E. S. ROBERTSON.

HOISTING MACHINE.

APPLICATION FILED NOV. 9, 1908.

929,168.

Patented July 27, 1909.

4 SHEETS—SHEET 1.

Fig. 1.

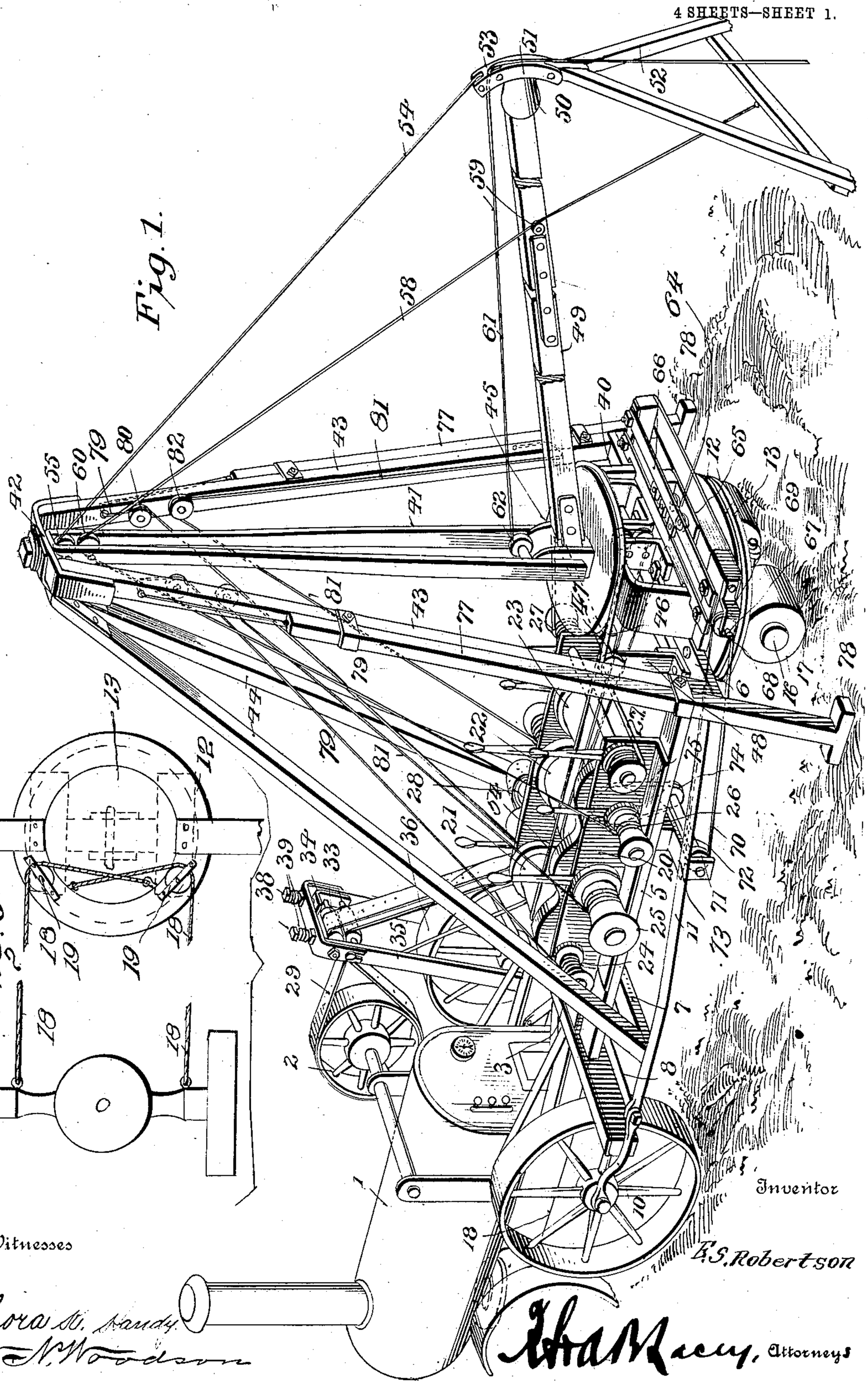

Fig. 6.

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4 SHEETS—SHEET 2.

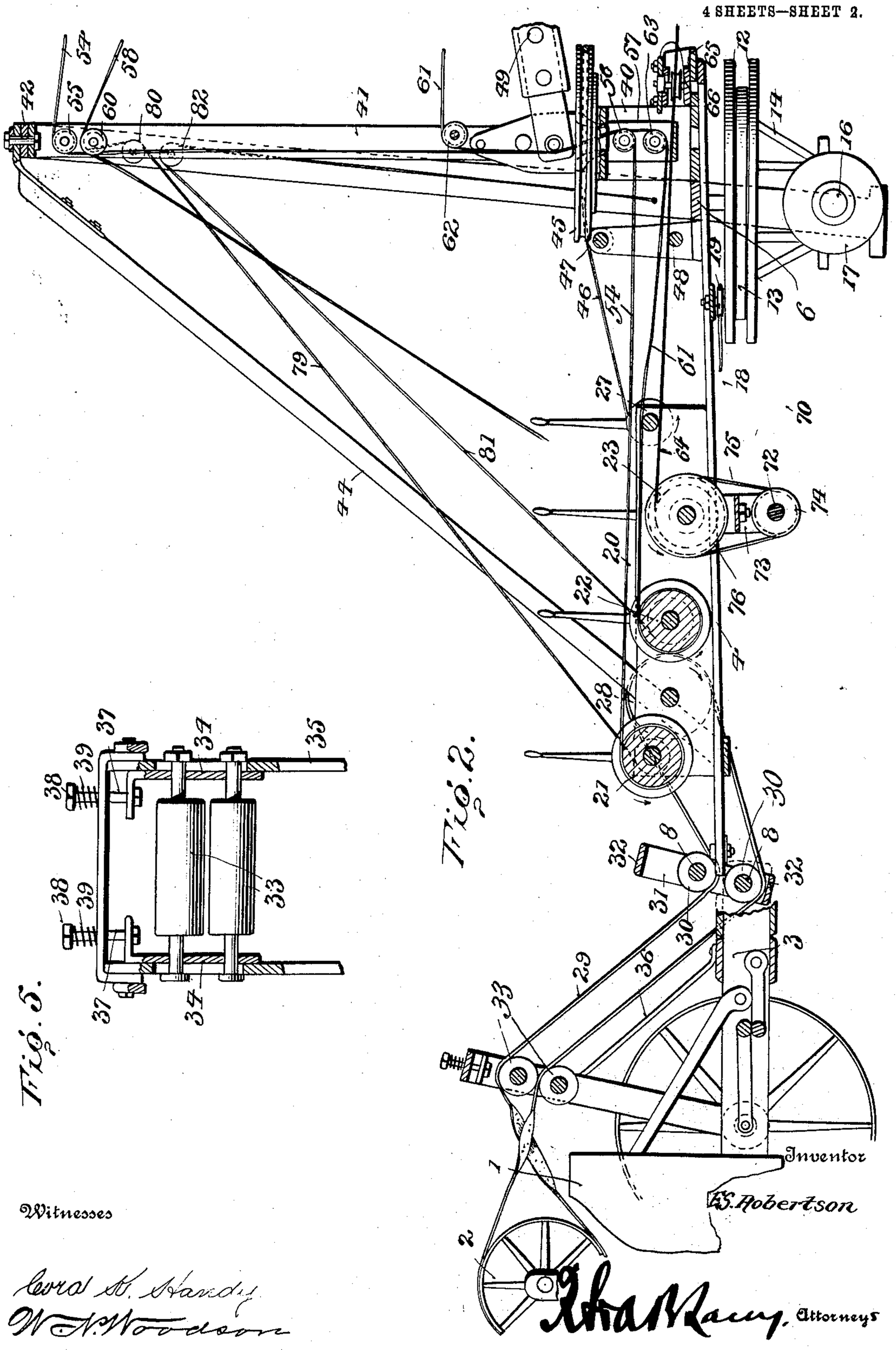

Fig. 2.

Fig. 5.

Witnesses

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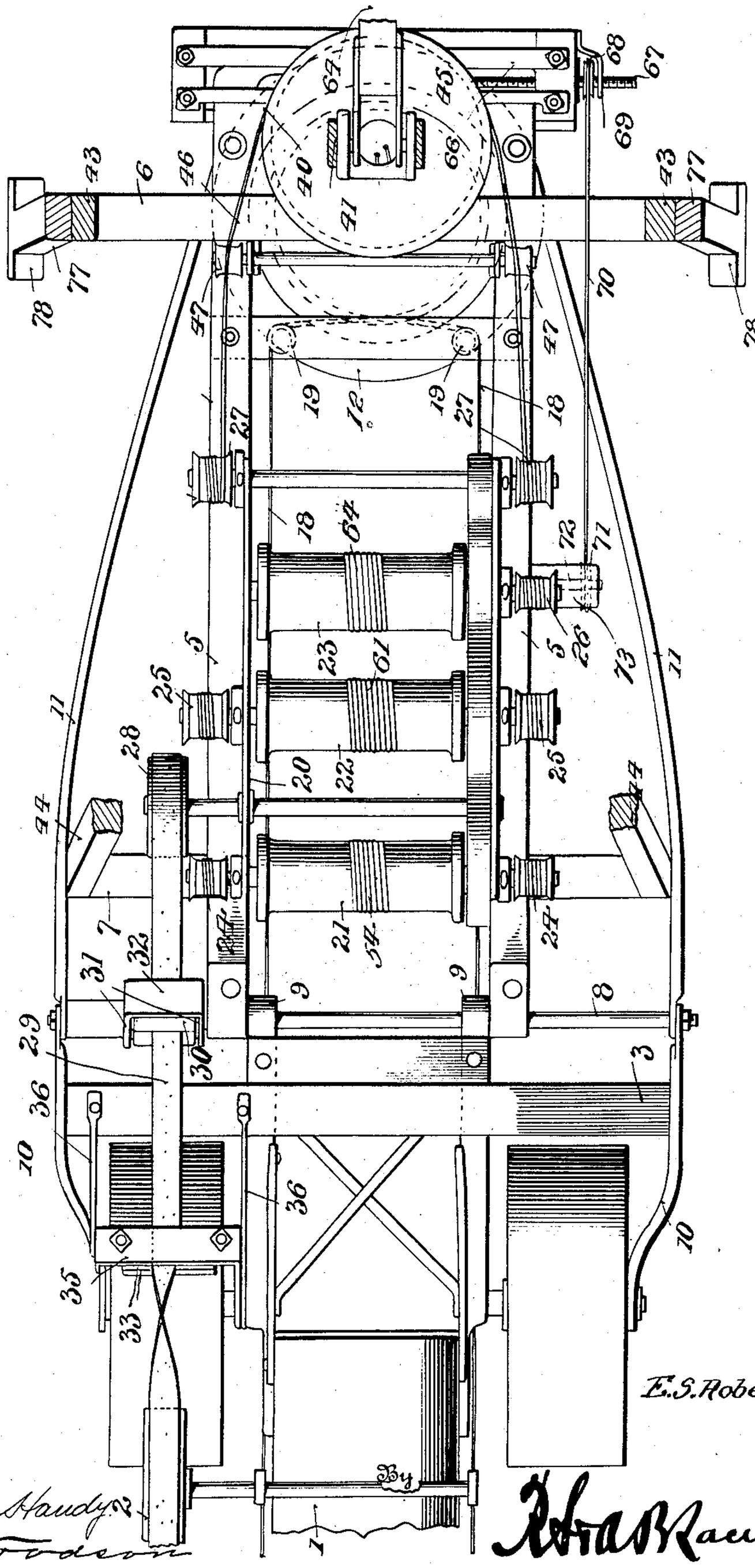
4 SHEETS—SHEET 3.

Fig. 3.



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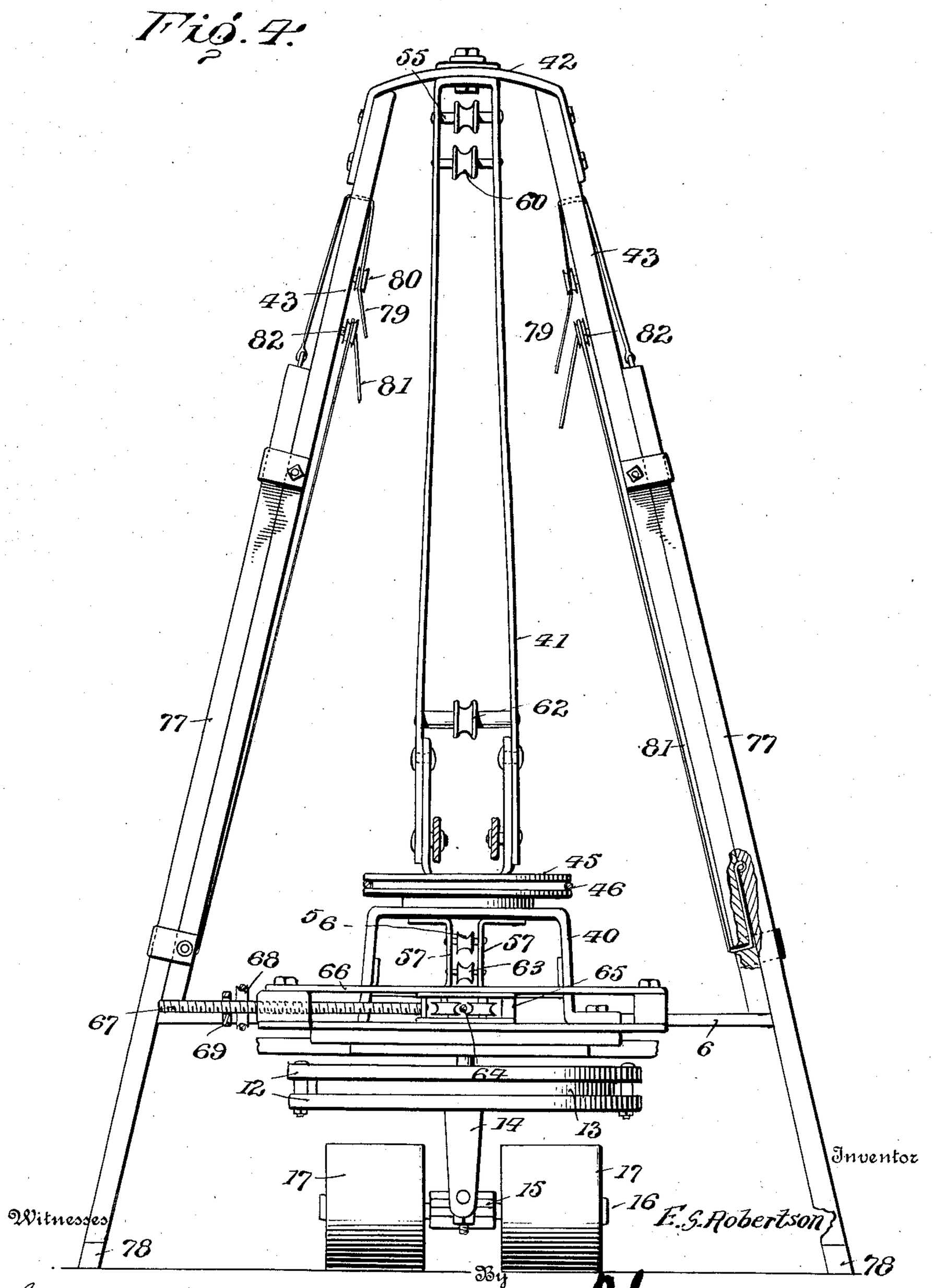
4 SHEETS—SHEET 4.

Fig. 4.



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UNITED STATES PATENT OFFICE.

ELVADIS S. ROBERTSON, OF MAY CITY, IOWA.

HOISTING-MACHINE.

No. 929,168. Specification of Letters Patent. Patented July 27, 1909.

Application filed November 9, 1908. Serial No. 461,674.

To all whom it may concern:

Be it known that I, ELVADIS S. ROBERTSON, citizen of the United States, residing at May City, in the county of Osceola and State of Iowa, have invented certain new and useful Improvements in Hoisting-Machines, of which the following is a specification.

The present invention relates to improvements in hoisting machines, and is more particularly designed for the pulling or piling of stumps and logs, although it may be utilized for dredging or excavating purposes or wherever a similar device may be required.

One of the primary objects of the invention is the provision of a hoisting mechanism which is connected to a traction engine so as to receive power therefrom and be drawn from place to place thereby.

The invention further contemplates a novel means for transmitting power to the various parts and controlling the same, and for steadying the machine when in use.

With these and other objects in view that will more fully appear as the description proceeds, the invention consists in certain constructions and arrangements of the parts that I shall hereinafter fully describe and claim.

For a full understanding of the invention and the merits thereof, and to acquire a knowledge of the details of construction, reference is to be had to the following description and accompanying drawings, in which:

Figure 1 is a perspective view of an excavating machine embodying the invention, portions of the boom being broken away; Fig. 2 is a side elevation of a hoisting machine, portions being broken away, and shown in section; Fig. 3 is a top plan view, portions being removed; Fig. 4 is an end view of the machine; Fig. 5 is a detail view of the tension regulating rollers for the drive belt; Fig. 6 is a detail top plan view of the turn-table and cables secured thereto.

Corresponding and like parts are referred to in the following description and indicated in all the views of the drawings by the same reference characters.

Specifically describing the present embodiment of the invention, the numeral 1 designates the traction engine which may be of any approved construction and is provided with the usual drive wheel 2 from which power is taken. The rear end of the traction engine is formed with a platform 3, and hinged to the rear edge of this platform is a truck upon which the hoisting mechanism is mounted. The framework of this truck comprises a pair of spaced longitudinal beams 5 which are connected toward their rear ends by a transverse beam 6 and toward their forward ends by a transverse beam 7, the extremities of the said transverse beams projecting laterally beyond the longitudinal beams. The forward ends of the longitudinal beams 5 are loosely connected to a transverse shaft 8 which passes loosely through a pair of spaced bearings 9 which project rearwardly from the platform 3. It will also be observed that the extremities of the transverse shaft 8 are connected to the rear axle of the traction engine 1 by arms 10 and to the rear of the truck by the rods 11. In this manner, the pull of the traction engine is distributed evenly to all parts of the truck, and all undue strain is avoided.

Secured to the rear portion of the truck under the transverse beam 6, is a pair of spaced circular plates or rings 12 between which a turntable 13 is loosely mounted so as to revolve about a vertical axis, anti-friction rollers being interposed between the parts so as to reduce the friction and cause the turntable to revolve easily. Projecting downwardly from the front and rear portions of this turntable are brackets 14, and journaled between these brackets so as to turn about a horizontal axis is a bearing member 15 upon which the rear axle 16 of the truck is mounted. This axle projects laterally upon both sides of the bearing, and is provided with the wheels 17 which are shown as formed with a broad rim, so as to provide a large bearing surface and prevent the wheels from sinking into the ground. Cables 18 extend rearwardly along opposite sides of the machine, from the extremities of the front axle of the traction engine, and these cables pass around pulleys or guide members 19 mounted upon the upper faces of the circular plates 12 and have their ends secured to the turntable 13, so that when the front axle of the traction engine is turned in one direction, the turntable will be revolved in the opposite direction. In this manner, the machine can be readily guided from place to place, and is enabled to make comparatively short turns.

Mounted upon the forward portion of the

truck 4 is a frame 20, and journaled upon this frame are the three winding drums 21, 22 and 23, the winding drums 21 and 22 being provided at their opposite ends with the winch heads 24 and 25 respectively, while the winding drum 23 is provided at one end with the winch head 26. The sluing drums 27 are also journaled upon this frame, and are mounted so that they can be run in either direction and be reversed, when desired. These various drums and winch heads are designed to be thrown into and out of operation by means of the usual clutch mechanism, and receive power from an operating wheel 28 upon one side of the frame. A belt 29 passes around the operating wheel 28 and also around the drive wheel 2 of the traction engine, and serves as a means for transmitting power from the traction engine to the drums. This belt 29 passes around upper and lower idlers 30 mounted between side bars 31 which are connected at their ends by the blocks 32, and are loosely mounted upon the transverse shafts 8, so as to swing back and forth thereon. The lower idler 30 is also journaled upon the transverse shaft 8, and these idlers serve to prevent the swinging of the truck about the platform of the traction engine from either tightening the drive belt or producing slack therein. It will also be observed that the belt 29 passes around a pair of rollers 33 which are journaled between slides 34 mounted upon opposite sides of an inverted U-shaped frame 35 projecting upwardly from the rear axle of the traction engine and spanning one of the rear wheels of the traction engine. This frame is held rigidly against any swinging movement by means of the braces 36 which are inclined downwardly and rearwardly therefrom and secured to the platform of the traction engine. The slides 34 are connected at their upper ends to the adjusting screws 37 which extend upwardly through the cross bar at the top of the frame, and are provided with the nuts 38, springs 39 being interposed between the nuts and the frame. These springs normally tend to draw the slides 34 upwardly, and thereby serve to automatically hold the drive belt under the required tension. It will be entirely obvious, however, that by properly adjusting the nuts 38, the tension of the drive belt could be either increased or decreased as required.

An inverted U-shaped standard 40 projects upwardly from the rear end of the truck, and pivoted upon this standard is the lower end of the mast 41 which is mounted to turn about a vertical axis. The upper extremity of this mast is pivoted in a bar 42 which is supported by the downwardly diverging side braces 43 and the downwardly and forwardly inclined braces 44, the lower ends of the braces 43 resting upon and being secured to the extremities of the transverse beam 6, while the lower ends of the braces 44 rest upon and are secured to the extremities of the transverse beam 7. The lower end of the mast 41 is provided with a wheel 54 which is connected to a cable 46 extending around the same, the ends of the cable passing over the guide rollers 47 on the frame 48 projecting upwardly from the truck, and having the extremities thereof secured to the sluing drums 27. When these sluing drums are driven in one direction, one end of the cable is taken up and the opposite end let out and the wheel 45 turned in a corresponding direction, while when the sluing drums are driven in the reverse direction, the above designated operation is reversed, and the wheel 45 turned in the opposite direction.

A boom 49 has one end thereof pivotally connected to the bottom of the mast 41, so as to swing up and down about a horizontal axis, the free end of the boom being provided with a cap 50 having a head 51 swiveled thereon so as to turn freely about an axis corresponding to the axis of the boom. This head is shown as projecting laterally upon both sides of the cap, one end of the head having the leg 52 pivotally connected thereto, while the opposite end is provided with a pulley or guide member 53 and is connected to the cable 54 by means of which the boom is raised and lowered. This cable 54 passes around a pulley 55 at the top of the mast 41, downwardly through an opening in the bottom of the mast, around a pulley 56 journaled between a pair of upright bars extending between the truck and the standard 40, and forwardly to the winding drum 21. It will thus be obvious that by throwing the winding drum 21 into and out of operation by means of the usual clutch mechanism, the boom may be either raised or lowered as desired. The leg 52 is only utilized when the device is employed for pulling stumps or similar purposes, and is designed to rest upon the ground upon one side of the stump or other member to be lifted. A cable 58 is provided for swinging the lug upwardly into an inoperative position when the device is not in use, and this cable passes over a guide member 59 at an intermediate point upon the boom 49, around a guide member 60 at the top of the mast, and has the extremity thereof connected to the winch head 26. A hoisting cable 61 passes around the pulley 53 at the outer end of the boom, extends along the top of the boom and passes around a pulley 62 at the lower portion of the mast, passes through an opening in the bottom of the mast, and around a pulley 63 journaled between the upright bars 57, and then forwardly to the winding drum 22. After the free end of this hoisting cable has been connected to the stump or other member to be lifted, the winding drum 22 is thrown into operation and the cable wound upon the

drum until the stump has been lifted above the ground to the desired height. The third drum 23 is provided with a cable 64 which extends rearwardly between a pair of guide members upon a block 65 which is slidably mounted within a transversely disposed guideway 66 at the rear end of the truck. A screw 67 projects from one side of the block 65 and is engaged at one side of the truck by a sprocket wheel 68 which can turn freely but is held against longitudinal movement by means of an arm 69. It will thus be obvious that by turning this sprocket wheel, the screw 67 can be moved longitudinally and the block 65 thereby moved within the guideway 66. A chain 70 which passes around the sprocket 58, also passes around a sprocket wheel 71 rigid with a shaft 72 journaled upon a bracket 73 projecting downwardly from the truck. A second sprocket wheel 74 is also rigid with this shaft 72 and engages a chain 75 which passes around a sprocket wheel 76 upon one end of the drum 23. With this construction, it will be apparent that as the drum 23 is turned to take in and let out the cable 64, the block 65 will be moved from side to side, and the various parts are so designed that the movement of this block will just be sufficient to cause an even winding of the cable upon the drum. The cable itself is used for drawing stumps from a distance to within reach of the boom, and the block 65 enables the cable to be turned at an angle to the axis of the machine. It may be mentioned at this point, that in the operation of the hoisting machine, the stump or other member which has just been drawn within reach of the boom by the cable 64, can be lifted by the boom and swung to one side into the desired position at the same time that the cable 64 is unwound and drawn out for attachment to another stump.

Provision is also made for staying and bracing the sides of the machine, and for this purpose slides 77 are mounted upon the side braces 43 of the mast. The lower ends of the slides 77 are provided with the shoes 78 and when the slides are moved downwardly, these shoes are designed to bear upon the ground so as to hold the truck and mast securely against any lateral swaying motion. The upper end of each of the slides 77 is attached to a cable 79 which passes through an opening in the upper end of the corresponding brace 43, extends around a pulley or guide member 80 upon the inner face of the said brace, and has the extremity thereof secured to the winch head 24 upon the corresponding end of the drum 21. In a somewhat similar manner, cables 81 which are connected to intermediate portions of the slides 77, pass through openings in the lower portions of the braces 43, extend upwardly along the inner faces of the said braces, pass around the pulleys or guide members 82 upon the braces and have their extremities connected to the winch heads 25 at the ends of the winding drum 22. With this construction, it will be obvious that by leaving the winch heads 25 loose and operating the winch heads 24, the cables 79 will be taken in and the cables 81 let out and the slides 77 drawn upwardly into an inoperative position. By the reverse of this operation, however, the slides can be readily moved downwardly until the shoes 78 contact with the surface of the ground and the slides are in an operative position.

In the operation of the device as a stump puller, the traction engine is caused to draw the truck across the field, and as the various stumps are encountered, they are engaged by the hoisting cable, as previously explained, and drawn upwardly above the surface of the ground. Owing to the fact that the boom can be swung from side to side, a comparatively large area upon each side of the truck can be effectively operated upon. It is to be understood, however, that I do not restrict myself to the use of the device as a stump pulling apparatus, since by dispensing with the leg at the outer end of the boom, and making other slight alterations, the device could be used for excavating, dredging or for similar operations where a hoisting mechanism is essential.

It is to be understood that the drums may be run by chain belting, and for this purpose there could be a sprocket wheel attached to the shaft to which the drive wheel 2 is attached, and the idlers 30 that are on the transverse shaft 8 could be removed and a double sprocket wheel could be put in their place, and the chain could run from the sprocket wheel on 2, through the rollers 33, which would act as a chain tightener, onto one of the sprocket wheels that are loose on the transverse shaft 8, and there could be a sprocket wheel in place of the operating wheel 28, and the sprocket wheels that are on the transverse shaft 8 to be cast together.

Having thus described the invention, what I claim is:

1. The combination of a traction engine, a truck mounted to trail behind the traction engine, a hoisting mechanism on the truck, and means driven by the traction engine for operating the hoisting mechanism.

2. The combination of a traction engine provided with a drive wheel, a truck mounted to trail behind the traction engine, a hoisting mechanism upon the truck, an operating wheel for the hoisting mechanism, a belt connecting the operating wheel and the drive wheel of the traction engine, and means for regulating the tension in the said belt.

3. The combination of a traction engine provided with a drive wheel, a truck mounted to trail behind the traction engine, a hoist-

ing mechanism upon the truck, an operating wheel for the hoisting mechanism, a belt connecting the said operating wheel to the drive wheel of the traction engine, a frame upon the traction engine, a slide mounted upon the frame, and guide members upon the slide for engaging the belt to regulate the tension therein.

4. The combination of a traction engine provided with a drive wheel, a truck mounted to trail behind the traction engine, a hoisting mechanism on the truck, an operating wheel for the hoisting mechanism, a belt connecting the said operating wheel and the drive wheel of the traction engine, a frame upon the traction engine, a slide mounted upon the frame, guide members upon the slide for engaging the belt, and adjusting screws for moving the slide to regulate the tension in the belt.

5. The combination of a traction engine provided with a drive wheel, a shaft applied to the traction engine, a truck hinged upon the shaft and mounted to trail behind the traction engine, a hoisting mechanism upon the truck, a drive belt for transmitting power from the drive wheel of the traction engine to the hoisting mechanism, and idlers engaging the drive belt and carried by the shaft to prevent any swinging movement of the truck from tightening the belt or producing slack therein.

6. The combination of a traction engine provided with a drive wheel, a shaft applied to the traction engine, a truck hinged upon the shaft and mounted to trail behind the traction engine, a hoisting mechanism upon the truck, a drive belt for transmitting power from the drive wheel of the traction engine to the hoisting mechanism, an idler journaled upon the shaft, a bar pivoted upon the shaft, and a second idler carried by the bar, the said idlers engaging the belt to prevent any swinging movement of the truck from tightening the same or producing slack therein.

7. The combination of a traction engine provided with a platform, a shaft supported between its ends by the platform, a truck mounted to trail behind the traction engine and loosely connected to the shaft between its ends, arms connecting the ends of the shaft to the traction engine, and rods connecting the ends of the shaft to the truck.

8. The combination of a traction engine formed with a movable axle for guiding the same, a truck mounted to trail behind the traction engine, a turntable upon the truck, wheels carried by the turntable, and cables connecting the turntable to the movable axle of the traction engine.

9. The combination of a traction engine formed with a movable axle by means of which it can be guided, a truck mounted to trail behind the traction engine, a turntable mounted upon the truck, a bearing carried by the turntable and mounted to swing about a horizontal axis, an axle mounted within the bearing, wheels upon the axle, and an operative connection between the turntable and the movable axle of the traction engine.

10. The combination of a truck, a mast mounted upon the truck, side braces for the mast, a boom upon the mast, means for controlling the boom, and slides upon the side braces for steadying the truck.

11. The combination of a truck, a mast mounted upon the truck, braces for the mast, a boom upon the mast, means for controlling the boom, slides mounted upon the braces for steadying the truck, and cables for moving the slides into and out of operative position.

12. The combination of a truck, a hoisting mechanism mounted upon the truck and embodying a mast and side braces therefor, slides upon the side braces for steadying the truck, cables for moving the slides, winding drums for controlling the hoisting mechanism, and winch heads at the ends of the winding drums for taking in and letting out the cables of the slides.

13. The combination of a truck, a mast mounted upon the truck, a boom having one end thereof pivotally connected to the mast, a head loosely connected to the opposite end of the boom, a leg connected to the head, a guide member upon the head, a hoisting cable passing over the guide member of the head, and means for taking in and letting out the hoisting cable.

14. The combination of a truck, an inverted U-shaped standard upon the truck, a mast pivoted upon the standard so as to swing about a vertical axis and having an opening in the lower end thereof, winding drums upon the truck, guide members upon the truck under the inverted U-shaped standard, a boom connected to the mast, a boom-controlling cable, and a hoisting cable, the said cables passing through the opening in the bottom of the mast and around the guide members under the standard and having their extremities connected to the winding drums.

15. The combination of a truck formed with longitudinal beams connected by transverse beams which project laterally beyond the longitudinal beams, a mast mounted upon the truck, braces for the mast, the lower ends of the braces resting upon the extremities of the transverse beams, a boom upon the mast, a boom-controlling cable, a hoisting cable extending along the boom, and winding drums upon the truck for taking in and letting out the cables.

16. The combination of a traction engine, a truck mounted to trail behind the traction engine, a turntable upon the truck, wheels

carried by the turntable, a mast mounted upon the truck, braces for the mast, slides mounted upon the braces and adapted to be moved downwardly into engagement with the ground to steady the truck, a boom upon the mast, a boom-controlling cable, a hoisting cable, winding drums upon the truck for taking in and letting out the said cables, and means driven by the traction engine for operating the winding drums.

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

ELVADIS S. ROBERTSON. [L. S.]

Witnesses:

A. E. BUCK,

H. E. RICHARDS.