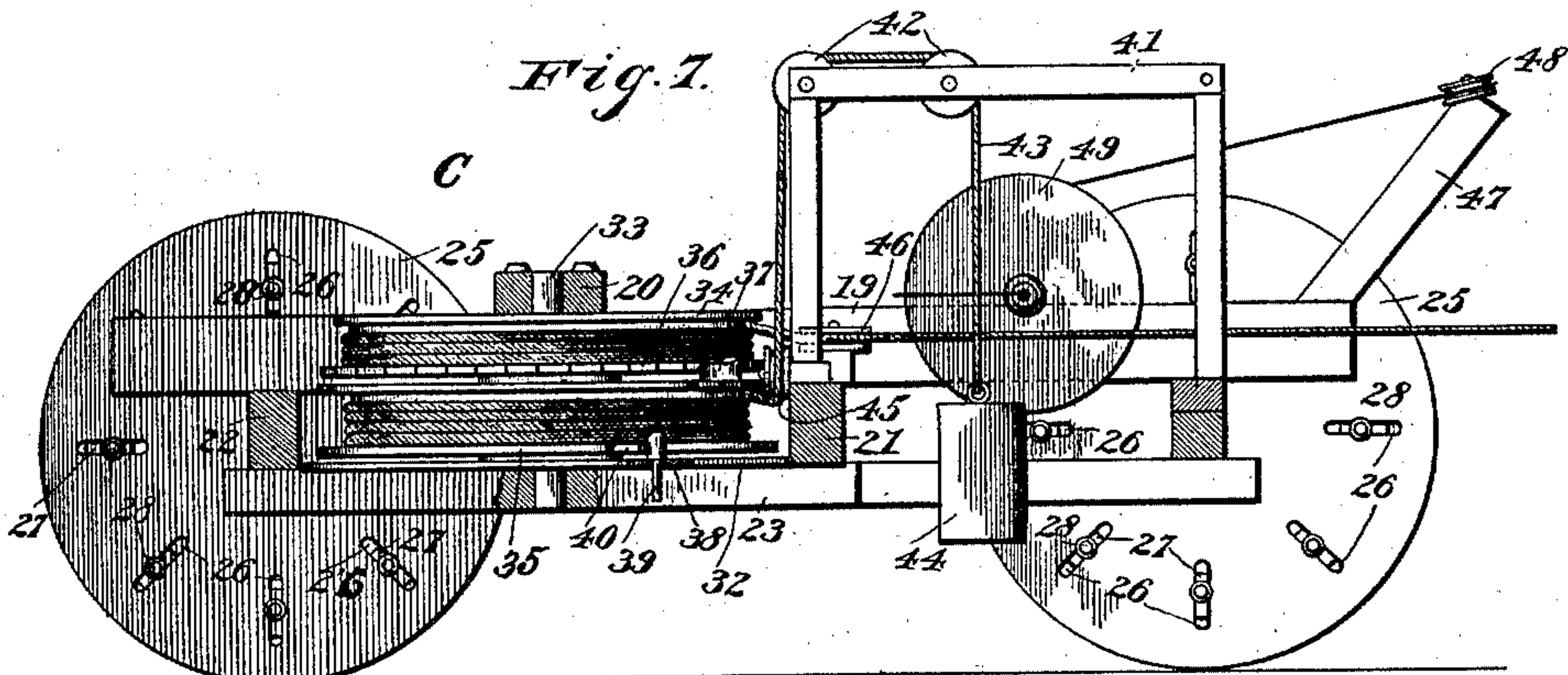
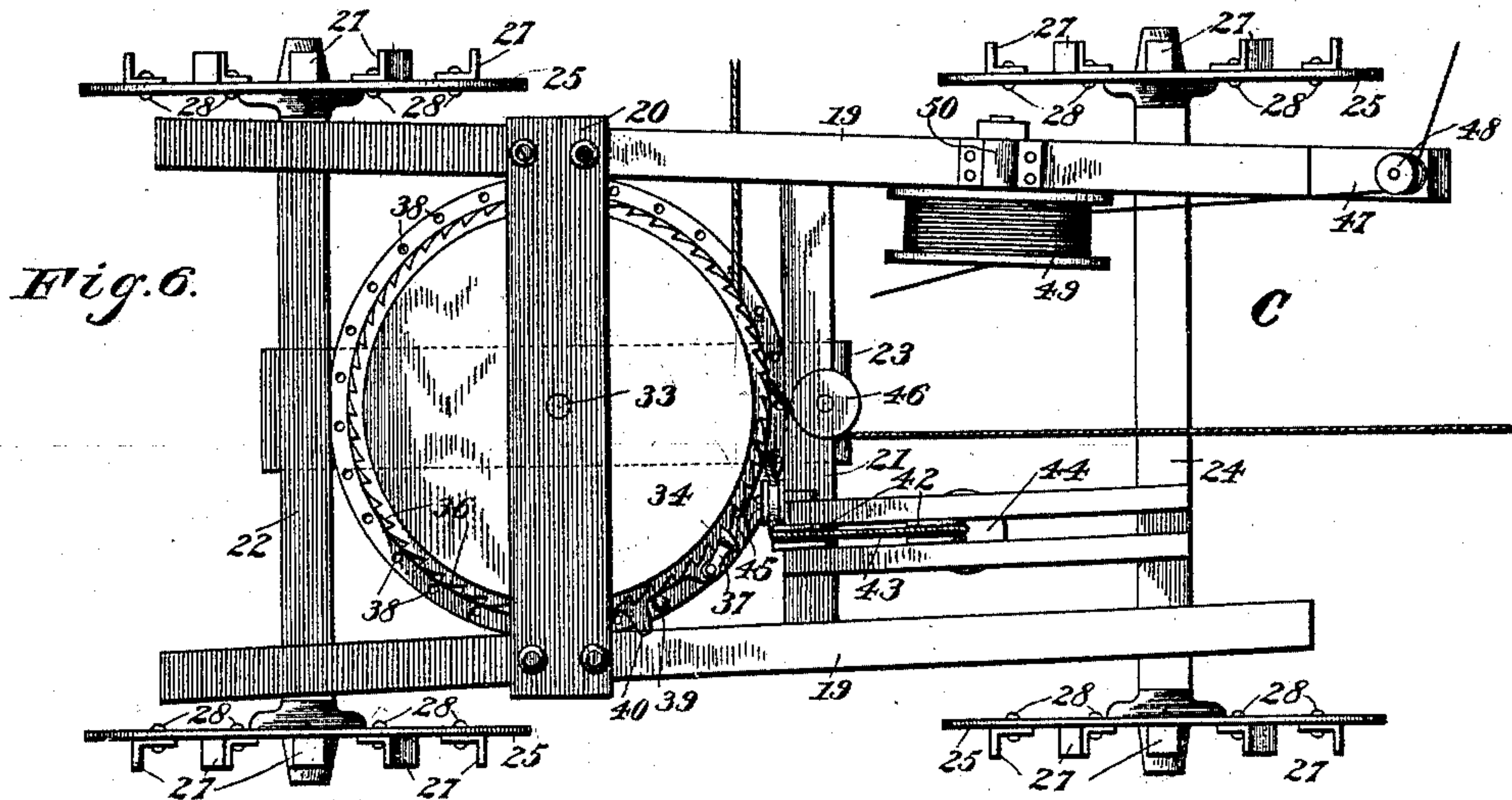
(No Model.)

4 Sheets—Sheet 3.

C. H. ROBERTS.
ELECTRIC PLOW.

No. 509,556.

Patented Nov. 28, 1893.



Witnesses

J. M. [Signature]
J. B. [Signature]

By *his* Attorneys,

C. A. Snow & Co.

Inventor,
Chas. H. Roberts,

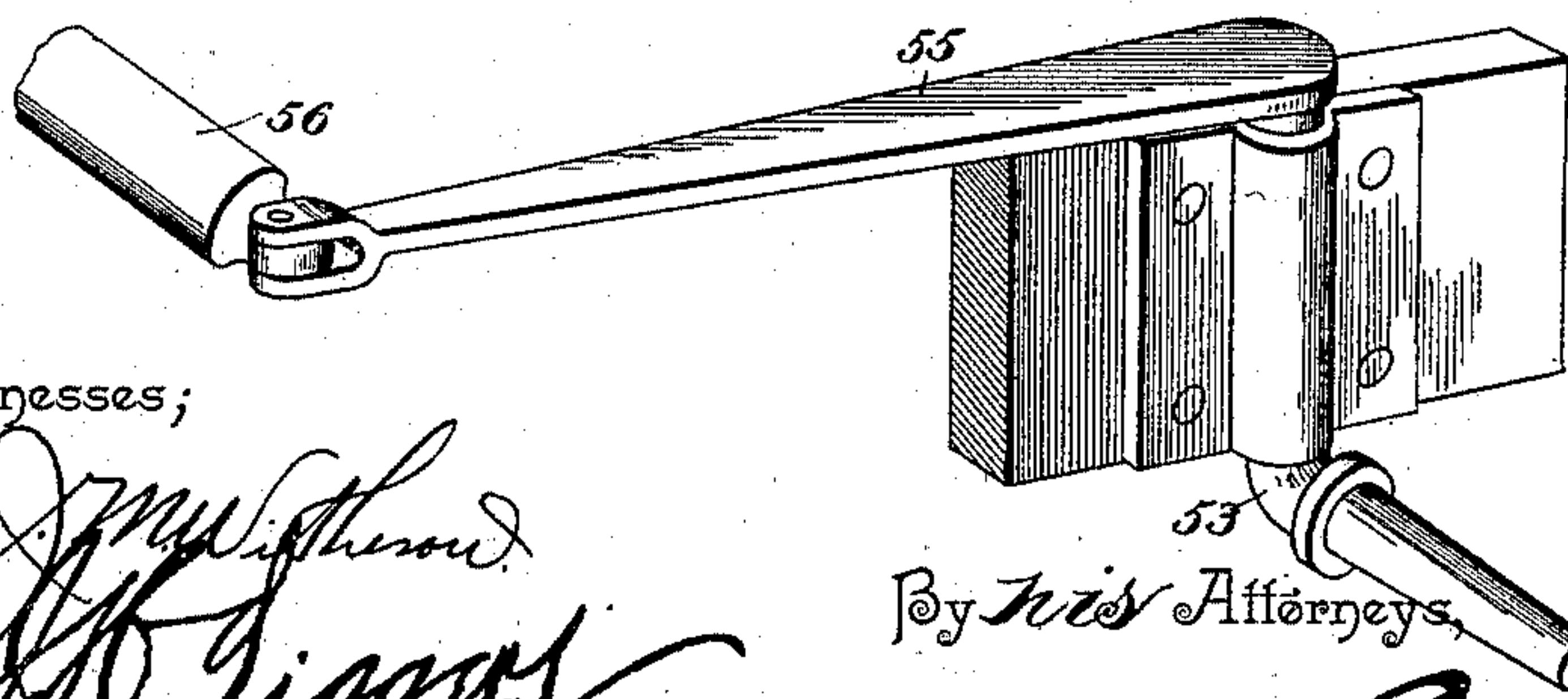
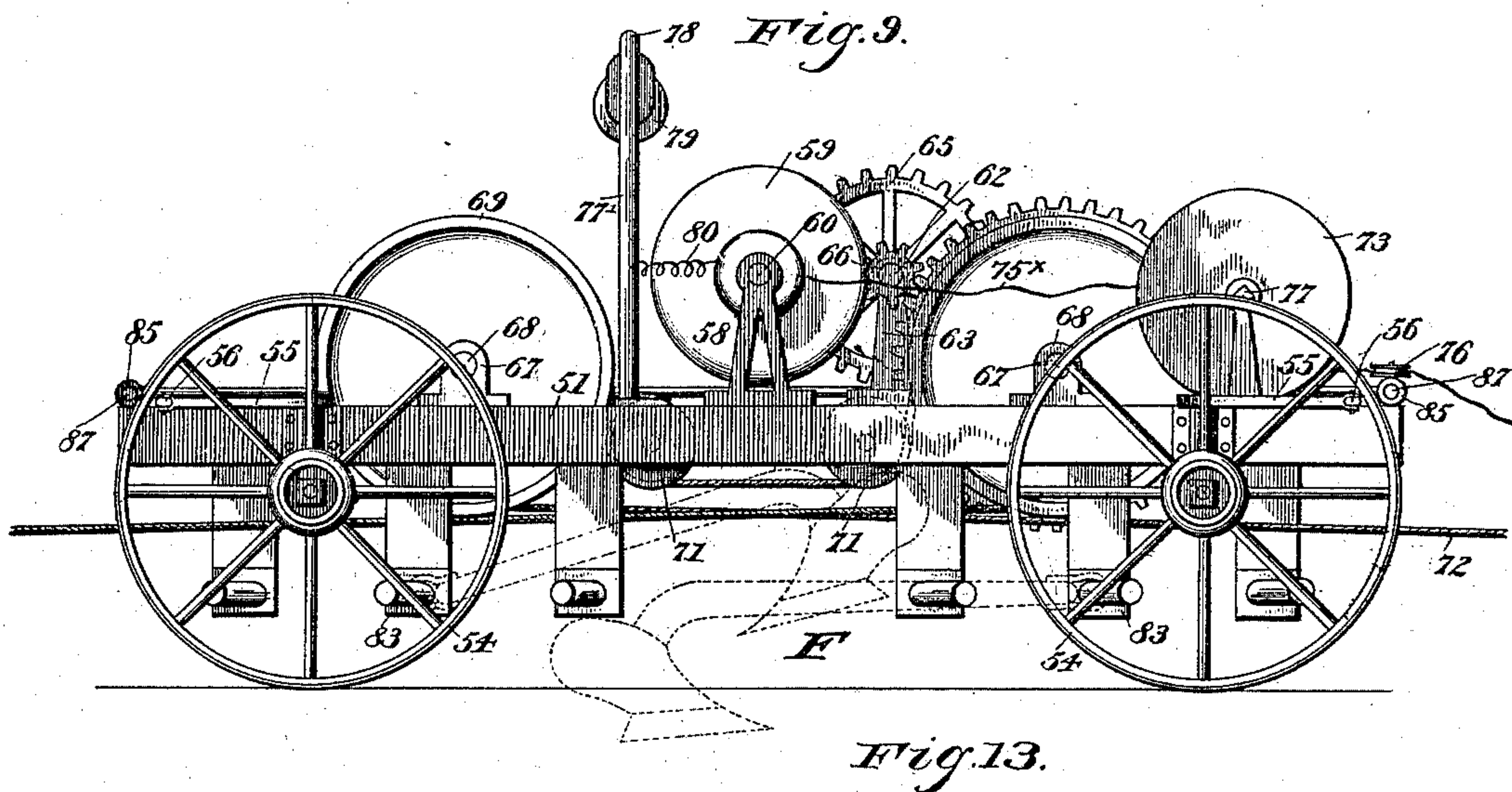
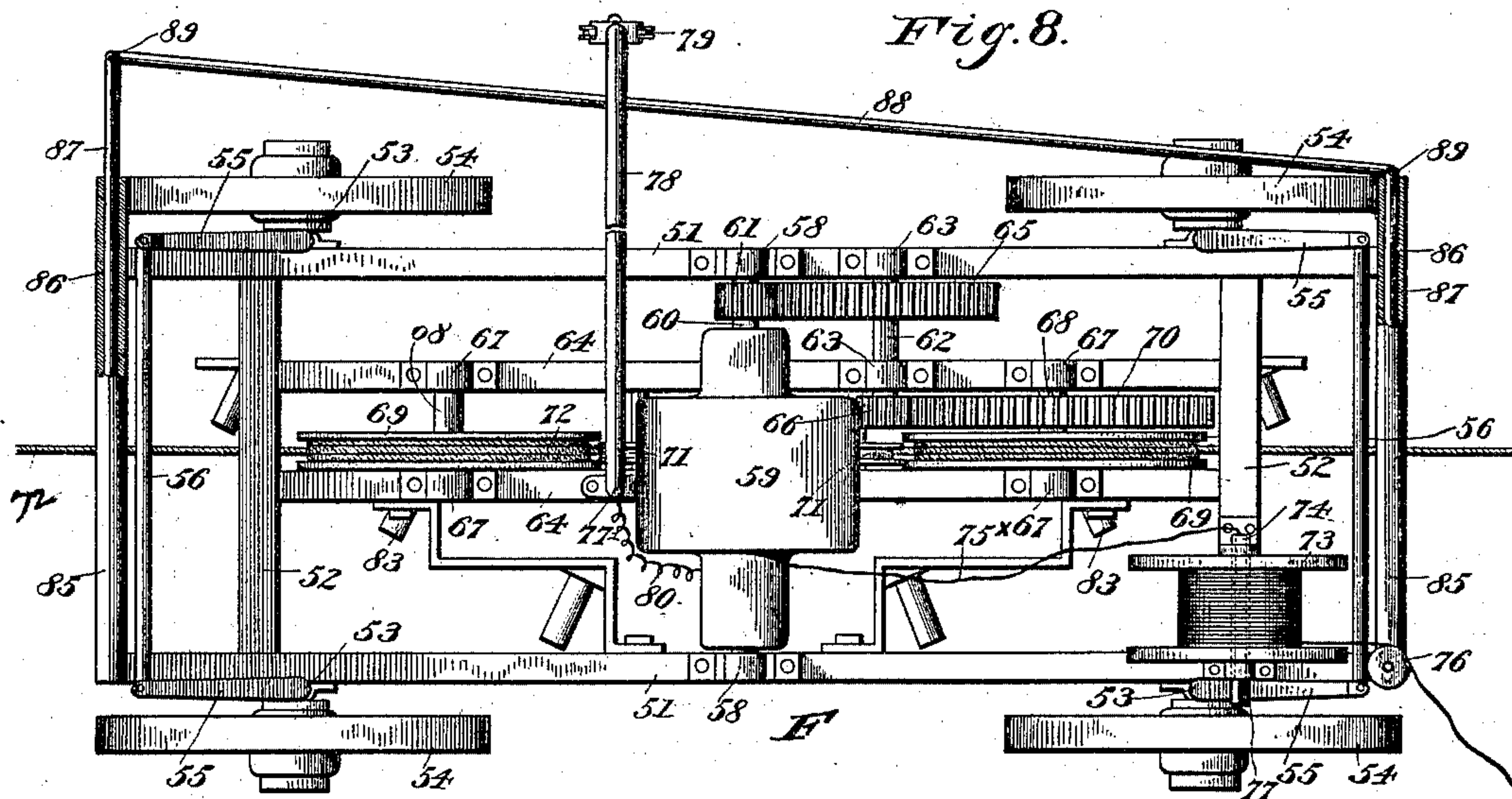
(No Model.)

4 Sheets—Sheet 4.

C. H. ROBERTS.
ELECTRIC PLOW.

No. 509,556.

Patented Nov. 28, 1893.



Witnesses;

J. M. Withers
J. B. Tiggers

By his Attorneys,

C. A. Snow & Co.

Inventor
Chas. H. Roberts

UNITED STATES PATENT OFFICE.

CHARLES H. ROBERTS, OF EAU CLAIRE, WISCONSIN.

ELECTRIC PLOW.

SPECIFICATION forming part of Letters Patent No. 509,556, dated November 28, 1893.

Application filed April 30, 1892. Serial No. 431,307. (No model.)

To all whom it may concern:

Be it known that I, CHARLES H. ROBERTS, a citizen of the United States, residing at Eau Claire, in the county of Eau Claire and State of Wisconsin, have invented a new and useful Electric Plow, of which the following is a specification.

My invention relates to that class of plows adapted to be drawn back and forth by mechanical power, over a field, and to form a series of furrows when traveling in either direction.

The objects in view are, primarily, to construct a plow adapted to be operated by electricity, furnished from a fixed or stationary battery, and to provide suitable anchors, both stationary and movable, and movable conductor-supports, and automatic means for adjusting or moving the said movable anchors and conductor-supports; and furthermore to avoid the employment of poles for supporting the electric wires.

Various other objects and advantages of the invention will appear in the following description, and the novel features thereof will be particularly pointed out in the claims.

Referring to the drawings:—Figure 1 is a diagrammatic or plan view of my entire apparatus, the same being in operative position, as it would appear in a field. Fig. 2 is a side elevation, parts being broken away, of one of the stationary anchors. Fig. 3 is a top plan of the same. Fig. 4 is an elevation and partial section of one of the wire conductor-supports. Fig. 5 is a front view of the same. Fig. 6 is a plan of one of the movable anchors. Fig. 7 is a vertical longitudinal section of the same. Fig. 8 is a plan view of the plow. Fig. 9 is a side elevation of the same. Fig. 10 is a section through one of the wheels of one of the movable anchors. Fig. 11 is a detail in perspective of the removable tire with which each of said wheels is provided. Fig. 12 is a detail in perspective of one of the L-shaped gage-plates, employed on said wheels. Fig. 13 is a detail in perspective of one of the crank-axles of the plow.

Like numerals of reference indicate like parts in all the figures of the drawings.

Referring more particularly to Fig. 1, which is a diagrammatic view of my invention in operation, A and B designate stationary an-

chors, of which there are two, located at two of the corners of the field to be plowed.

C and D designate movable anchors, which are located, at the beginning of the plowing operation, at the two remaining corners of the field.

E designates a movable wire conductor-support, of which a series are employed, they being arranged at equal distances apart between the movable anchors C and D, and in a position to travel across the field, or toward that side thereof at which are located the fixed anchors A and B; and F designates the plow-truck, which is located and adapted to travel back and forth between the movable anchors C and D.

The above describes the diagrammatic arrangement of the several elements or mechanism, when in operation; and I shall now proceed to elucidate in detail the constructions thereof, premising such description with the statement that the stationary anchors, the movable anchor and the wire conductor-supports are duplicates of each other, and therefore a specific description of one of each will suffice for its companions.

Referring to Figs. 2 and 3, in which the stationary anchor is shown in detail, 1 1 designate a pair of opposite beams arranged in line with each other, and spaced apart by front and rear blocks 2 and 3, bolts 4 serving to bind the blocks and beams together. Between the rear diverging ends of the beams a standard 5 is bolted as at 6, and extends downwardly from the beams and has bolted to its front face a fluke-plate 7. A brace-rod 8 passes through the fluke-plate and standard, and is connected to the block 3. In operation the fluke-plate is buried in the ground, so as to resist the draft, and the draft-rope or cable hereinafter referred to, is connected to the bolt 4.

Referring more particularly to Figs. 4 and 5, in which I have illustrated a detail of one of the wire-supports, 9 designates a rectangular frame, which is supported upon front and rear axles 10, the axles carrying ordinary ground-wheels 11. From the longitudinal side-bars of the frame rise pairs of inwardly-inclined standards 12, which meet above the center of the frame and there support an electrical conductor, longitudinally-

disposed bar 13, the same being insulated or formed of non-conducting material, and having its ends upwardly and inwardly bent to form hooks 14. A bearing-bracket 15 declines from the rear axle 10, and supports a vertical shaft 16, the upper end of which is connected with the bar 13. This shaft is provided with a bearing-shoulder 17, and between said shoulder and the bracket 15 a loose roller 18 is mounted on the shaft.

Referring now more particularly to Figs. 6 and 7 wherein I have illustrated the construction of the movable anchor, 19 designates the opposite longitudinal side-sills of the frame of the same, which are connected near their centers by the superimposed transverse beam 20, and at each side thereof and at the under sides of the sills by the transverse beam 21 and rear axle 22, these in turn being connected by the short longitudinal beam 23. Near their front ends the sills 19 are connected by the axle 24. The axles are provided with circular disks 25, which constitute anchoring-wheels, the same being formed of sheet metal and adapted to take into the ground to form an anchorage and thereby prevent lateral movement. Each of the disks is provided with slots 26, and adjustably connected to the outer face of each disk is a series of L-shaped gage-brackets 27, a bolt 28 passing through each bracket and through the aforesaid slot 26. It will be seen that the brackets will regulate the depth of penetration of the disks or wheels into the ground. 29 designates fellies, with which the disks or wheels 25 are provided. These fellies are removably secured in position against the outer faces of the disks at their peripheries by bolts 30, and to the fellies tires 31 are secured. These tires and fellies are secured in position upon the wheels, when it is desired to transport the anchor to and from the field of operation, and prevent during such transportation, the sinking of the disks into the ground. The short longitudinal beam 23 supports a metal plate or platform 32, through which and the transverse beam 20 a shaft 33 passes. Upon this vertical shaft are mounted and arranged one above the other, two winding drums, designated as the upper drum 34, and the lower drum 35. The upper drum has the lower flange provided with teeth 36, into which engages the free end of a pivoted pawl 37, mounted on the upper side of the lower drum, said pawl thus locking the drums together when the lower drum moves in one direction, and permitting the lower drum and upper drum to independently move in reverse directions. The plate or platform 32 is provided with an annular series of perforations 38, and into any one of these may be removably inserted a stop-pin 39, against which will contact a lug 40, formed on the lower flange of the lower drum. A vertical framework 41 is located in front of the aforesaid drums, and rises from the front axle 24 and the transverse beam 21. This framework, which in

fact is double, is provided with a pair of interposed grooved pulleys 42, over which passes a rope or cable 43, the outer end of which has connected to it a re-winding weight 44. Below the pulley 42, at the rear end of the frame 41, a guide-pulley 45 is located, and under this the before-mentioned rope or cable 43 passes. Above the beam 21 there is journaled in the framework a guide-pulley 46. An arm 47 inclines from the inner side-sill and has journaled at its outer end a loose grooved guide-pulley 48. In rear of said arm a wire-receiving reel 49 is journaled upon a suitable bearing, 50.

Referring more particularly to Figs. 8 and 9 it will be seen that I have illustrated in detail my electrical plow. 51 designates the opposite side-sills, which are connected near their ends by the transverse sills 52. Near the juncture of the sills swiveled L-shaped bearings or journals 53 are located, and upon the same ordinary wheels 54 are mounted. Arms 55 extend from each of the journals, toward the ends of the frame and these are connected at the front and rear ends of said frame by transverse connecting-bars 56, which are pivoted at their extremities to the extremities of the arms. From this it will be obvious that each pair of wheels may be adjusted at angles to the frame of the machine, and simultaneously, and to the same degree.

In suitable standards 58, mounted on the side-sills 51, there is supported an electric motor 59, from which the drive-shaft 60 extends, and upon the same is mounted the gear-wheel 61. A countershaft 62 is journaled in bearings 63, located upon one of the side-sills 51, and the adjacent one of a pair of inner sills 64, and upon this shaft there is keyed or fixedly mounted a gear-wheel 65, of greater diameter than the gear 61. The shaft 62 projects beyond its inner bearing, and is there provided with a small gear 66. At opposite sides of the electrical motor 59, there are journaled in pairs of transversely opposite bearings 67, short transverse shafts 68, upon each of which and in line with each other, are mounted for rotation with the shafts, cable-pulleys 69. Upon that shaft 68 more adjacent to the countershaft 62, there is in addition to the pulley 69, a large gear 70, which gear is engaged and driven by the small gear 66 of the aforesaid countershaft. Below the electrical motor and between the two drums or cable-pulleys 69, small guide-pulleys 71 are mounted for rotation.

72 designates the draft-cable, the opposite ends of which are made fast to the before-described drums 35 of the opposite movable anchors C and D. Between these anchors the draft-cable passes several times about each of the drums or pulleys 69 and under the guide-pulleys 71.

73 designates a reel, the hub 74 of which is tubular. An electrical conductor is wound upon the reel, one end of the conductor leading from any suitable electrical supply or

generator 75, located at the end of the field or at any other point, and passing about suitable guide-pulleys 76, and the remaining end of said conductor, or what would be its inner end being passed through the tubular hub 74 and connected with one pole of the motor. One end of the hub 74 is squared, as at 77, to receive the square socket-end of a crank, whereby the reel may be rotated for the purpose of winding up the electrical conductor. Rising from one of the central sills 64 is a standard 77', which is provided at its upper end with a laterally-extending arm or trolley 78, bifurcated at its extremity and having journaled therein a trolley-wheel 79. This trolley-arm 78 is electrically connected with the second pole of the motor by a wire 80. The remaining conductor extends from the electrical generator Fig. 1 to the reel 49 of the adjacent movable anchor, and after being wound upon the same, passes therefrom around a guide-pulley 48, and across the field over the various supporting-bars 13, and is made fast to an arm 82 of the companion movable anchor, and also passes over the trolley-wheel 79 before described.

End-bars 85 connect the side-sills 51 and are provided with keepers or ways 86, in each of which a reciprocating bar 87 is mounted. The ends of these bars are pivotally connected as at 89 to a longitudinally-disposed inclined track-bar 88. By reciprocating one of the bars 87 inwardly and the other outwardly, the track-bar 88 may be inclined in one direction, and by reversing the movements of the bars 87, the track-bar may be inclined in the opposite direction, for a purpose hereinafter apparent.

This completes the construction, with the exception of the plows with which the motor-truck is provided. These plows are, as is usual in this class of machinery, arranged in gangs 83, one gang being elevated when out of operation, and the remaining gang lowered into operation. Any suitable mechanism may be employed for raising and lowering the plows.

The operation or manner of forming the furrows will be understood for the most part from my previous description, and I will therefore but briefly outline the same.

It will be seen that a current of electricity will pass from the generator through the wires, 75* and 80, and the trolley-arm and wheel, and also through the electrical motor by which motion will be imparted to the drums 69 in the manner before described. The cable 72 being wound upon the drums 69 a sufficient number of times to prevent slipping, it will be seen that as said drums revolve through the medium of the electrical motor described and intermediate gearing the plow-truck will be drawn along between the movable anchors, the cable 72 being unwound as in the present instance from the drum 35 of the movable anchor C and through the medium of the pawl 37 carrying with it the upper drum

34. This causes the drum 34 to wind the anchor-cable 90 thereon, said cable being connected at its ends to the drum 34, and to the opposite stationary anchor A, and thus during the movement of the plow away from the movable anchor C, the said movable anchor is drawn a short distance across the field, or to a proper position to form the point of approach of the plows in their movement. So much for the operation of one of the movable anchors when the plows are receding therefrom, and I will now proceed to describe the operation of the companion movable anchor, toward which the plows are moving, such in the present instance being the movable anchor D, from which it will be understood the plows have previously receded. The approach of the plows toward this movable anchor D, it will be seen, slackens the cable 72 between the plows and the anchor C, and in order to take up the slack I employ the before-described re-winding weight 44, and its cable 42. Thus it will be seen that the weight 44 that has been previously elevated during the unwinding of the cable upon the drum 35, now descends and rotates the drum so as to take up the slack and re-wind the cable thereon. During this re-winding or taking up of the slack of the cable, the anchor-cable 90 of the movable anchor D is at rest, as is also its drum 34, the pawl 37 now riding loosely over the teeth of the said drum 34. When the plow reaches the end of its travel, its wheels are set, the plows or gangs have their positions reversed, and the operation of the motor is reversed, so that the plow now travels toward the opposite movable anchor C, during which the operation just described is repeated. The trolley-wheel 79 elevates the electrical conductor from the supporting-bars 13 of each of the electrical supports E, as said trolley passes the same and thus said trolley-wheel clears the same. Furthermore inasmuch as the inclined track 88 is always shifted so as to be inclined in the direction of travel of the plow, it will be successively brought in contact with the rollers 18 of the electrical wire-supports E, and by the action of the inclined track against said rollers, each support will be successively forced a short distance across the field, and in this manner it will be seen that the electrical conductor-supports are automatically moved at the proper time by the action of the plows, as are also the movable anchors, so that after starting the machine at one side of the field, it is simply necessary to attend to the adjustments and manipulations of the described parts of the plow-truck, the adjusting of the remaining elements of the apparatus being properly timed and entirely automatic. The advantages arising from the employment of my invention are too numerous to herein enumerate in detail, and it is now believed that such is unnecessary.

Various details of construction may be changed or modified without departing from

the spirit of my invention, and scope of my claims, and hence I do not limit my invention to such details.

Having described my invention, what I claim is—

1. The combination with opposite take-up and paying-out mechanisms, and means for operating the same, of a truck arranged between said mechanisms, reversible plows carried thereby a motor on the truck, a drum supported on the truck, and a draft-cable passed about the drum and leading to the said take-up and paying-out mechanisms, substantially as specified.

2. The combination with the opposite movable anchors, and take-up and pay-out mechanisms mounted thereon, of an intermediate truck, reversible plows carried thereby means for operating the truck, drums mounted on the truck, a cable passing from the take-up and paying-out mechanisms of one anchor to that of the other, and passed about the drums, and means for automatically moving the anchors at each take-up movement of the mechanism, substantially as specified.

3. The combination with the opposite movable anchors, the fixed anchors, a pair of drums mounted upon each of said movable anchors, cables leading from the fixed anchors to one of the drums of each of the movable anchors, of a truck, arranged between the said movable anchors, reversible plows and pulleys or drums mounted on the truck, a draft-cable passed about said drums, and at its ends connected to the remaining drums of the movable anchors, a motor mounted on the plow-carrying truck for operating the pulleys, and engaging-devices between the pulleys of the draft-cable and those of the anchor-cables, whereby unwinding movements of the draft cable-pulleys are communicated to the anchor-cable pulleys, substantially as specified.

4. The combination with the opposite anchors, having take-up and pay-out mechanisms, of an intermediate plow-carrying truck, a draft-cable connecting the anchor-mechanisms, drums mounted in the truck around which the cable is passed, an electrical motor on the truck for operating the drums, an electrical supply and electrical conductors leading to and from the motor and supply, substantially as specified.

5. The combination with the opposite movable anchors, having take-up and pay-out mechanisms, and means for alternately operating or moving said anchors, of a series of trucks carrying wire-supports, an intermediate plow-carrying truck, an electrical motor mounted on the latter, drums mounted on the plow-truck, a cable connected with the take-up and pay-out mechanisms of the anchors and passed about the drums of the plow-truck, electrical conducting-wires passing over the supports, a generator from which the wire leads, a wire leading from the generator to the motor of the truck, electrical connections

between the motor and the wire, and devices mounted on the side of the truck for successively coming in contact with and moving the aforesaid wire-supports, substantially as specified.

6. The combination with the transverse series of wheeled trucks, provided with electrical wire-supports, of a plow-carrying truck arranged for movement in front of the supports, an electrical motor mounted on the truck, an electrical supply, a conducting-wire leading from the supply, arranged upon the supports, connections between it and the motor, and between the motor and supply, and an inclined track supported at one side of the plow-carrying-truck, and adapted for contact with the wire supporting-trucks, substantially as specified.

7. The combination with the transverse series of wheeled trucks, provided with electrical wire-supports, of a plow-carrying truck arranged for movement in front of the supports, an electrical motor mounted on the truck, an electrical supply, a conducting-wire leading from the supply, arranged upon the supports, connections between it and the motor and between the motor and supply, the inclined track located at one side of the plow-carrying truck and adapted to successively contact with the wire-supporting trucks, and means for reversing the inclination of the track, substantially as specified.

8. The combination with the series of rectangular truck-frames, having axles, ground-wheels, upwardly-converging standards, a superimposed insulated wire-conductor supporting-bar, the rear shaft and the roller 18, of the plow-carrying truck arranged in front of the same, an electric motor thereon, a trolley-arm extending from the truck and provided with a trolley-wheel, and electrically connected with the motor, an electrical supply, wires leading therefrom to the motor, over the trolley-wheel and the supporting bars of the trucks, the opposite ways formed in the ends of the plow-truck, the reciprocating-bars mounted in the ways, and the inclined track pivoted at its ends to the bars and adapted to operate against the before-mentioned roller 18, substantially as specified.

9. The combination with the opposite movable anchor-trucks, the vertical shaft mounted therein, the upper and lower drums mounted on the shaft, the upper drum having ratchet-teeth, a pawl on the lower drum for engaging the teeth when the drums operate in one direction, stationary anchors, cables leading from them to one drum of each of the movable anchors, a frame on each of the movable anchor-trucks, pulleys thereon, re-winding cables passed over the pulleys and about the anchor cable-drums, and provided with weights, of the plow-carrying truck arranged intermediate the movable anchors, drums thereon, a motor for operating the drums, and a draft-cable passed about the drums of the plow-carrying truck, and about the remain-

ing drums of the movable anchors, and reversely disposed with relation to the anchor-cables, substantially as specified.

10. The combination with a pair of stationary-anchors, movable anchor-trucks arranged opposite the same, and having thin metal wheels having radial slots, L-shaped brackets, and adjusting-bolts passing through the brackets and slots, of take-up and pay-out devices mounted on said trucks, an intermediate plow-carrying truck, a drum therein, a cable leading therefrom to the take-up and pay-out devices of the movable anchor-trucks, a motor carried by the plow-truck for operating the drum, and cables leading from the stationary anchors to said take-up and pay-out devices, substantially as specified.

11. The combination with a pair of stationary-anchors, movable anchor-trucks arranged

opposite the same, and having thin metal wheels, removable felly-rings having tires, and bolts passing through the rings and disks, of take-up and pay-out devices mounted on said trucks, an intermediate plow-carrying truck, a drum therein, a cable leading therefrom to the take-up and pay-out devices of the movable anchor-trucks, a motor carried by the plow-trucks for operating the drum, and cables leading from the stationary anchors to said take-up and pay-out devices, substantially as specified.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

CHARLES H. ROBERTS.

Witnesses:

WM. BUSSELMAN,
C. B. DANIELS.