Sept. 25, 1951 H. F. ILLIES 2,568,959

PORTABLE DERRICK CRANE

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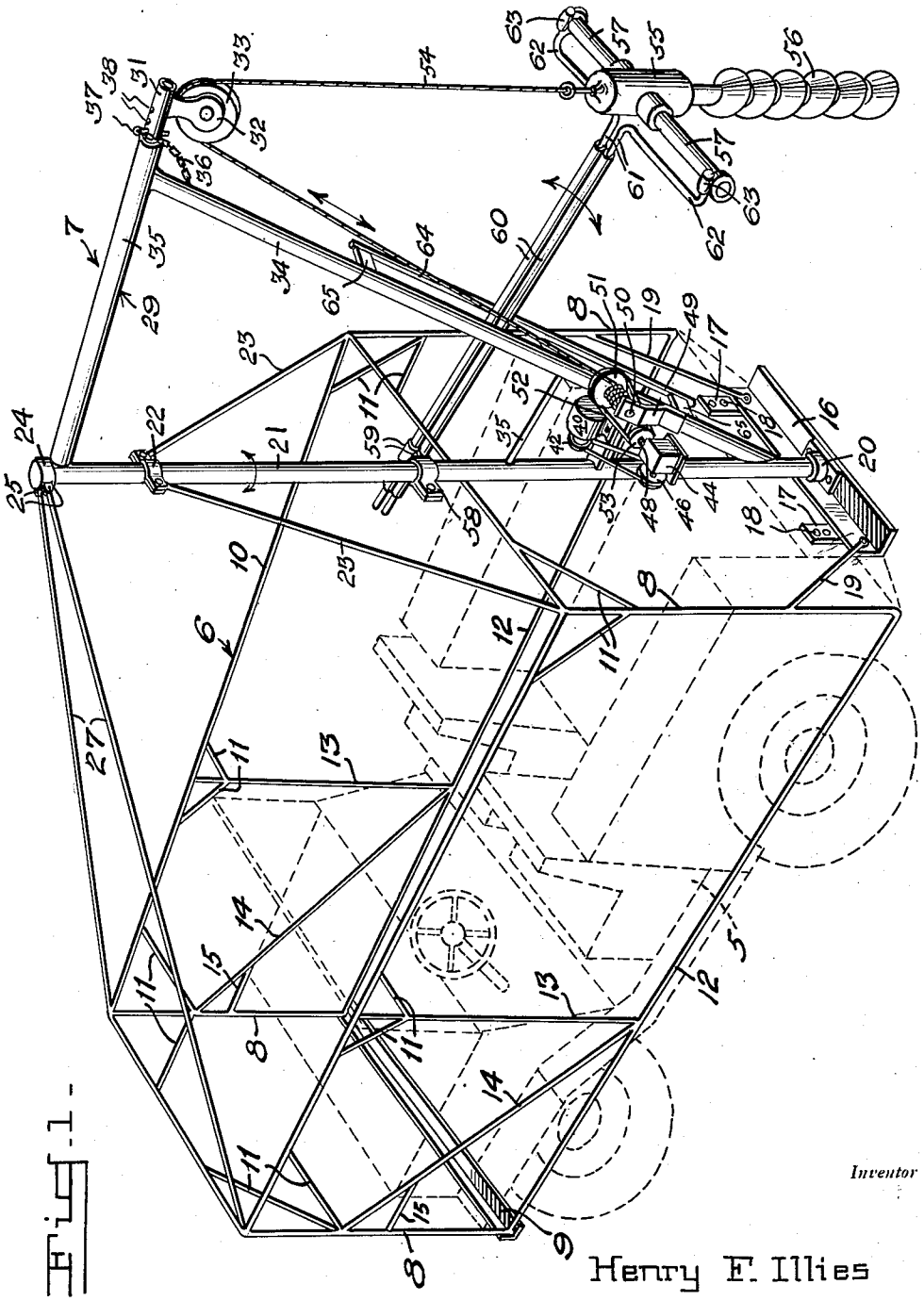


Fig. 1.

Inventor

Henry F. Illies

By Randolph & Beavers

Attorneys

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Fig. 2.

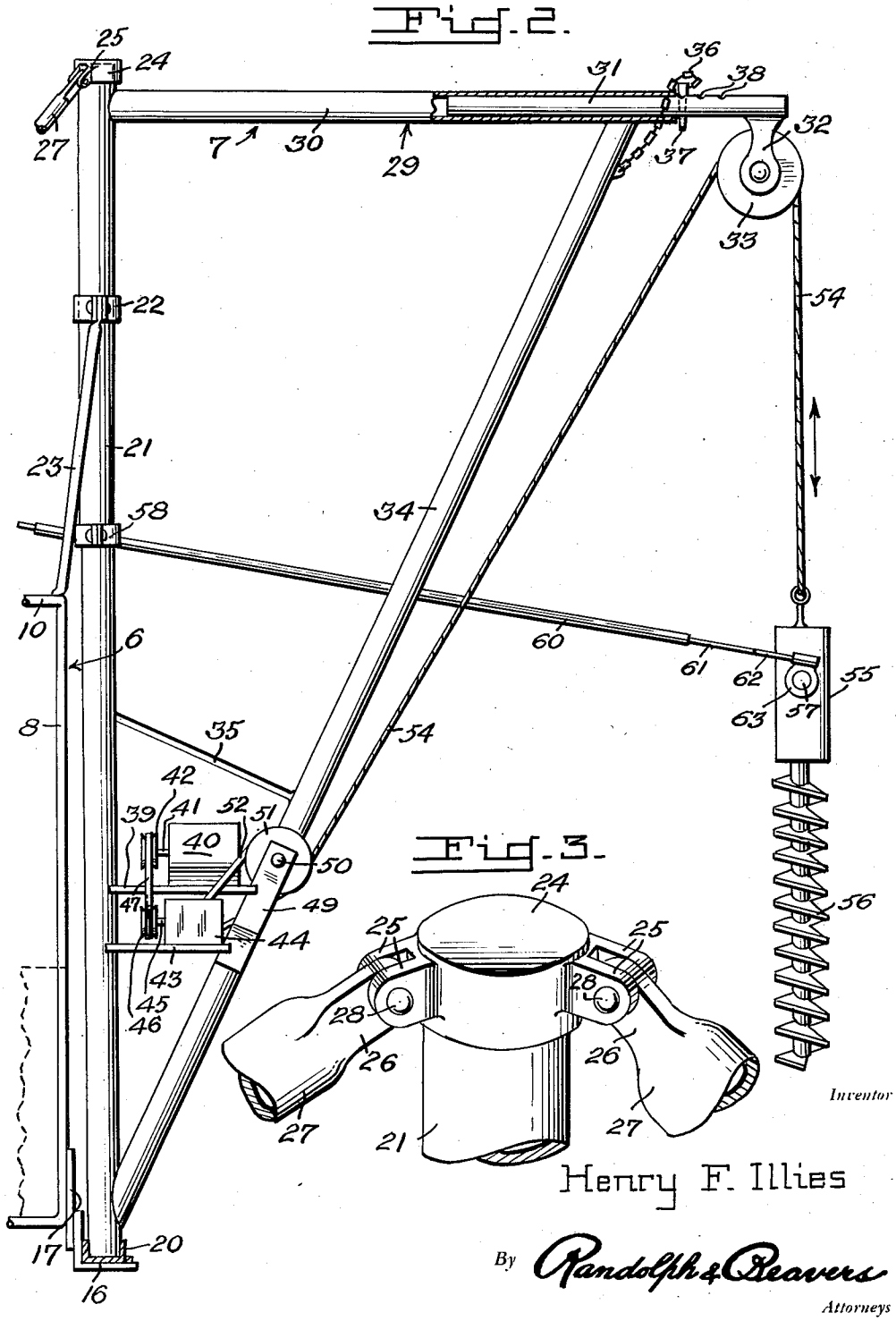


Fig. 3.

Inventor

Henry F. Illies

By Randolph & Reavers

Attorneys

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PORTABLE DERRICK CRANE

Henry F. Illies, Fosston, Minn.

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1 Claim. (Cl. 212—55)

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This invention relates to a derrick crane adapted to be mounted on a small motor vehicle and while adapted generally for supporting, raising and lowering or conveying heavy objects is especially adapted to provide a support for an auger such as is employed for digging post holes and by means of which the auger may be adjustably supported with respect to the vehicle, lowered gradually as it advances into the ground, subsequently raised out of a hole dug thereby for lifting the dirt out of the hole with the auger thereby leaving a clean hole ready to receive a post or pole, and by means of which the auger may be swung through a horizontal arc relatively to the vehicle on which the derrick crane is mounted for positioning the auger at any desired location with respect thereto.

Still another object of the invention is to provide a portable derrick crane of the character previously described having an extensible jib or spar by means of which the supporting means attached to the auger or other load may be extended or retracted relatively to the derrick crane mast for positioning the auger or load at various distances or radii with respect to a given point of the vehicle to afford means whereby the auger may be employed on the opposite side of a fence, trench or other obstruction from the supporting vehicle of the derrick crane.

Still another object of the invention is to provide a derrick crane as previously described having driving means of relatively low horsepower for actuating the hoisting rig for raising and lowering the auger or other load supported thereby.

Still a further object of the invention is to provide a portable derrick crane having a novel frame structure for securely mounting it on a motor vehicle and by means of which the derrick crane is rotatably supported with respect to the vehicle.

Still a further object of the invention is to provide a portable derrick crane having means for guiding the auger or load relatively to the mast and spar or jib of the crane.

Various other objects and advantages of the invention will hereinafter become more fully apparent from the following description of the drawings, illustrating a preferred embodiment thereof, and wherein:

Figure 1 is a perspective view of the portable derrick crane;

Figure 2 is an enlarged side elevational view of a portion thereof, and

Figure 3 is an enlarged perspective view of the bearing in which the upper end of the crane and mast is journaled.

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Referring more particularly to the drawings, for the purpose of illustrating a preferred application and use of the invention, a jeep type truck is shown in Figure 1 at 5 in broken lines with the frame, designated generally 6 of the derrick crane 7 shown mounted thereon.

The frame 6 includes upright corner posts 8 which rise from the vehicle 5, adjacent the four corners thereof; the two rear upright posts 8 being secured to the rear corners of the vehicle 5 and the two forward posts 8 being secured to the ends of a transverse supporting bar 9 formed of angle iron. The posts 8 are connected at their upper ends by a rectangular frame 10 formed of longitudinally extending side members and transversely extending end members which are braced to each corner post by diagonal braces 11. The frame 6 also includes longitudinally extending side members 12 which join at their ends with the lower ends of the corner posts 8 located at corresponding sides of the vehicle 5. The frame 6 also includes upright side posts 13 located intermediate of the ends of the frame and which are connected to the longitudinal side members 12 and the side members of the frame portion 10, located thereabove and which are likewise braced relatively to the frame portion 10 by additional diagonal braces 11. The frame 6 also includes relatively long diagonal braces 14 which extend forwardly and upwardly from the apexes of the side members 12 and braces 13 to the forward corner posts 8 and which are additionally reinforced by horizontal braces 15.

A supporting platform 16, formed of angle iron, is secured to the rear end of the vehicle 5 by strap members 17 provided with fastenings 18 which are connected to the rear end of the vehicle, and the rear corner posts 8 are braced relatively to said platform 16 by diagonal brace members 19.

The platform 16 supports an upwardly opening socket 20 in which is swivelly supported the lower end of a substantially upright mast 21, forming a part of the derrick crane 7 and which is journalled near its upper end in a bearing or sleeve 22 which is supported by a pair of diagonal members 23 which are secured to and converge upwardly from the rear corners of the frame portion 10. The upper end of the mast 21 is journaled in a cap 24 which, as best seen in Figure 3, is provided with two pairs of ears 25 which project radially from the periphery thereof for receiving between each pair of said ears the re-

stricted end 26 of a brace rod 27. The ends 26 are fastened between the ears 25 by fastenings 28 and said pairs of ears are spaced from one another so that the tie rods 27 can extend downwardly and forwardly therefrom in diverging relationship to be secured at their forward ends to the two front and upper corners of the frame 6, as clearly illustrated in Figure 1.

As best illustrated in Figure 2, the derrick crane 7 has a boom, designated generally 29 projecting substantially at right angles from adjacent the upper end thereof. The boom 29 includes an inner tubular section 30 the inner end of which is formed integral with or suitably secured to the mast 21 and the opposite, outer end of which telescopically receives the other section 31 of the boom 29 which protrudes beyond the outer end of the section 30 and which is provided, adjacent its outer end, with a depending bifurcated hanger 32 in which is journaled a pulley 33. The boom 29 is braced relatively to the mast 21 by a brace 34, the lower end of which is fixed to or formed integral with the mast 21, adjacent the lower end of the latter and which extends upwardly and outwardly with respect thereto and is formed integral with or secured to the boom section 30 at its upper end and adjacent the outer end of said section 30. The brace 34 is reinforced relatively to the mast 21 by a brace 35 and additional braces may be provided, if required. A chain or flexible member 36 is attached to the brace 34, adjacent the upper end of the latter, and has a pin 37 attached to its free end for selective engagement in longitudinally spaced openings 38 of the boom section 31, for a purpose which will hereinafter become apparent.

A platform 39 is supported between and on the mast 21 and brace 34 for mounting a motor 40, preferably a small electric motor having a driven shaft 41 provided with a pulley 42. A second platform 43 is supported by the mast 21, below and to one side of the platform 39 for supporting a gear box 44 containing reduction gearing, not shown, and having a shaft 45 projecting from one side thereof and carrying a pulley 46. An endless belt 47 is trained over the pulleys 42 and 46 for driving the shaft 45 from the shaft 41 and, as seen in Figure 1, a shaft 48 projects from the gear box 44 at right angles to the shaft 45 and is driven thereby at a reduced speed by the reduction gearing contained within said gear box. A bracket 49 is fastened longitudinally at one end thereof to the brace 34 and has an upper, outwardly off-set end forming a bearing for one end of a shaft or drum 50, the opposite end of which is journaled in the brace 34. A pulley 51 is keyed to the shaft or drum 50 adjacent its last mentioned end to be driven by the shaft 48 by means of an endless belt 52 which is trained over the pulley 51 and over a pulley 53 keyed to the shaft 48 so that the shaft or drum 50 will be driven at a reduced speed by the shaft 41 of the motor 40.

A cable or other suitable flexible hoisting member 54 has one end thereof secured to and wound on the shaft or drum 50 and extends upwardly therefrom over the pulley 33 and has its opposite, depending end attached to the motor housing 55 of an auger or post hole digger 56. The parts 55 and 56 are of conventional construction and the motor housing 55 has oppositely disposed outwardly projecting arms or handle members 57 by means of which the auger 56 is normally handled manually.

A clamp 58 is fixed to the mast 21 at any suitable elevation and has a pair of sleeve members 59, forming a part thereof and which are mounted for swivel movement with respect to the clamp 58 and in each of which is clamped an elongated guide tube 60. The two guide tubes 60 support a pair of rods 61 which are reciprocably mounted therein and which are provided, at corresponding ends thereof with out-turned portions 62 carrying clamps 63 at the terminals thereof which are secured to the ends of the arms 57. The guide tubes 60 extend rearwardly across one side of the brace 34 and are guided for swinging movement relatively thereto by a rod 64 which is disposed parallel to the brace 34 and spaced therefrom by spacing members 65 which connect the rod 64, adjacent its ends, to the brace 34.

It will be readily apparent from the preceding description that the weight of the auger 56 on the cable 54 will tend to cause the boom section 31 to telescope into the boom section 30 so that the pin 37 will function to retain the boom section 31 in an extended position, variable depending upon how far to the rear of the vehicle 5 it is desired to locate the auger 56. The auger 56 is driven by a motor contained within the housing 55 in a conventional manner and as such motors are usually electrically powered and for such purpose a source of electric current, such as a storage battery or generator, not known, may be mounted on the vehicle 5 for driving the auger motor and also the motor 40. In order to extend the boom 29, the cable 54 can be slacked off to allow the auger 56 to come to rest on the ground and by providing additional slack in the cable 54 the boom section 31 may be readily extended. The auger 56 is manually guided in drilling a hole in the earth and as the auger penetrates the earth the cable 54 is slacked off. When a hole of the desired depth has been drilled, the motor 40 is energized for revolving the drum or shaft 50 for rewinding the cable 54 thereon to thereby extract the auger 56 from the drilled hole and at the same time extract the loose dirt with the auger leaving a clean hole in which a post or pole may be inserted.

When the auger 56 is raised and lowered the guide tubes 60 and clamps 59 will swing relatively to the clamp 58 and mast 21, and the rods 61 will slide within said guide tubes 60. By extending the boom 29 for positioning the auger 56 at a greater distance from the mast 21 and the rear end of the vehicle 5, it will be readily apparent that the auger may be utilized on one side of an obstruction and while the vehicle 5 is disposed on the opposite side thereof under circumstances where said vehicle cannot be moved across the obstruction. Likewise, the mast 21 may rotate in its journals 20, 22 and 24 for swinging the entire derrick crane 7 through an arc of approximately 180° and so that the auger 56 may be utilized at any position within said arc and at various radii relatively to the mast thus accommodating the derrick crane 7 for use at positions which might otherwise be inaccessible to the vehicle 5. When the derrick crane 7 is not in use the guide tubes 60 may be moved inwardly of the clamping sleeves 59 and the auger 56 may be swung toward and secured to the brace 34 to facilitate transportation thereof. It will be readily apparent that the tie rods 27 will assist materially in supporting the weight of the auger 56.

The frame 6 and majority of the derrick parts 7 may be formed of tubular metal, as illustrated

in Figure 3, or said parts may be of solid construction.

While the portable derrick crane has been described in connection with the handling of an auger, constituting a preferred utilization thereof, it will be readily apparent that any other load may be substituted for the auger 56.

Various other modifications and changes are likewise contemplated and may obviously be resorted to, without departing from the spirit or scope of the invention as hereinafter defined by the appended claim.

I claim as my invention:

A portable derrick crane comprising a mast supporting frame adapted to be secured to the sides and ends of a motor vehicle and supported thereby, an upright mast swivelly supported on the frame beyond one end of the motor vehicle, an extensible boom projecting outwardly from the upper portion of the mast and disposed in a horizontal plane, said boom comprising an inner section rigidly secured to the mast and an outer extensible section telescoping into said inner section through the outer end of the inner boom section, said outer extensible section being provided with a plurality of longitudinally spaced openings, a pulley journaled on said outer extensible section adjacent its outer end and outwardly of the inner boom section, a driven winding drum supported by the mast, a flexible member having one end secured to and wound on the drum and extending from said drum over the pulley and terminating in a depending load supporting opposite end adapted for supporting a load at various levels and swingable relatively to the frame, and a stop supported by the mast and engageable with selected openings in the outer extensible boom section for engaging the outer end of the inner boom section to prevent retraction of the outer extensible section within the inner section, a flexible member cooperating with the pulley to retain the stop in engagement with the outer end of the inner boom section when the depending end of the flexible member is supporting a load.

HENRY F. ILLIES.

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