May 31, 1949. D. R. MOORE 2,471,492

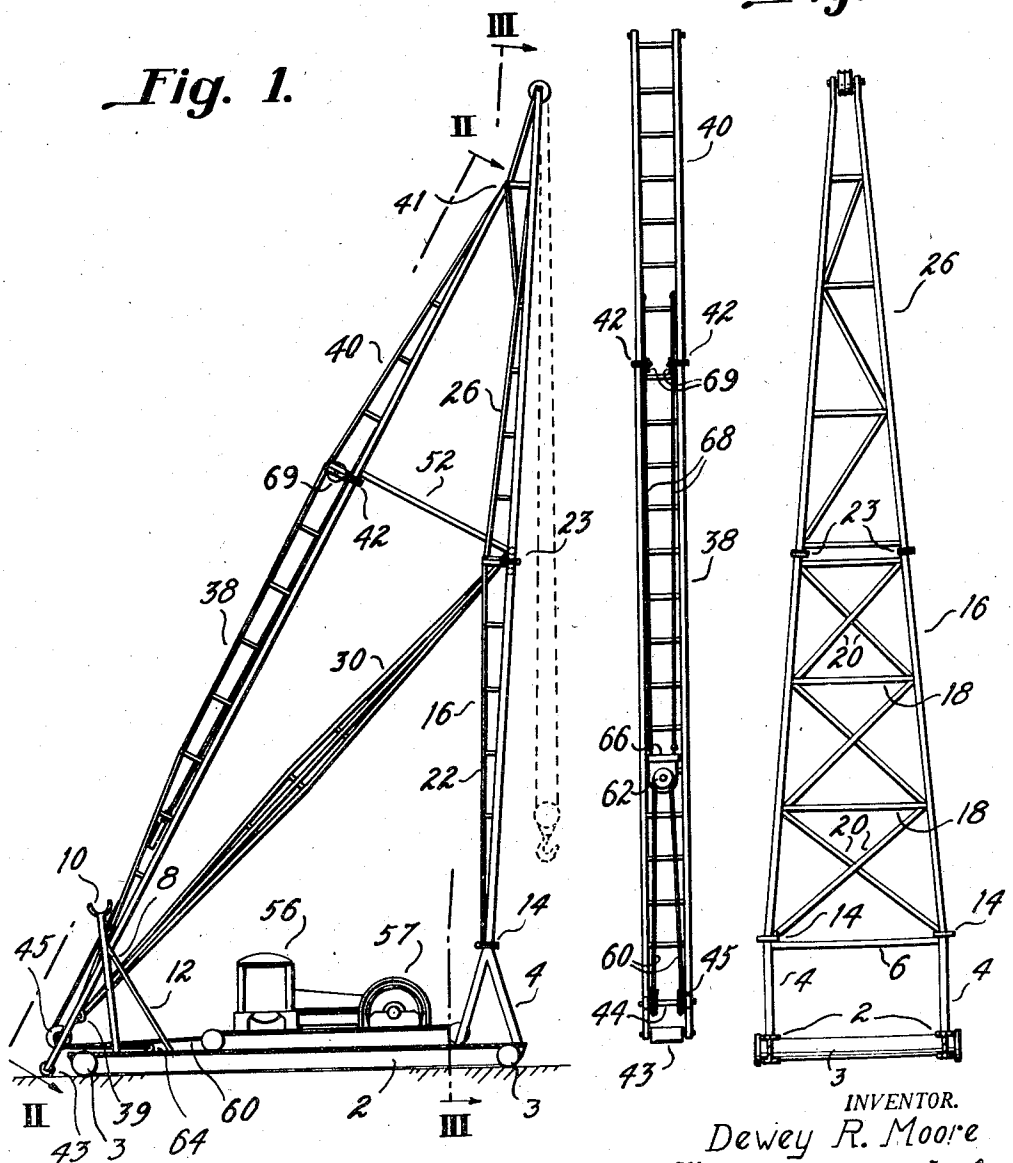
PORTABLE DERRICK

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Fig. 2.

Fig. 3.

Fig. 1.



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Fig. 9.

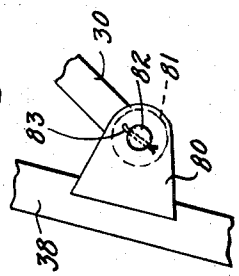


Fig. 4.

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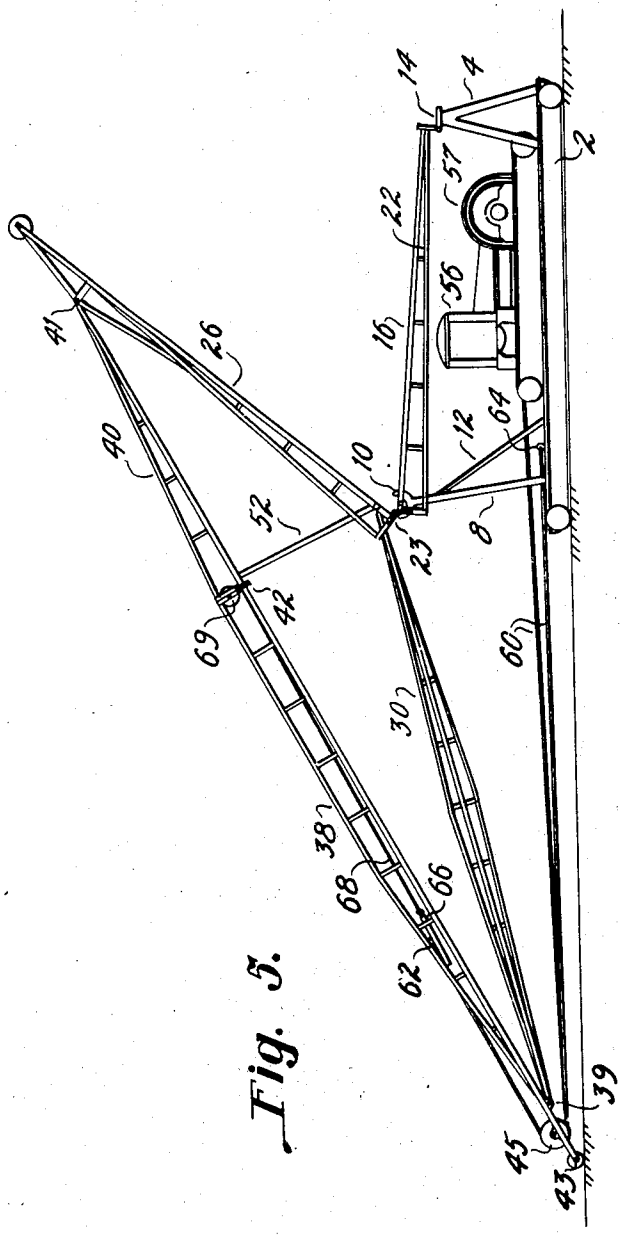


Fig. 5.

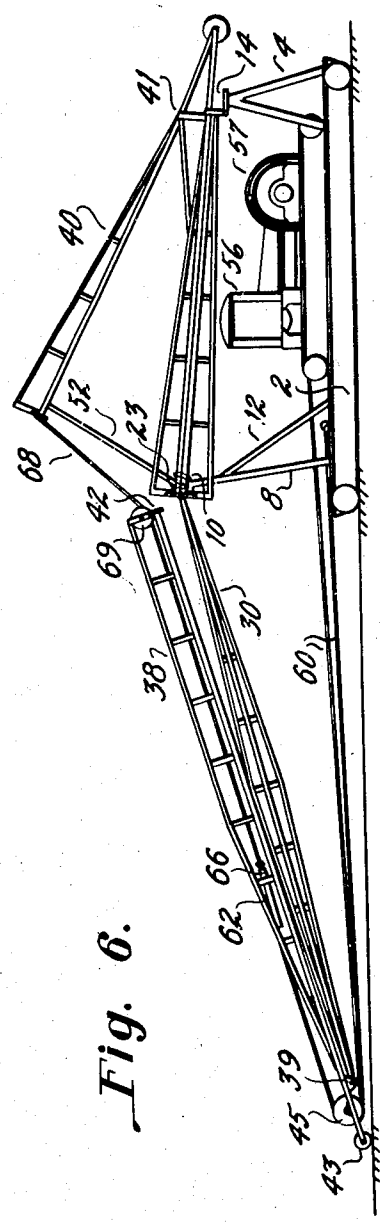


Fig. 6.

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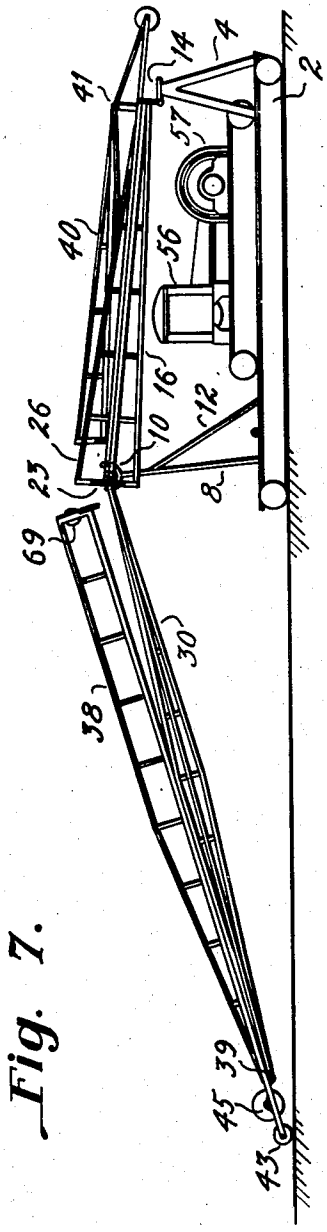


Fig. 7.

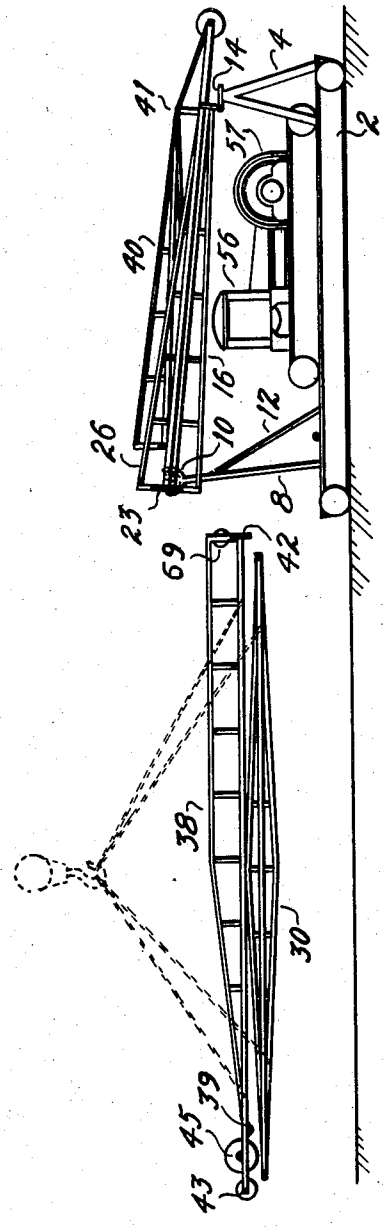


Fig. 8.

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PORTABLE DERRICK

Dewey R. Moore, Dallas, Tex.

Application September 12, 1946, Serial No. 696,477

5 Claims. (Cl. 189—11)

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This invention relates to portable derricks and more particularly to a portable derrick such as may be used in connection with well drilling or servicing operations, although not limited thereto.

It is among the objects of the present invention to provide a portable derrick which is highly efficient in operation, yet easy and inexpensive to manufacture and maintain.

Another object is the provision of an apparatus of the class described which requires a minimum of power to operate into its erect and dismantled positions.

The invention, then, comprises the features hereinafter described and as particularly pointed out in the claims, the following description and the annexed drawings setting forth in detail certain illustrative embodiments of the invention, these being indicative of several of the number of ways in which the principles of the invention may be employed.

In said drawings:

Figure 1 is an elevational view illustrating the portable derrick of the present invention in its erect and operative position;

Figure 2 is an elevational view on the line II—II of Figure 1;

Figure 3 is an elevational view on the line III—III of Figure 1;

Figure 4 is an elevational view similar to that of Figure 1, but illustrating the component elements of the portable derrick in the first stages of dismantling;

Figures 5, 6 and 7 are views similar to the showing of Figure 4, but illustrating the component elements of the portable derrick in progressively more advanced stages of the dismantling operation;

Figure 8 is a composite view illustrating some of the component elements of the apparatus in fully dismantled and racked position, with the remainder of the component elements disconnected therefrom and ready for superposition thereon; and

Figure 9 is an enlarged elevational view of a preferred form of detachable hinged joint employed in the derrick.

In the interest of simplicity, the portable derrick of the present invention will first be described in its erect and operative position.

Referring more particularly to the drawings, the derrick comprises a rectangular base formed of a pair of parallel I-beams 2 joined at their respective ends by a pair of tubular end members 3.

At one end of I-beams 2 there is mounted a pair of opposed and transversely aligned vertically extending inverted V-shaped supports 4 which are connected together by a transverse tubular member 6 which extends between them at the

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points where their respective leg members converge.

At the opposite ends of I-beams 2 there is provided a pair of uprights 8 which extend vertically and outwardly with respect to the base; and on the upper end of each of these uprights there is mounted a U-shaped saddle 10, the recesses formed by the said saddles aligning with each other horizontally, as shown. Suitable diagonal bracing members 12 extend between the uprights 8 and the adjacent I-beams which form the side members of the base.

Atop each of the supports 4 there is secured the bottom half of a horizontally disposed hinge 14, the pintle of which is disposed inwardly of the base, as shown in Figure 1.

To the upper half of each of the horizontally disposed hinges 14 there is secured the bottom of one of a pair of upwardly convergent leg members which form part of a mast section 16, the same being hereinafter designated the "lower mast section." As shown, the lower mast section 16 is provided with cross-members 18 and diagonal bracing members 20, and, in addition, the upwardly convergent leg members are provided with cantilever-type bracing members 22 for the purpose of increasing resistance against buckling in directions at right angles to the major plane of the said mast section.

Atop the upper end of each of the convergent leg members of the lower mast section 16 is the bottom half of a horizontally disposed hinge 23, the pintle of which is disposed outwardly of the base.

To the upper half of each of the horizontally disposed hinges 23 there is secured the bottom of one of a pair of upwardly convergent leg members which form part of a mast section 26, the same being similar in construction and design to the lower mast section 16, and hereinafter designated as the "upper mast section."

To the lower end of the upper mast section 26 there is pivotally and detachably connected the top of a diagonal main brace 30 which depends downwardly and diagonally to extend over the opposite end of the base for a purpose which will be later described. This elongate diagonal main brace 30 is composed of suitably connected longitudinal and transverse tubular sections, and in side elevation defines a truss which tapers toward both ends.

In addition to the foregoing elements the portable derrick of the invention comprises a sectionally-arranged diagonal mast support which is composed of a lower section 38 which extends diagonally upward from a position proximate the lower end of the diagonally extending main brace 30; and the lower end of the latter is pivotally and detachably connected to the said lower section 38 of the aforesaid sectionally-arranged diagonal

mast support at a position adjacent to, but spaced from, its lower end, as shown at 39. Superposed on the upper end of the lower section 38 of the sectionally-arranged diagonal mast support is an upper section 40, the latter being pivotally connected, as at 41, to the upper mast section 26 at a point which is somewhat below its upper end and preferably to the most outwardly spaced portions of the cantilever-type bracing members thereof.

Figure 9 illustrates in detail a preferred form of detachable hinged joint for connecting main brace 30 and lower section 38 of the diagonal mast support. Inwardly protruding apertured ears 80 are fixed to opposite sides of section 38. The side members of brace 30 have eyes 81 at their extremities. A pintle 82 is removably received within eyes 81 and the apertures in ears 80. Preferably said pintle is retained by a cotter key 83. It is seen that hinging of brace 30 can take place about pintle 82 and that said brace can be detached from section 38 on removal of cotter key 83 and pintle 82. The two other detachable hinged connections—namely that between the upper end of brace 30 and the lower end of mast section 26 and that between the upper end of the upper section of the mast support and the upper mast section (i. e. connection 41) are preferably of similar construction and hence are not shown in detail.

The upper end of the lower section 38 of the sectionally-arranged diagonal mast support, and the lower end of the upper section 40 thereof, are detachably connected through the agency of a pair of clamping plates 42 which as such form no part of the present invention and accordingly are not illustrated in detail in the drawings nor further described hereinafter. The lower end of the lower section 38 of the diagonal mast support is provided with a roller 43 which is mounted on a horizontal axis and constructed and arranged to make rolling contact with the ground.

In relatively close adjacency to the roller 43 at the bottom of the lower section 38 of the diagonal mast support there is provided a pair of spaced parallel pulleys 45 which rotate on a common horizontal axis.

The lower end of the upper section 40 of the diagonal mast support is connected, by a detachable auxiliary brace 52, with the lower end of the upper mast section 26, the said auxiliary brace simply comprising a pair of conventionally shaped, and attached, leg members.

On the base there is mounted a prime mover 56 driving a drum 57 onto which there is reeled a rope 60. The rope 60 is reeved over one of the pulleys 45, over a sheave 62 (which is disposed above the said pulleys), reversed upon itself, passed back over the other of the pulleys 45, and dead-ended, as at 64, onto the base. The sheave 62 carries a crossbar 66 to which are attached two upwardly extending parallel ropes 68, Figure 2. A pair of sheaves 69 are rotatably mounted in lower section 38 near its upper extremity. Ropes 68 extend through said lower section and pass around the under side of said sheaves and are attached to the upper section 40 of the diagonal mast support. As will be appreciated by those skilled in the art, the immediately foregoing construction and arrangement of ropes and associated instrumentalities produces a mechanical advantage such as will result in a minimum of line pull, or required power, for erecting and dismantling the component elements of the portable derrick.

Through the medium of the prime mover 56, drum 57, ropes 60 and 68, etc., the portable derrick may be dismantled from the position of Figure 1 in the following manner.

The hinge 23 which connects the lower and upper mast sections 16 and 26, respectively, is permitted to open as shown in Figure 4, and the rope 60 is paid-out from the drum 57. This permits the lower mast section 16 to pivot about its supports 4, and move downwardly over the base until its top cross-member 18 seats in the saddles 10 atop the uprights 8, as shown in Figure 5. During this lowering movement of the lower mast section 16, the lower end of the lower section 38 of the diagonal mast support moves outwardly on its ground-contacting roller 43 and carries with it the lower end of the elongate diagonal main brace 30.

When the component elements have moved into the approximate positions of Figure 6, the flange connections 42 are disconnected, and the paying out of the rope 60 is continued. thereby permitting both the upper mast section 26 and the upper section 40 of the diagonal mast support to overlie the lower mast section 16 in its supported position on the base. As shown in Figure 6, after flange connections 42 are disconnected, ropes 68 support section 38 for lowering onto brace 30. At this point the pair of cables 68 is detached from the upper section 40 of the diagonal mast support. Then, the detachable auxiliary brace 52 is disconnected and the elements made to occupy the relative positions shown in Figure 7. At this point, there is broken the pivotal connection between the upper end of the elongate diagonal main brace 30 and what had previously been the lower end of the upper mast section 26. Now, the elements illustrated on the left-hand side of Figure 8 may be moved, as by a crane hook, into superposed relationship with respect to the dismantled and supported elements shown on the right-hand side of the said figure. When the elements have been made to assume the aforementioned superposed relationship, the entire portable derrick may be conveniently moved, along with the base, as a compact unit.

In order to raise the component elements of the portable derrick into the erect or operative position shown in Figure 1, the foregoing procedure is simply reversed.

Preferably, but not necessarily, the parallel side members of the sectionally-arranged diagonal mast support are provided with transverse rungs, as shown in Figure 2, whereupon the said mast support may also serve as a ladder.

While I have shown and described certain specicfic embodiments of the present invention, it will be readily understood by those skilled in the art that I do not wish to be limited exactly thereto, since various modifications may be made without departing from the scope of the invention as defined in the appended claims.

I claim:

1. A portable derrick or the like comprising a support, a lower mast section pivotally mounted at its lower end on said support and adapted for alternative movement into substantially horizontal and substantially vertical positions, an upper mast section pivotally connected to the free end of said lower mast section and adapted to alternately occupy juxtaposed and overlying positions with respect to said lower mast section, the pivotal connection between said lower mast section and said support being inwardly of said support and the pivotal connection between said

upper and lower mast sections being outwardly of said support, a diagonal mast support including a pair of detachable and juxtaposed sections, the upper section of said mast support being pivotally connected to said upper mast section adjacent the upper portion of the latter, the lower section of said mast support extending to the ground, an elongate diagonal brace pivotally connected to and extending between the lower end of said upper mast section and the lower end of said diagonal mast support, and means for positioning the lower end of said diagonal mast support relative to said first named support.

2. A portable derrick or the like comprising a support, a lower mast section pivotally mounted at its lower end on said support and adapted for alternative movement into substantially horizontal and substantially vertical positions, an upper mast section pivotally connected to the free end of said lower mast section and adapted to alternately occupy juxtaposed and overlying positions with respect to said lower mast section, the pivotal connection between said lower mast section and said support being inwardly of said support and the pivotal connection between said upper and lower mast sections being outwardly of said support, a diagonal mast support including a pair of detachable and juxtaposed sections, the upper section of said mast support being pivotally connected to said upper mast section adjacent the upper portion of the latter, the lower section of said mast support extending to the ground, an elongate diagonal brace pivotally connected to and extending between the lower end of said upper mast section and the lower end of said diagonal mast support, an auxiliary brace extending between the lower end of said upper mast section and the lower end of the lower section of said diagonal mast support, and means for positioning the lower end of said diagonal mast support relative to said first named support.

3. A portable derrick or the like comprising a support, a lower mast section pivotally mounted at its lower end on said support and adapted for alternative movement into substantially horizontal and substantially vertical positions, an upper mast section pivotally connected to the free end of said lower mast section and adapted to alternately occupy juxtaposed and overlying positions with respect to said lower mast section, the pivotal connection between said lower mast section and said support being inwardly of said support and the pivotal connection between said upper and lower mast sections being outwardly of said support, a diagonal mast support including a pair of detachable and juxtaposed sections, the upper section of said mast support being pivotally connected to said upper mast section adjacent the upper portion of the latter, the lower section of said mast support extending to the ground, a ground-contacting roller carried on the lower end of said mast support, an elongate diagonal brace pivotally connected to and extending between tthe lower end of said upper mast section and the lower end of said diagonal mast support, and means for positioning the lower end of said diagonal mast support relative to said first named support.

4. A portable derrick or the like comprising a support, a lower mast section pivotally mounted at its lower end on said support and adapted for alternative movement into substantially horizontal and substantially vertical positions, an upper mast section pivotally connected to the free end of said lower mast section and adapted

to alternately occupy juxtaposed and overlying positions with respect to said lower mast section, the pivotal connection between said lower mast section and said support being inwardly of said support and the pivotal connection between said upper and lower mast sections being outwardly of said support, a diagonal mast support including a pair of detachable and juxtaposed sections, the upper section of said mast support being pivotally connected to said upper mast section adjacent the upper portion of the latter, the lower section of said mast support extending to the ground and movable with respect thereto, an elongate diagonal brace pivotally connected to and extending between the lower end of said upper mast section and the lower end of said diagonal mast support, a sheave on the exterior of said diagonal mast support, a pair of parallel ropes connecting said sheave with the lower end of the upper section of said diagonal mast support, a pair of horizontally rotatable pulleys mounted adjacent the lower end of said diagonal mast support, a drum, and a rope having one of its ends connected to said drum, said rope being reeved over one of said pulleys, said sheave, the other of said pulleys, and dead-ended.

5. A portable derrick or the like comprising a support, a lower mast section pivotally mounted at its lower end on said support and adapted for alternative movement into substantially horizontal and substantially vertical positions, an upper mast section pivotally connected to the free end of said lower mast section and adapted to alternately occupy juxtaposed and overlying positions with respect to said lower mast section, the pivotal connection between said lower mast section and said support being inwardly of said support and the pivotal connection between said upper and lower mast sections being outwardly of said support, a diagonal mast support including a pair of detachable and juxtaposed sections, the upper section of said mast support being pivotally connected to said upper mast section adjacent the upper portion of the latter, the lower section of said mast support extending to the ground, a ground-contacting roller carried on the lower end of said mast support, an elongate diagonal brace pivotally connected to and extending between tthe lower end of said upper mast section and the lower end of said diagonal mast support, an auxiliary brace extending between the lower end of said upper mast section and the lower end of the lower section of said diagonal mast support, a sheave on the exterior of said diagonal mast support, a pair of parallel ropes connecting said sheave with the lower end of the upper section of said diagonal mast support, a pair of horizontally rotatable pulleys mounted adjacent the lower end of said diagonal mast support, a drum, and a rope having one of its ends connected to said drum, said rope being reeved over one of said pulleys, said sheave, the other of said pulleys, and dead-ended.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
2,271,577	Woolslayer	Feb. 3, 1942
2,344,390	Cohen	Mar. 14, 1944
2,364,851	Johansen	Dec. 12, 1944