C. D. SHORTS.

PIPE PULLING MACHINE.

APPLICATION FILED FEB. 20, 1909.

951,621.

Patented Mar. 8, 1910.

4 SHEETS—SHEET 1.

Fig. 1.

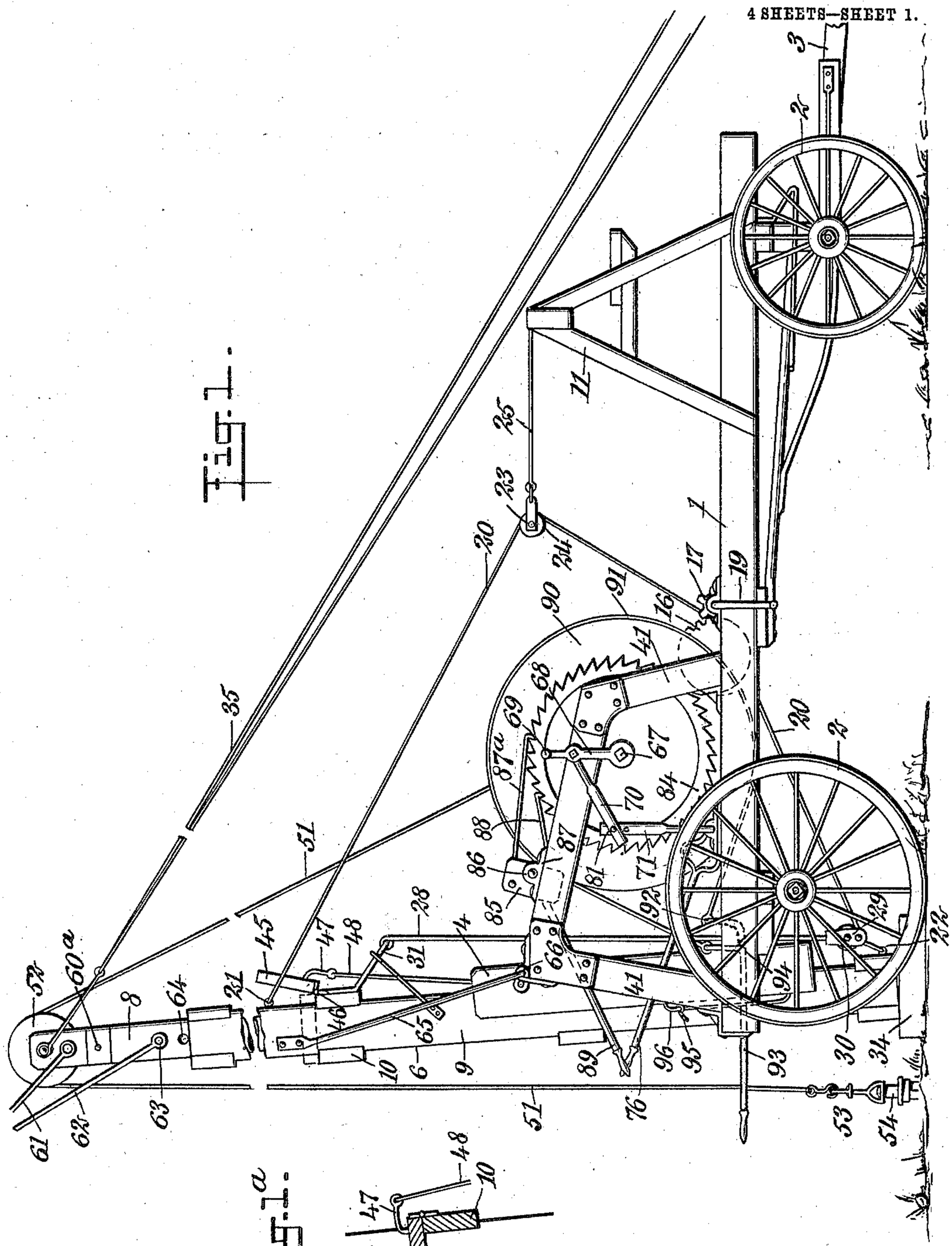
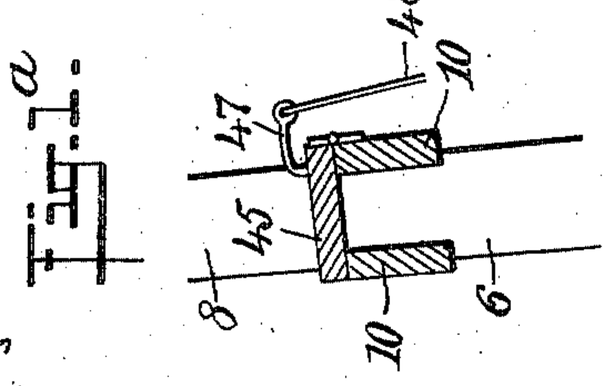


Fig. 1a.



WITNESSES

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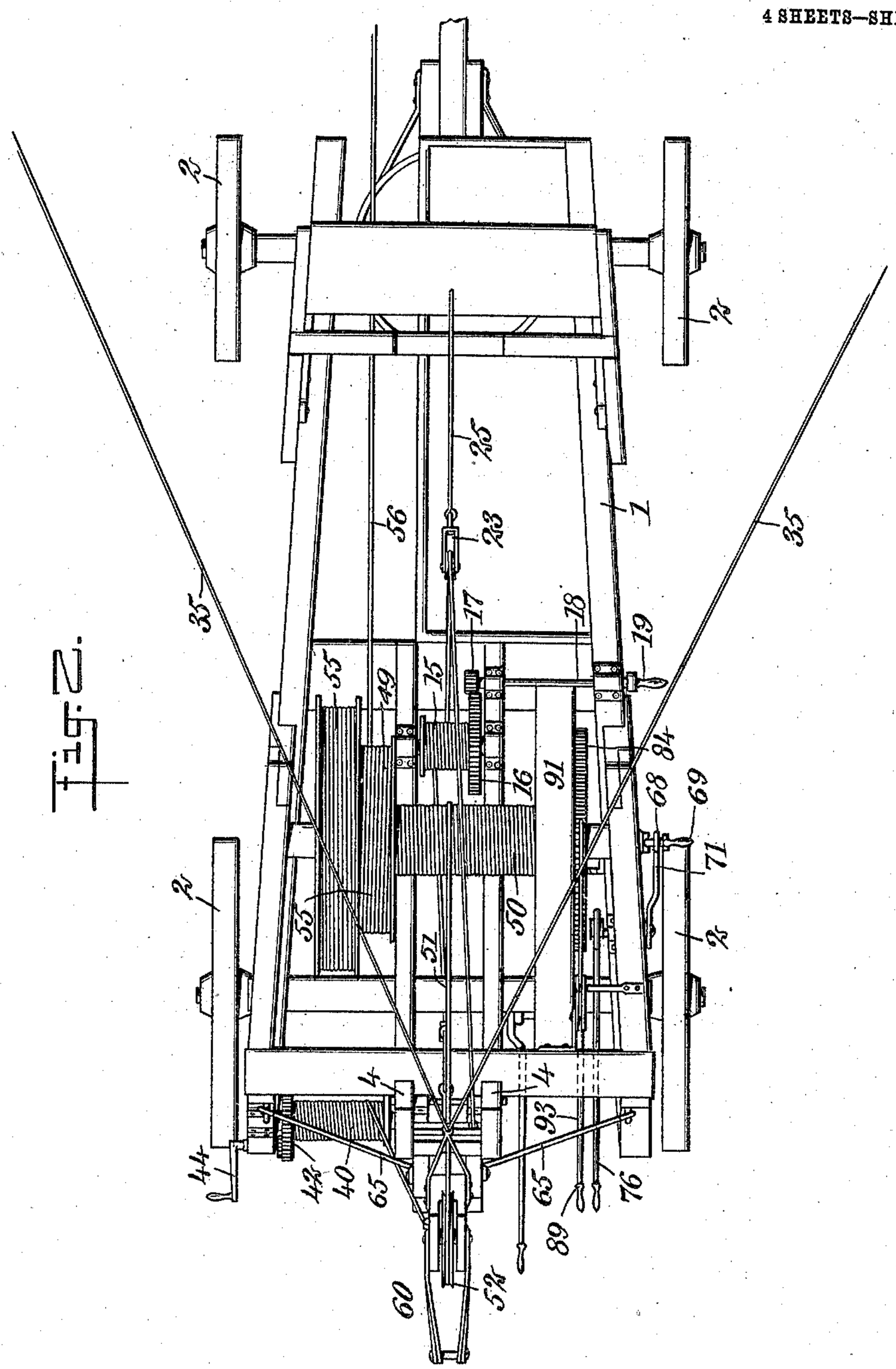
4 SHEETS—SHEET 2.

Fig. 2.



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4 SHEETS—SHEET 3.

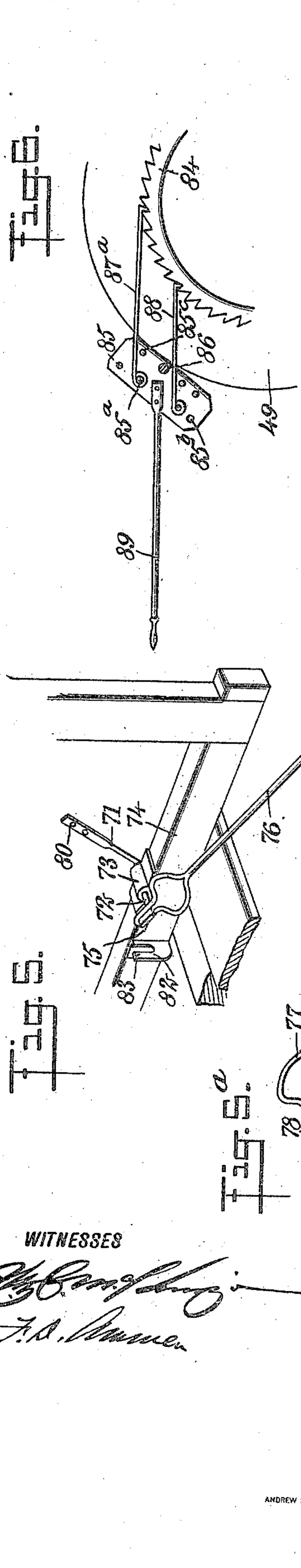

Fig. 6.

Fig. 7.

Fig. 5.

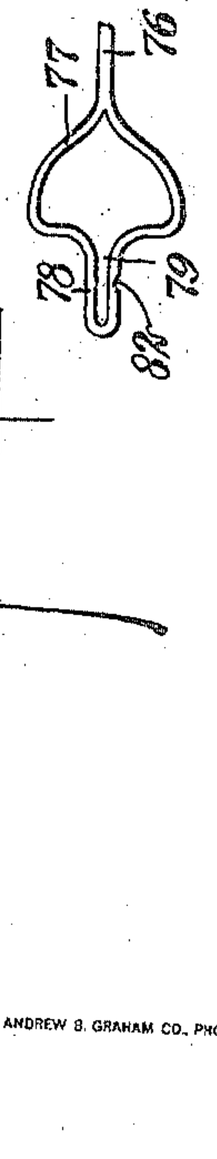

Fig. 5a.

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4 SHEETS—SHEET 4.

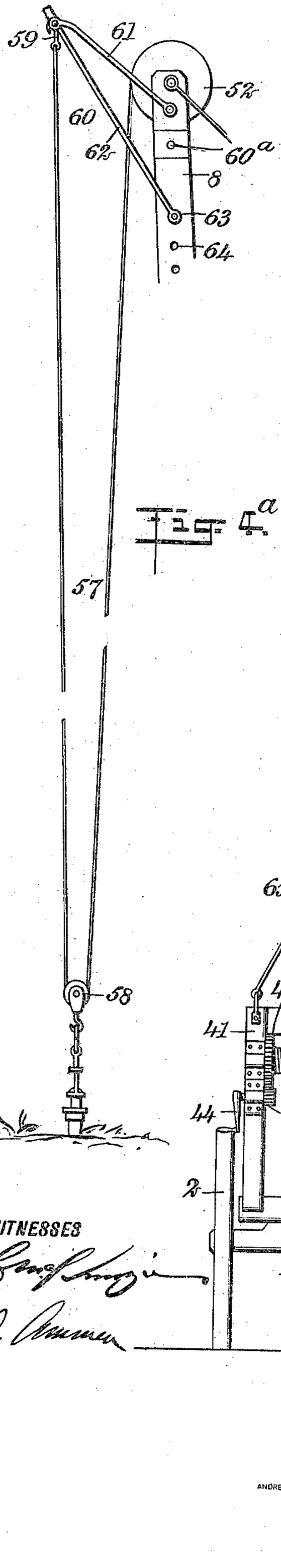

Fig. 4a.

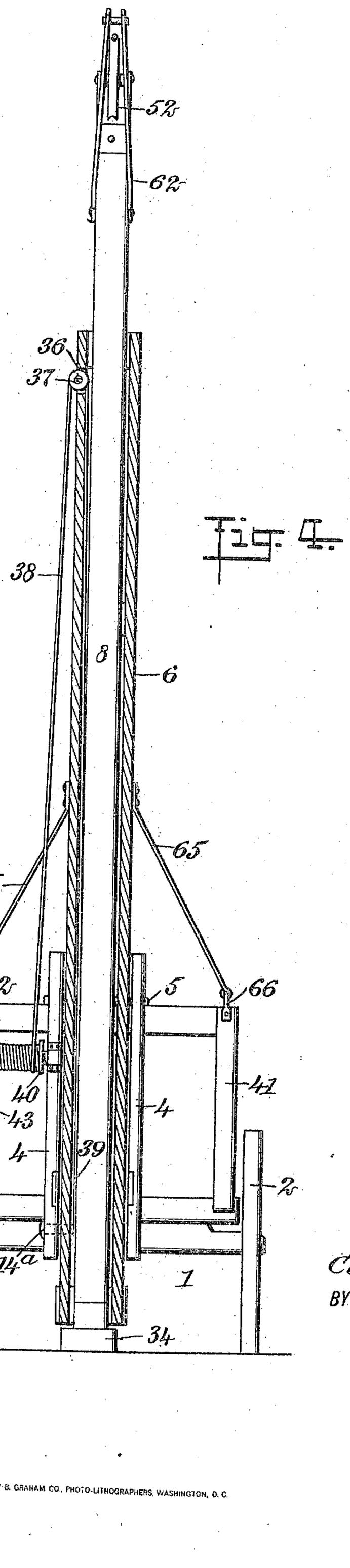

Fig. 4.

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UNITED STATES PATENT OFFICE.

CLAIR D. SHORTS, OF FERN, PENNSYLVANIA.

PIPE-PULLING MACHINE.

951,621. Specification of Letters Patent. Patented Mar. 8, 1910.

Application filed February 20, 1909. Serial No. 479,081.

To all whom it may concern:

Be it known that I, CLAIR D. SHORTS, a citizen of the United States, and a resident of Fern, in the county of Clarion and State of Pennsylvania, have invented a new and Improved Pipe-Pulling Machine, of which the following is a full, clear, and exact description.

This invention relates to a machine the purpose of which is to facilitate the placing or removing of the pipe rods or casings of deeply driven wells, such as oil wells or Artesian wells.

The object of the invention is to provide a machine of this class having an extensible mast which is adapted to fold down upon the frame of the device, the entire structure being mounted upon wheels, so that it can be readily moved to and from the localities of the wells.

The invention consists in the construction and combination of parts to be more fully described hereinafter and particularly set forth in the claims.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views, and in which—

Figure 1 is a side elevation of a machine constructed according to my invention, certain parts being broken away; Fig. 1ª is a vertical section taken at a point on the mast, and indicating the manner in which the movable shaft of the mast is supported in the guide-mast; Fig. 2 is a plan of the machine; Fig. 3 is a longitudinal vertical section, taken through the machine, and showing the mast in a folded position, a portion of the mast being broken away; Fig. 4 is a vertical section through the guide-mast, taken in a transverse plane and showing the other parts in elevation, this view illustrating especially the means for extending the shaft of the mast; Fig. 4ª is a side elevation, showing the upper portion of the mast and illustrating a tackle-arm and tackle for pulling the pipe; Fig. 5 is a perspective, showing a portion of the frame and illustrating the mechanism for controlling the rotation of the lifting drum; Fig. 5ª is a side elevation further illustrating details of the parts shown in Fig. 5; and Fig. 6 is a fragmentary sectional view of the ratchet wheel, illustrating a device for rotating the pulling drum by hand.

Referring more particularly to the parts and especially Figs. 1 to 3, 1 represents the main frame, which is mounted upon wheels 2, so that it constitutes a truck or wagon frame, at one end of which a tongue 3 is provided, to which draft animals may be attached. At the end of the main frame 1 which is remote from the tongue 3 are provided a pair of pivotally-disposed posts 4. These posts project nearly vertically, and are disposed at a slight distance apart, as indicated in Figs. 2 and 4. Near their upper ends, these posts are connected by a horizontal shaft 5, and this shaft is rotatably attached to the mast-guide or sheath 6 by means of a suitable bracket 7.

Within the sheath 6 there is mounted to slide longitudinally a mast-extension or shaft 8. The sheath 6 is formed of two side bars 9 connected by cross bars 10, and these cross bars guide the shaft 8 in sliding longitudinally in the sheath. On account of the shaft 5 which supports the mast, the mast may occupy a horizontal folded position, as indicated in Fig. 3, at which time its free end is supported on an upper frame or horse 11. As indicated in Fig. 3, the lower end of one of these posts 4 is connected with the rear axle 12 of the truck, by means of a plate 13, which plate has a plurality of adjusting openings 14 therein. These adjusting openings are adapted to receive a removable pin 14ª which is adapted to engage an opening in the butt-end of the sheath 6, as indicated clearly in Fig. 4. On account of this arrangement, the mast may be held in either an elevated position when the pin is in use; or the pin may be removed to permit the mast to be lowered to a depressed position.

In order to raise the mast from its depressed position, as indicated in Fig. 3, I provide a small elevating drum 15, which is attached in a horizontal position on the main frame. Rigid with this drum, there is provided a gear wheel 16, which is adapted to be rotated by a pinion 17 on a shaft 18, said shaft being driven by a hand-crank 19, as indicated in Fig. 2. Around this drum 15, an elevating cable 20 is coiled, and one end of this cable is attached at 21 to a part of the mast which is above the shaft 5, when the mast is elevated. The other end of the cable runs down under the axle 12, and is attached to the foot of the mast at 22. Between the drum 15 and the point 21, a

shackle 23 is attached to the cord, the said shackle having a roller 24 which receives the cord as indicated. This shackle is attached to a guy-cord 25, which runs in a nearly horizontal direction over the back 26 of the horse 11. From this point, the guy-cord 25 extends downwardly, and it is anchored in the frame of the truck at 27. This guy-cord 25 holds the cable 20 in the manner indicated in Fig. 1 when the mast is raised; that is, it holds the cable out of the way of the mechanism of the machine, and gives a desirable direction to the upper portion of the cable in pulling the mast down.

Between the axle 12 and the point 22, a strut or strut-bar 28 is provided. At the lower end of this strut bar, a shackle 29 is attached, having a roller 30 running on the cable 20. The upper end of this strut is pivotally attached to a bracket 31, which bracket is pivotally attached to the side of the main sheath in an inclined position, as indicated. The strut 28, near its middle point, is provided with a brace 32, which brace is pivotally attached at 33 to the under side of the axle 12, as shown.

In the operation of raising the mast, the drum 15 is rotated in a left-hand direction, referring to Fig. 3. This takes up the part of the cable below the drum and pays out the part of the cable above the drum. In this way, the butt-end of the mast is brought downwardly, and the upper end raised. The strut 28 not only gives a downward direction or pull to the end of the cable which is attached to the butt-end of the mast, but it also produces a downward thrusting force in the strut, which is exerted against the mast on the opposite side of the shaft 5. This facilitates very much the raising of the mast into a nearly vertical position, in which it can be locked by means of the pin 14ª, as described above. When the mast has been brought to this position, a large block 34 is placed under the butt-end of the sheath, so as to take the weight off the truck wheels.

Referring now especially to Fig. 1, the upper end of the shaft 8 projects above the sheath 6, and it is provided with guy-cables 35, which are carried to the rear and suitably anchored in the ground. These guy-cables are not secured, however, until the shaft 8 of the mast has been raised or extended to an elevated position. In order to enable the mast to be extended in this manner, one of the side bars 9 of the sheath 6 is provided with an opening 36, as indicated in Fig. 4, and in this opening a pulley 37 is provided, around which passes a cord 38. This cord passes through the opening 36 into the interior of the sheath, and is attached at the point 39 to the shaft 8; that is, it is attached near the lower end of the shaft 8. The outer part of the cord extends down to a point near the foot of the mast and is coiled on a shaft-lifting drum 40. This drum is mounted in a horizontal position between one of the posts 4 and one of the truss-frames 41, which are mounted on each side of the frame 1. This drum 40 is provided with a large gear wheel 42, which is rotated by means of a pinion 43 through the medium of a hand-crank 44. Evidently, by rotating this crank, the cord 38 may be wound up so as to raise the shaft 8 in the sheath 6.

In order to enable the shaft to be supported at a high elevation, I provide a shaft-seat 45, which is attached by a hinge 46 to one of the cross bars 10 of the sheath or guide-mast. This seat 45 is simply a block, which is adapted to drop down across the interior of the guide-mast or sheath, as indicated in Fig. 1ª, and when in this position, it will form a support for the butt-end of the shaft, as will be readily understood.

In extending the shaft 8, as described, it should be raised sufficiently so as to enable the seat 45 to be lowered or "set", and the shaft 8 may then be lowered down upon the seat, as will be readily understood. In order to raise and lower the seat 45 at will, it is provided with a rigid arm 47, to which an operating rod or link 48 is attached.

In order to use the mast for pulling the pipes or casings from the well, I provide a large pulling drum 49. On the reduced waist 50 of this drum, a cable 51 is coiled, and the end of this cable extends upwardly and over a large guide-sheave 52 rotatably mounted on the extremity of the shaft 8, as indicated in Fig. 1. From this point, the end of the cable extends downwardly so that it may be attached by means of a suitable shackle 53 to the pipe or rod 54, which is to be pulled. This drum 49 is provided with two enlarged sections or drum-collars 55, which are of much greater diameter than the waist 50 of the drum. On either of these collars, a draw-cable 56 is coiled, and the free end of this draw-cable extends longitudinally of the frame, and is adapted to have horses attached to it. From this arrangement, when the horses pull on the draw-cable, the drum 49 rotates and the cable 51 becomes coiled up on the waist 50 of the drum. In this way, the pulling cable or line 51 will be taken up so as to raise or pull the pipe 54.

If it is not desired to attach the pulling cable 51 directly to the pipe, I may employ a fall or dead-line 57, which is simply a loop which passes down to the pipe, as indicated in Fig. 4ª, passing through a guide-block 58, the fixed end of the dead-line being attached by means of a hook 59 to the extremity of an arm 60. This arm 60 is formed of two bars 61 and 62, which are pivotally attached together at their outer ends. The lower bar 62 is attached by a removable pin

63 to the side of the shaft 8, and I provide a plurality of openings in the side of the shaft 8, in any one of which the main pin 63 may be attached. By removing the pin 63 to a lower opening, the arm 60 will project farther from the mast, and this arrangement will enable the direction of pull of the deadline to be adjusted with respect to the pipe without necessitating the moving of the entire apparatus. The bar 62 is made long enough so that it extends at its upper extremity beyond its point of connection with the bar 61. In this way a projection is formed over which a loop may be hung in case the cable is not provided with a hook. The upper end of the mast is provided with eyes 60[a] by means of which side guy wires may be attached.

In order to brace the mast against lateral force, I provide diagonal braces 65, which are attached as indicated in Fig. 4, the upper ends being rigidly secured to the sides of the sheath, and the lower ends being pivotally attached to eye-bolts 66 on the truss frames 41.

I provide means for operating the drum 49 by hand. For this purpose, the shaft 67 of this drum is extended so as to project beyond the truss frame on one side of the machine, as indicated in Fig. 1. To this extension of the shaft, I attach a crank 68, which crank may be directly rotated by hand by means of its handle 69. At a suitable point on the crank 68, a link 70 is pivotally attached, and to the outer portion of this link a rocker arm 71 is pivotally attached. The details of this rocker arm and the means for rocking it are illustrated in Fig. 5. At one end, the rocker arm has a wrist 72, which is rotatably mounted in a bearing 73 on one of the frame bars 74. Beyond the bearing 73, the wrist 72 is formed into a radially extending plate or wing 75. In order to swing the rocker arm to and fro, I provide a lever 76, which consists simply of a long bar, the one extremity of which is bifurcated so as to form a heart-shaped yoke 77, and beyond this yoke the sides of the yoke are extended so as to form a double or bifurcated tongue 78. Between the bars of this tongue 78, a narrow throat 79 is formed. This throat is adapted to receive the wing 75, so that if the lever 76 is rocked to and fro, the rocker arm 71 will also be swung to and fro. The rocker arm 71 is provided with several openings 80, in any one of which a removable pin 81 is placed, for connecting the rocker arm to the link 70, as will be readily understood. This gives the desired adjustment to the rocker arm with respect to the crank 68.

On the under side of the tongue 78, a notch 82 is formed, and this notch is for the purpose of enabling the lever 76 to be supported in an inoperative position. For this purpose, I provide a rest 82, which is in the form of a bracket attached to the frame bar 74. This rest presents a vertical slot 83, and the lower edge of this slot is adapted to engage the notch, so as to support the tongue, when the tongue has been disengaged from the wing 75. In this connection, it should be understood that the tongue is removable from the wing, and it can be hung at one side with the notch supported on the bracket. When it is desired to attach the lever, the heart-shaped yoke is placed over the wing 75, and the lever is then pulled away from the wrist 72 until the wing 75 seats in the tongue. With this arrangement, it will be evident that the lever 76 can be readily thrown into or out of operation, and it will be also evident that by rocking the lever 76 backward and forward, the rocker arm 71 will move backward and forward, so as to rotate the drum. In addition to this, I provide detent means for holding the pulling drum against a backward rotation. This detent device operates as a means for enabling the drum to be slowly rotated. The details of this mechanism are most clearly illustrated in Fig. 6, but they are also shown in Fig. 1.

On the end of the drum 49, a ratchet wheel 84 is provided, the teeth of which incline toward the right, as shown. On the adjacent truss frame, a rocking plate 85 is pivotally mounted on a pin 86, said pin being secured in a suitable bearing 87. This rocking plate 85 is formed of two oppositely-disposed plates, between which a pair of pawls 87[a] and 88 are mounted. These pawls extend over toward the ratchet wheel. The upper one is the longer of the two, and both pawls have nibs at their extremities, which engage the teeth of the ratchet wheel, as indicated. The rocking plate 85 is further provided with a lever 89, by means of which it may be rocked on the pin 86. The pin 86 is located between the pawls 87[a] and 88, so that, when one advances the other recedes. From this arrangement, it will be evident that by rocking the lever 89 up and down, these pawls 87[a] and 88 will rotate the drum. During this operation, as one pawl is rotating with the ratchet wheel, the other pawl will be slipping back of the teeth of the same, so as to give a new hold. This rocking plate is provided with extra openings 85[b] which may removably receive the pivot pins 85[a] which attach the pawls to the rocking plate. The rocking plate is also provided with pins 85[c] which support the pawls if the lever 89 is held down so as to disengage the pawls from the ratchet teeth. The openings 85[b] are different distances from the pivot pin 86 so that the leverage of the pawls may be varied to travel as desired.

On one end of the drum 49, a brake-wheel 90 is provided, and this brake-wheel

is provided with a brake-band 91 which passes around the same. One end of this brake-band is secured to a lever 93 at 92, as indicated in Fig. 1. The other end of the band is attached to another arm of the lever 93, which is mounted on the frame so as to rock at the point 94 between the arms of the lever. When the long arm of the lever 93 is forced downwardly, the brake-band will be tightened on the brake-wheel, so that a frictional resistance is presented, tending to prevent the rotation of the drum. This lever may be held in a depressed position by means of a hook 95, which runs freely on a guide-bar 96 attached to the frame, as indicated in Fig. 1. When this hook is engaged over the lever 93, it holds it against rising. In this connection, it should be understood that the hook 95 projects from a ring which runs loosely on the guide 96, so that the ring binds itself when force is applied to the lever.

While I have illustrated only one of the seats 45 for supporting the shaft 8 in an elevated position, more of these may be provided, if desired, at different elevations. In this way the shaft 8 may be supported in any number of different extended positions. In this way, the height of the mast can be regulated, as desired.

A machine constructed as described can evidently be readily transported from place to place like an ordinary wagon, and the mast can be quickly elevated and a tackle adjusted by a pulling operation.

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

1. In a machine of the class described, in combination, a truck frame, a mast having a pivot connection with said frame, a cable having its ends attached to said mast at points on opposite sides of the pivot point thereof, and means for engaging the cable at an intermediate point thereupon for advancing the same for raising and lowering said mast, said parts being arranged so that when one side of the cable is taken up, the other side is paid out.

2. In a machine of the class described, in combination, a truck-frame, a mast having a pivot connection with said frame, an elevating drum mounted on said truck-frame, and an elevating cable coiled on said drum and having its ends attached to said mast, said pivot connection being disposed between the ends of said cable, whereby, when one side of the cable is taken up the other side is paid out.

3. In a machine of the class described, in combination, a truck-frame, a mast having a pivot connection with said frame, an elevating drum mounted on said truck frame, an elevating cable wrapped on said drum and having its ends attached to said mast, said pivot connection being disposed between the ends of said cable, whereby, when one side of the cable is taken up the other side is paid out, and a strut attached to one side of said cable and connected with said mast on the side to be elevated, said strut affording means for forcing one side of said mast upwardly.

4. In a machine of the class described, in combination, a frame, a mast having a pivotal connection with said frame, an elevating drum, a cable attached to the butt end of said mast and coiled on said drum, and a strut seating on said cable at one end and thrusting against said mast at a point beyond said pivotal connection with respect to said butt end.

5. In a machine of the class described, in combination, a frame, a mast having a pivotal connection with said frame, an elevating drum, an elevating cable attached to said mast at a point above said pivotal connection when said mast is raised, said elevating cable being wrapped upon said drum, and a guy-rope having a shackle attached to said cable between said drum and said mast, said guy-cable being secured to said frame.

6. In a machine of the class described, in combination, a frame, a mast having a pivotal connection with said frame, an elevating drum mounted on said frame, a cable coiled on said drum, having one end attached to said mast above said pivotal connection and having the other end attached to the butt-end of said mast, and a strut seating on said cable between said drum and said butt-end and connected with said mast beyond said pivotal connection with respect to said butt-end.

7. In a machine of the class described, in combination, a frame, a mast having a pivotal connection with said frame, an elevating drum mounted on said frame, a cable coiled on said drum, having one end attached to said mast above said pivotal connection, and having the other end attached to the butt-end of said mast, a strut seating on said cable between said drum and said butt-end, and connected with said mast beyond said pivotal connection with respect to said butt-end, and a guy-rope having a shackle seating on said cable between said drum and said mast and on the side of said drum remote from said butt-end.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CLAIR D. SHORTS.

Witnesses:
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HARMAN KNIGHT.