

June 26, 1945.

C. R. ATHY

2,379,333

PORTABLE WELL-SERVICING APPARATUS

Filed Sept. 13, 1943

3 Sheets-Sheet 1

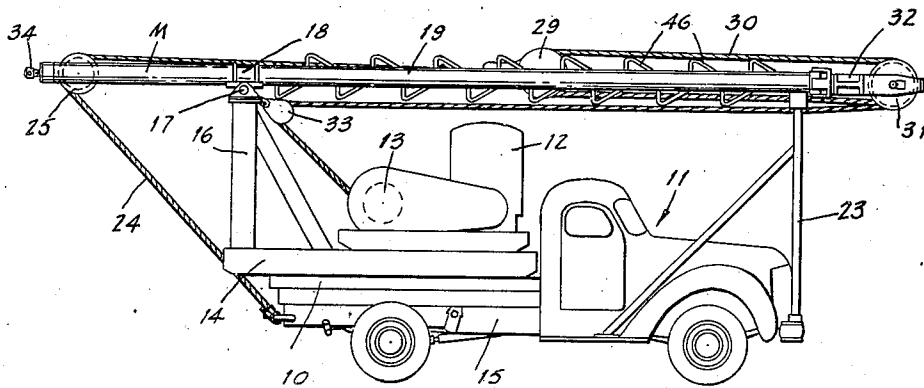


FIG. 1

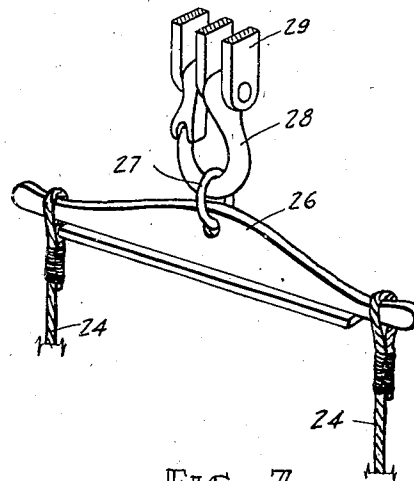


FIG. 7

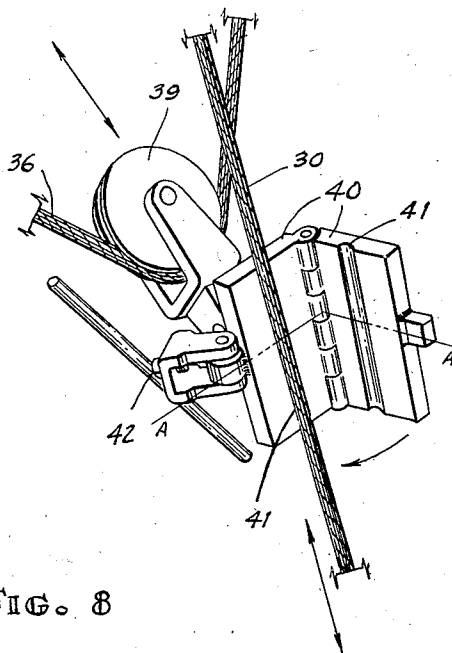


FIG. 8

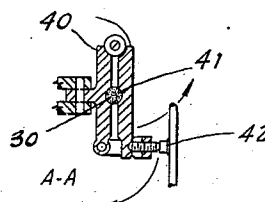


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3 Sheets-Sheet 2

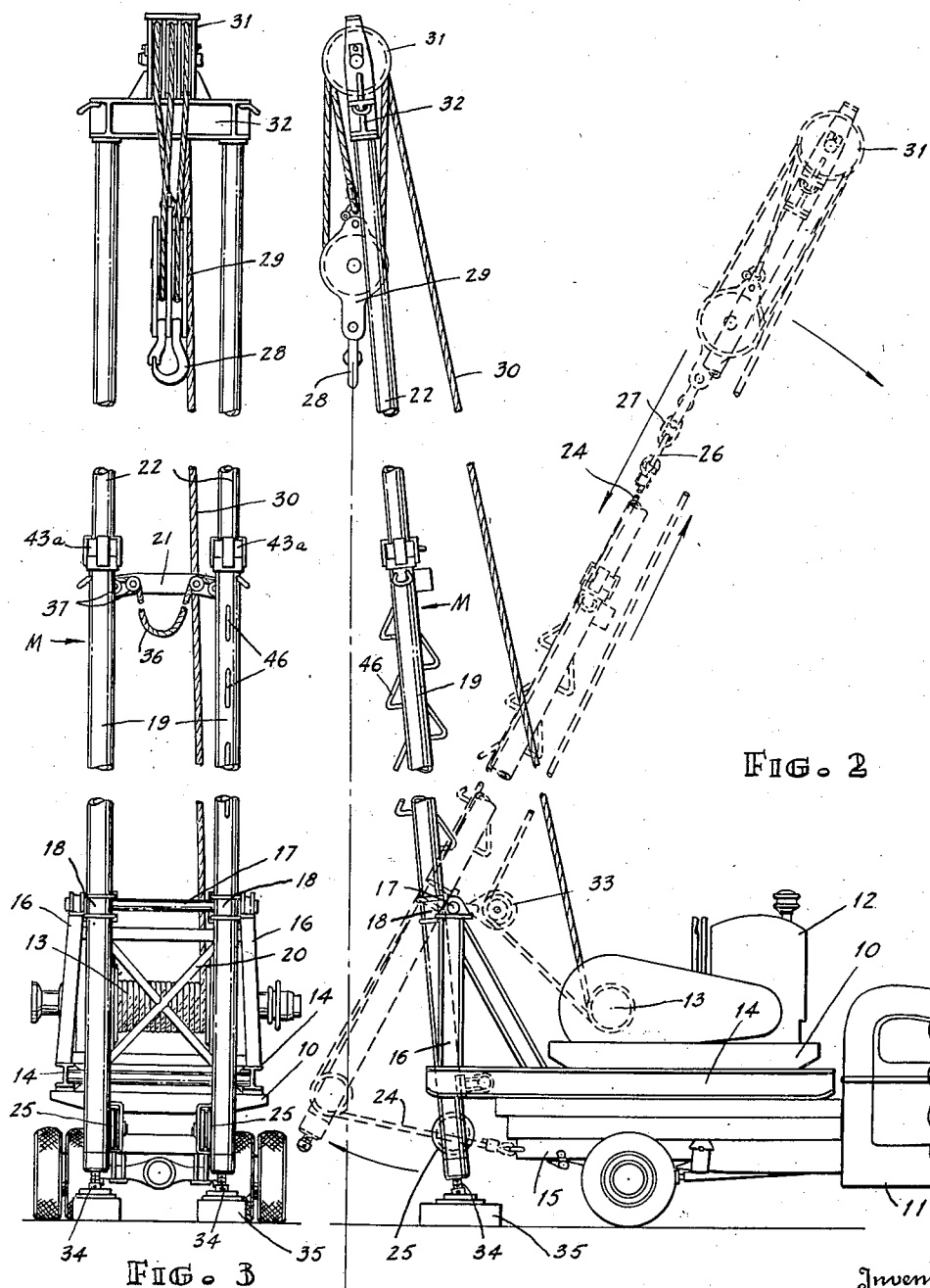


FIG. 2

FIG. 3

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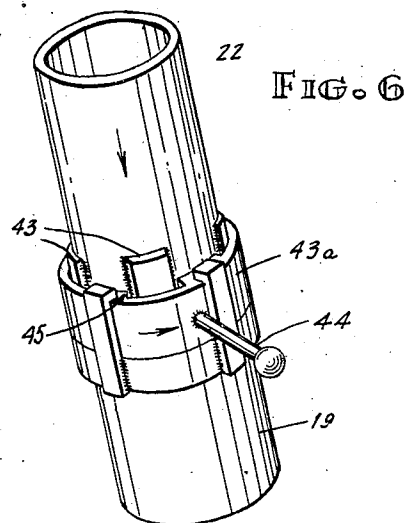
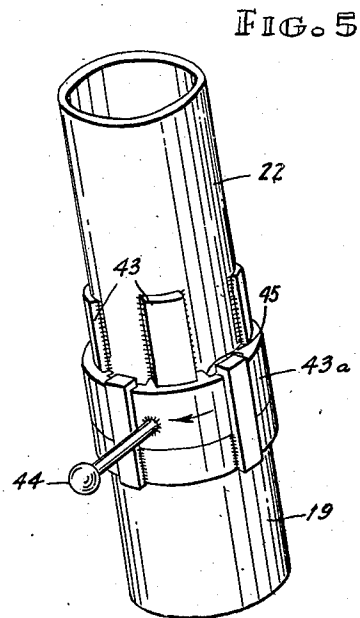
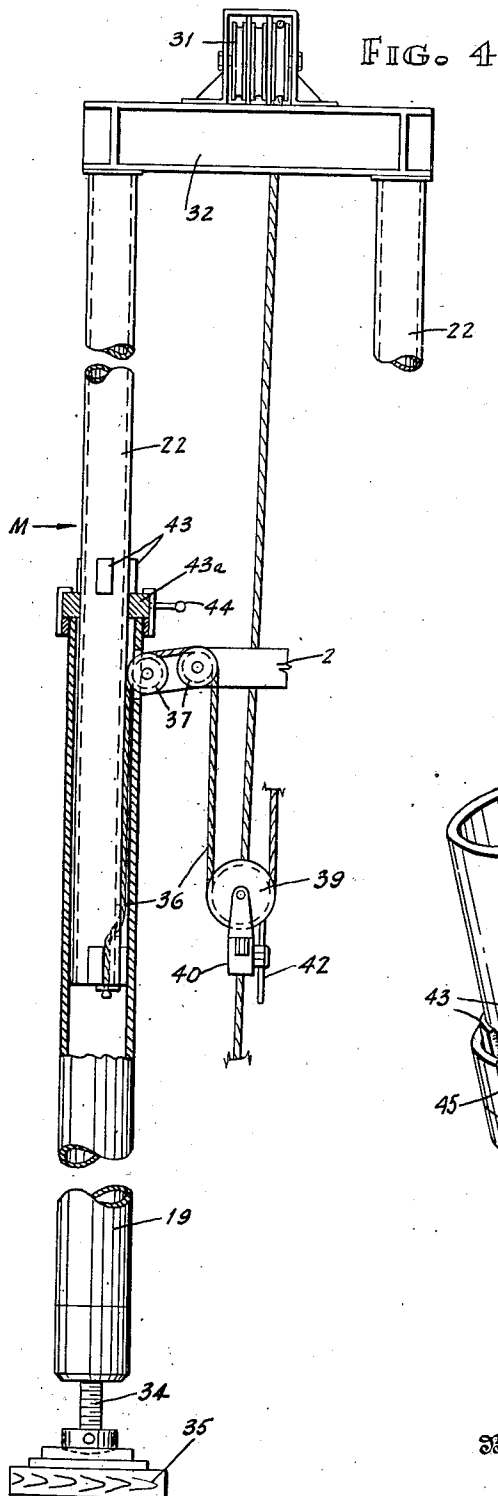
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PORTABLE WELL-SERVICING APPARATUS

Filed Sept. 13, 1943

3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

2,379,333

PORTABLE WELL-SERVICING APPARATUS

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Application September 13, 1943, Serial No. 502,145

2 Claims. (Cl. 189—15)

The present invention provides an improved portable mast adapted for use in oil fields in various well-servicing capacities, such as in well-cleaning operations, deepening, swabbing, in the pulling of rods and tubing, and in the execution of other operations wherein an elevated mast or pole structure is necessitated for the reception of a winch-operated cable line.

An object of the invention is to provide a telescopic mast structure adapted for pivotal mounting on an automotive vehicle or trailer unit and wherein a drum-actuated cable means of an improved character is utilized to swing, in a readily controlled manner, the mast structure between its collapsed horizontal position of transportation over the motor vehicle on which it is mounted, and an extended upright position suitable for active operational uses.

Another important object of the invention is to simplify the construction of such portable telescopic masts and the means for raising, lowering or swinging the same, such means comprising a single winch-operated working line, the latter being employed to effect the operations of swinging the mast structure about its horizontal pivotal union with its portable base between lowered and upright positions and, also, for raising and lowering the upper telescoping section of the mast with respect to its lower supporting and receiving section.

A further object of the invention is to provide an improved mechanical means for retaining the upper section of the telescopic mast in its extended or elevated position to render the support of the upper section of the mast independent of said cable means.

For a further understanding of the invention, reference is to be had to the following description and the accompanying drawings, wherein:

Fig. 1 is a side elevational view of an automotive vehicle equipped with a collapsible mast structure forming the present invention, said mast structure being disclosed in its horizontal position of transport;

Fig. 2 is a similar view disclosing in full lines the mast structure in its elevated and extended position suitable for active operation, and in broken lines, a position occupied by the mast structure as it is being lowered from its upright toward its lowered position;

Fig. 3 is an end elevational view;

Fig. 4 is a similar view, partly in vertical section, disclosing the mechanism for moving the mast between extended and telescoped positions;

Fig. 5 is a perspective view of the mechanical means for retaining the tubular columns of the mast in their positions of extension;

Fig. 6 is a similar view disclosing said retaining means positioned to admit of telescoping movement of the columns of the mast;

Fig. 7 is a perspective view of the winch-line yoke and the mast-operating cables connected therewith;

Fig. 8 is a perspective view of the winch-line clamp, and the cable means employed in effecting the raising and lowering of the collapsing sections of the mast.

Fig. 9 is a detail horizontal sectional view on the plane indicated by the line A—A of Fig. 8, the cable clamp being shown in its closed position.

Referring to the drawings, the numeral 10 designates the bed of an automotive vehicle 11, the bed having mounted thereon an internal combustion engine 12 which is utilized to operate a cable-receiving drum or winch 13. The bed 10 further embodies spaced longitudinally extending sill beams 14, which project rearwardly beyond and overhang the chassis 15 of the vehicle 11. Arising from the beams 14 are spaced stationary up-rights 16, the latter having their upper ends united by a transversely extending pivot bar 17.

Mounted for swinging movement on the bar 17 are fixed collars 18 which are carried by the spaced lower tubular members 19 of a mast structure M. These members are united by a lower transversely disposed bracing 20 and at their upper ends by a transversely extending bar 21. The lower members 19 of the mast are adapted to receive telescopically a pair of upper tubular members 22 which, through means hereinafter described, may be extended relative to the lower members and located in such extended positions, to provide a mast having the requisite working height. However, when the upper members 22 are telescoped within the lower members 19, and the entire mast structure oscillated to assume the horizontal position depicted in Fig. 1, the total length of the mast structure will be such as to comply with the requirements of highway operating vehicles, thus enabling the apparatus to be transported rapidly over highways and from one working location to another. When so lowered, the forward end of the mast structure is received on the frame 23 mounted on the front of the vehicle 11, affording the driver of the vehicle unobstructed vision and yet compactly arranging the mast structure over the top of the vehicle.

To swing the mast structure from its horizontal inactive position of transport, as illustrated in Fig. 1, to its elevated working position disclosed in Fig. 2, use is made of a pair of cables 24. These cables at one end are attached to the chassis 15 of the vehicle 11 and are passed around guide pulleys 25 carried by the lower ends of the members 19. The cables 24 are trained forwardly and have their forward ends engaged with a yoke 26. The center of this yoke is provided with a ring 27 which is adapted for detachable engagement with a pivoted hook 28 of a fall block 29.

Secured to the frame of the block 29 is one end of a winch-operated working line 30, the latter being trained around the sheave wheels of the block 29, and also around corresponding sheave wheels of a crown block 31 mounted on a cross beam 32 carried by the upper ends of the telescoping mast members 22. From the crown block 31, the line 30 extends to a guide pulley 33 connected with the upright 16, and following its passage around the pulley 33, the line is extended to the winch or drum 13, around which it is wound and secured.

By winding the line 30 on the winch to decrease its effective length, forces are imparted to the cables 24 which cause the mast structure to swing bodily about the horizontal pivot bar 17 until the same passes through a true vertical plane and assumes the off-center position shown in Fig. 2. The bottom of the mast may be provided with jack screws 34 for engagement with foundation blocks 35.

With the mast structure so elevated, the height thereof may be extended by moving the members 22 upwardly. A simple, yet efficient way for accomplishing this resides in connecting the lower ends of the members 22, as shown in Fig. 4, with the ends of a cable 36. The opposite end portions of this cable are arranged between the lower members 19 of the mast structure and the upper members 22 while the intermediate portions of the cable 36 are trained over guide pulleys 37 mounted on the bar 21 and receive loosely a clamp pulley 39. The frame of the pulley 39 carries a pair of hingedly united jaws 40, which have their inner faces grooved as at 41 for clamping engagement with the working line 30, a manually operated screw 42 serving to maintain the jaws securely in firm frictional engagement with the working line. When the intermediate portion of the cable 36 is so clamped to the working line, it will be seen that by operating the winch 13 to wind the working line thereon, downward movement will be imparted to the pulley 39 to cause the ends of the cable 36 to be raised, carrying with them the extensible members 22 of the mast.

When the members 22 have been raised to the desired height, the same are mechanically fastened or locked in their elevated positions so that the working line may be free. This may be accomplished by forming the members 22 with spaced rigid lugs 43, which are adapted to have seating engagement with the upper surfaces of oscillating rings 43a supported by the upper ends of the members 19. These rings are equipped with operating handles 44, so that the rings may be turned manually, as indicated in Fig. 5, so that the under surfaces of the lugs 43 will engage with the upper surfaces of the rings.

When it is desired to release the members 22 so that they may be telescoped within the members 19, the rings 43a, as shown in Fig. 6, are rocked in a reverse direction in order that grooves 45, provided in the inner surfaces of said rings, may be registered with the lugs 43, thus allowing the upper section of the supporting mast to be lowered relative to the lower section thereof. The rings 43a are rendered accessible by providing one of the lower members 19 with ladder rungs, thereby enabling an operator to climb to a position on the mast structure permitting of actuation of the rings, or to clamp the pulley 39 to or release the same from engagement with the working line 30. Controlled oscillating movement

of the mast about the pivot bar 17 toward its lowered position is obtainable by the controlled movement of the working line afforded through the operation of the winch 13, the latter serving to snub the descent of the mast so that it may be lowered with safety and at all times be under machine control.

From the foregoing, it will be apparent that a telescopic and pivoted mast structure has been provided for use in the servicing of oil wells and the like which lends itself readily to transportation from one well location to another, and when a given location is reached, the mast may be set up for operation in a quick, easily executed manner. The apparatus is safe to operate and does not place undue hazards on the physical security of the attendants.

After the mast has been raised and its upper section extended for locking engagement with the rings 43a, the working line 30 may then be used for operating well-cleaning appliances, elevating rods or tubing, or in any other capacity where the mast is useful. The collapsing of the mast and the swinging thereof to its lowered position may be effected with the same ease and factors of control as in the elevation and extension thereof.

I claim:

1. Well-servicing apparatus comprising a road vehicle, a mast structure mounted for swinging movement in a vertical plane, said mast structure having a telescopic upper section, a support carried by said vehicle adjacent to the rear end thereof and upon which support the lower portions of said mast structure are pivotally united, a power driven winch mounted on said vehicle, a work line secured at one end to said winch, a crown block mounted on the upper end of the telescopic section of said mast and around which said work line is trained, cable means connected at their ends with the telescopic section of said mast structure, a pulley around which the intermediate portions of said cable means are passed, means for detachably uniting said pulley with said work line, a pair of mast elevating cables having their inner ends secured to said vehicle, guides carried by the lower ends of said mast structure and around which the intermediate portions of said cables are passed, and a yoke joined with the outer ends of said elevating cables, said yoke having detachable engagement with said work line.

2. Well-servicing apparatus comprising a road vehicle, a mast structure mounted for swinging movement in a vertical plane, said mast structure having a telescopic upper section, a support carried by said vehicle adjacent to the rear end thereof and upon which the lower portions of said mast structure are pivotally mounted, a power driven winch mounted on said vehicle, a work line secured at one end to said winch, a crown block mounted on the upper end of the telescopic section of said mast and around which said work line is trained, a cable having its opposite ends connected with the telescopic section of said mast structure, a pulley around which the bight portions of said cable are passed, a frictional clamp for removably uniting said pulley with said work line, said clamp embodying a pair of hingedly united plate members, and threaded means for maintaining the plate members of said clamp in holding engagement with said work line.

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