Nov. 15, 1932. O. C. HAMRE 1,887,553

HOISTING DEVICE

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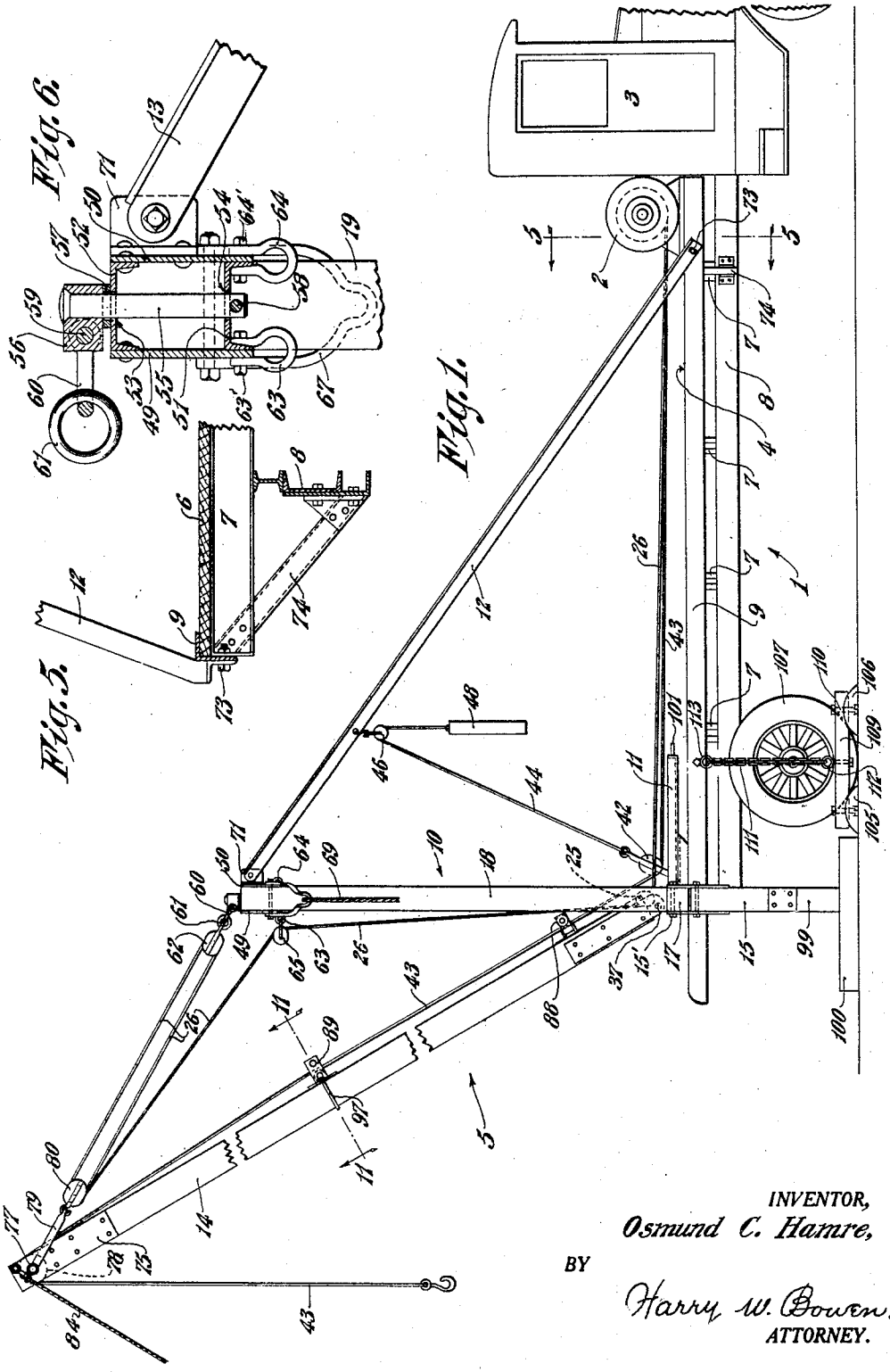


Fig. 1.

Fig. 5.

Fig. 6.

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Fig. 2.

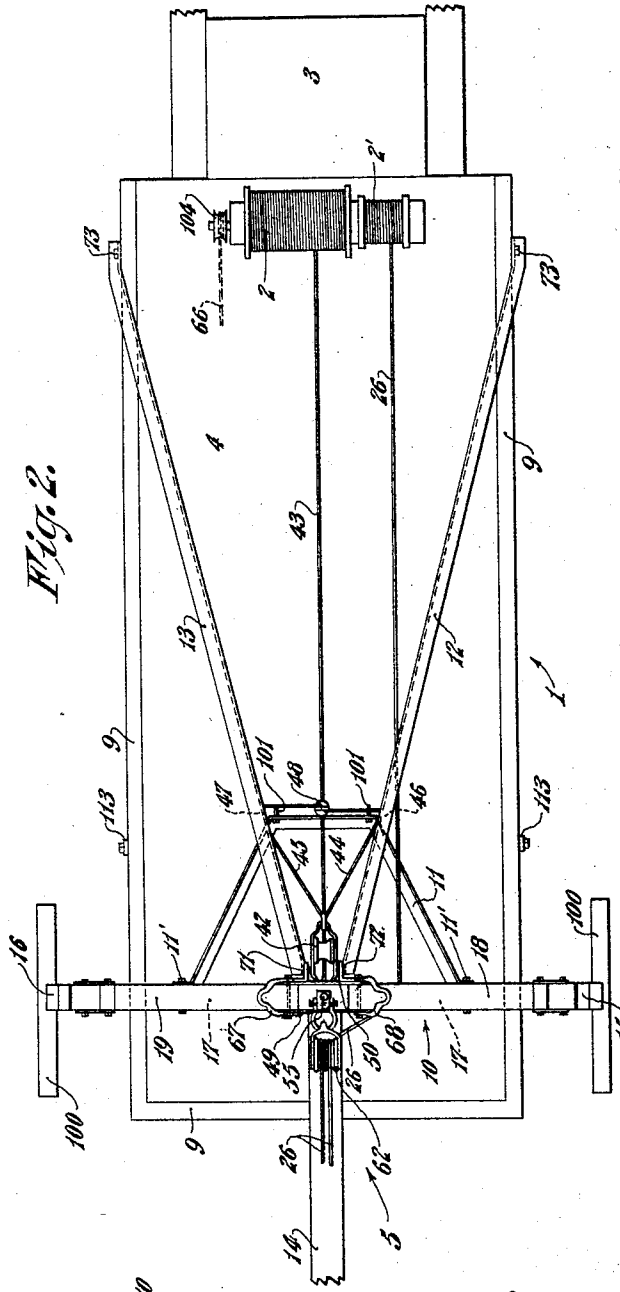


Fig. 8.

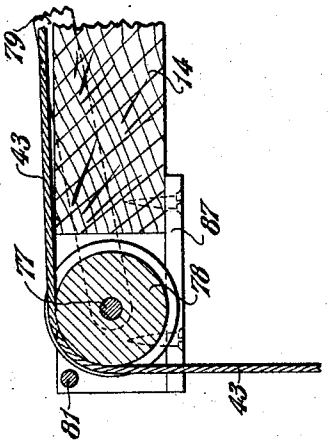


Fig. 12.

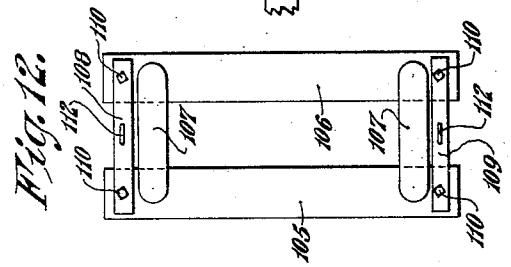
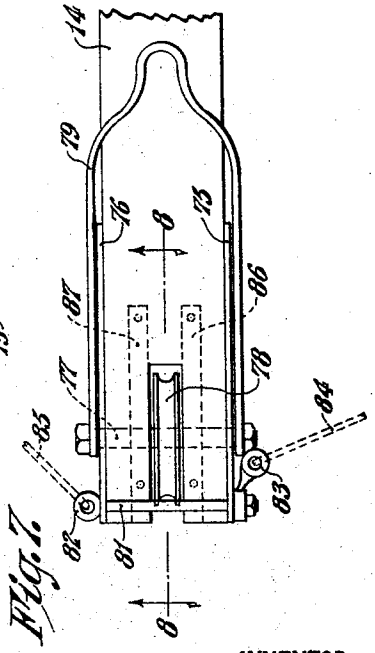


Fig. 7.



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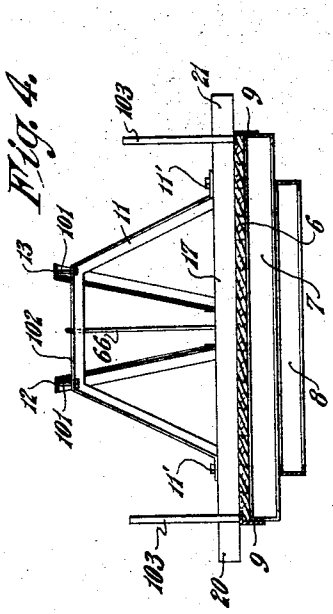


Fig. 4.

Fig. 3.

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Fig. 10.

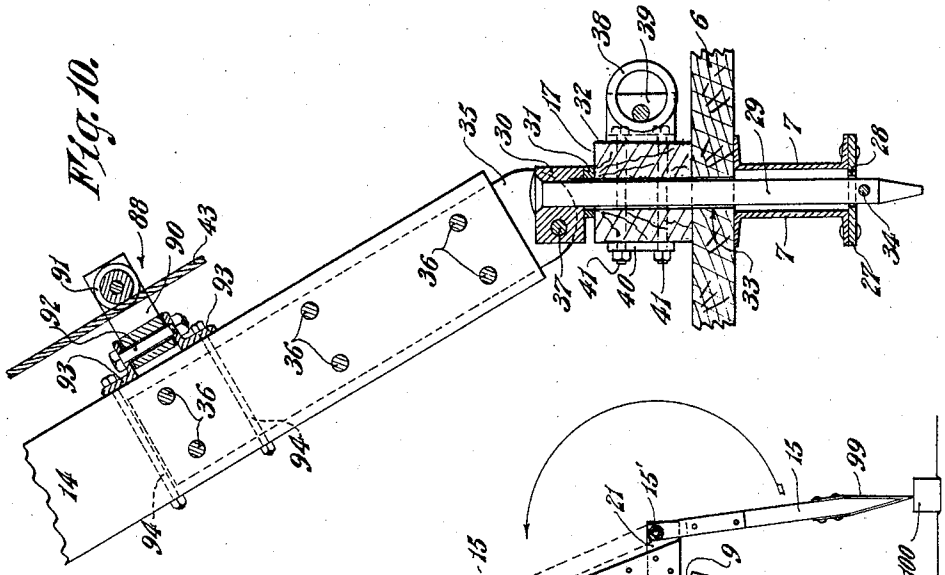


Fig. 9.

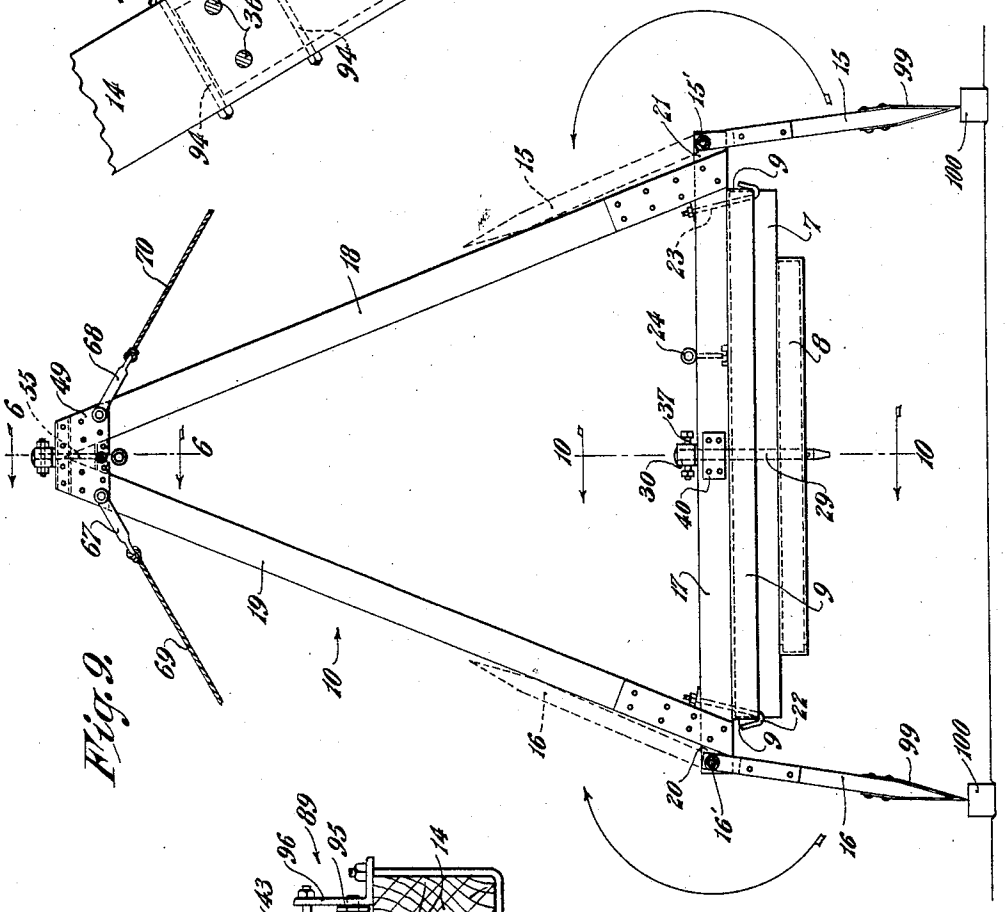
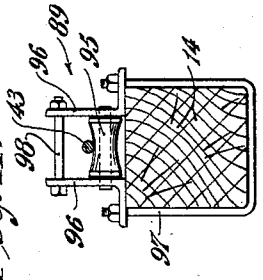


Fig. 11.



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UNITED STATES PATENT OFFICE

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HOISTING DEVICE

Application filed February 21, 1931. Serial No. 517,379.

This invention relates to improvements in hoisting devices and more particularly to that type of hoisting device which is designed to be used in co-operation with a motor truck which is equipped with a winch or windlass that is operated by the truck's motor.

An object of my invention is to provide a hoisting device which may be quickly and easily erected on and secured to the body of a motor truck and ready to be operated by the winch, which is a part of the standard equipment of the truck, for raising and lowering an article, as a safe, or pieces of building material.

A further object of my invention is to provide a hoisting device which may be mounted on and secured to the floor of a motor truck in such a way as to permit the ordinary movements of the truck from place to place with the hoisting device in place thereon, thus giving the hoisting device the same flexibility in movement from place to place as any motor truck.

A still further object of my device is to provide co-operative means, whereby the hoisting device is braced in the ground when desired, in order to relieve the truck chassis of excessive strain when heavy loads are being moved by the hoisting device.

At the present time, when a safe or a heavy piece of building material is to be hoisted in place, it is often necessary to erect a temporary structure for the particular or special piece of work to be performed. By means of my improved hoisting mechanism, which is located on and secured to a truck, it may be moved from place to place and the hoisting apparatus quickly assembled for use, as readily understood.

These and other objects and advantages of my invention will be more particularly set forth in the accompanying specification with reference to the drawings, and appended claims.

Broadly, my invention consists, in co-operation with a motor truck which is equipped with a double drum winch, which is connected to be operated by the truck motor, of a hoisting device comprising a triangular-shaped framework, bracing means secured to the apex of said frame, a boom, a boom cable operated by one drum of the winch, a hoisting cable operated by the other drum of the winch, the usual pulley blocks co-operating with said cables, means for erecting the frame on the truck body, means for securing the frame and braces to the truck body, and means for bracing the frame on the ground when desired.

A preferred form of my invention is illustrated in the accompanying drawings, in which:

Fig. 1 is a side elevational view showing the hoisting device mounted on a truck body ready for use.

Fig. 2 is a plan view of the same.

Fig. 3 is a side elevational view illustrating the method of erecting the apparatus on the truck body.

Fig. 4 is a cross sectional view taken on the line 4—4 of Fig. 3 illustrating the function of the erection frame mounted on the base member of the triangular hoist frame.

Fig. 5 is a detail sectional view on the line 5—5 of Fig. 1, showing the knee brace used to transfer the stresses in the hoist frame braces directly to the main chassis of the truck.

Fig. 6 is a detail sectional view on the line 6—6 of Fig. 9 showing the construction at the apex of the hoist frame.

Fig. 7 is a plan view of the upper end of the boom.

Fig. 8 is a sectional view on the line 8—8 of Fig. 7.

Fig. 9 is an end view of the hoist frame erected on and secured to the floor of a motor truck.

Fig. 10 is a detail, sectional view on the line 10—10 of Fig. 9.

Fig. 11 is a sectional view on the line 11—11 of Fig. 1, illustrating the central hoist cable guide attached to the boom, and Fig. 12 is a plan view of the support for the rear wheels and anchor for the same.

Referring now to the drawings in detail, in which like numerals refer to like parts throughout:

The motor truck 1, equipped with the

double drum winch 2, and 2′, mounted directly back of the cab 3 on the truck floor 4, and operated by the truck motor, (not shown), is used as a support for and carrier of the hoisting device 5. The truck floor 4 is built up of the plank 6 supported on a series of paired channels 7, which are in turn supported on the truck frame 8. The side and rear edges of the truck floor 4 are reinforced by the angle iron 9.

The principal members of the hoisting device 5 are the main frame 10, the erection frame 11, braces 12 and 13, connected to the main frame 10, boom 14, and foot braces 15 and 16. The triangular-shaped main frame 10 consists of the bottom member 17 and converging side members 18 and 19, framed together as indicated. The ends 20 and 21 of the bottom member 17 extend beyond the side members 18 and 19, and the sides of the truck. The foot braces 15 and 16 pivotally secured to the ends 20 and 21, as indicated at 15′ and 16′. When the truck is moved, or whenever the foot braces are not in use, they are swung upward and out of use against the side members 18 and 19, as indicated by dotted lines in Fig. 9. The bottom member 17 is secured to the truck body when in use by means of the hook bolts 22 and 23 which pass downward through the usual stake holes in the truck floor, and hook under the upright leg or web of the angle iron 9, as indicated in Fig. 9. An eye bolt 24, (see Fig. 9) is secured to the bottom member 17, at one side of the center, and serves as an anchor for the pulley block 25, which guides the boom cable 26. Fig. 10 illustrates the method of securing the boom 14 to the bottom member 17 by means of the plate 27, which is formed with the opening 28 and riveted to the bottom flanges of the cross-paired channels 7. The king bolt 29 having mounted thereon the cast steel block 30 and washer 31, is dropped through the openings 32 and 33 in the bottom member 17 and floor plank 6, respectively, between the channels 7, and through the opening 28 in the plate 27, and retained in place by the pin 34. The plates 35 secured to the boom 14 by the bolts 36, are supported on the steel block or casting 30 with the pivot pin 37. 38 is a ring secured to the bottom member 17 by angles 39, plate 40, and bolts 41 and serves as an anchor for the pulley block 42, (see Figs. 1 and 2), which guides the hoisting cable 43. The pulley block 42 is held in position at all times to prevent snarling of the hoisting cable 43 by means of the cables 44 and 45, which pass over the sheave wheels 46 and 47 and are secured to the counterweight 48.

The erection frame 11 is also bolted to the bottom member 17, as shown in Fig. 4, with the bolts 11′ and will be more fully described later.

The side members 18 and 19 of the main frame 10 are secured together at the apex of this frame with the plates 49 and 50, (see Fig. 6). The channels 51 and 52, formed with the openings 53 and 54, are framed between the plates 49 and 50 as indicated, and the king bolt 55, having secured thereon the cast steel block 56 and washer 57, is passed through the openings 53 and 54 and held in place by the pin 58. Secured to the block 56 by the pivot pin 59 is the U-shaped member 60 which in turn retains the ring 61, which serves as an anchor for the pulley block 62 for the boom cable 26, as shown in Fig. 1. The U-shaped, or clevis members 63 and 64, are secured to the plates 49 and 50 with the bolts 63′ and 64′ and the channel 51, and the member 63 acts as an anchor for the boom cable pulley block 65. When the main frame 10 is being erected, the erection cable 66 is secured to the clevis member 64. Anchor members 67 and 68 are bolted to the plates 49 and 50 and the side members 18 and 19, and stay lines 69 and 70 are secured to these members. The angle iron brackets 71 and 72 are secured to the plate 50, and one end of the braces 12 and 13 is pivotally connected to the brackets 71 and 72, respectively. The opposite ends of the brace 12 and 13 are secured to the angle 9 of the truck floor 4 by bolts 73. The angle 9 is framed to the channels 7, and the stresses of the braces 12 and 13 are transferred from the angle 9 to the truck frame 8 by the knee braces 74, framed between the frame 8 and the channels 7, as indicated in Fig. 5.

The construction at the top of the boom 14 is illustrated in Fig. 7. Plates 75 and 76 are secured to opposite sides of the boom 14, and the shaft 77, supported in the boom 14 and plates 75 and 76, forms a bearing for the hoist cable sheave 78 and the U-shaped clevis member 79. The boom cable block 80 is hooked in the clevis member 79, (see Fig. 1). To prevent the hoist cable 43 from jumping off the sheave 78, and to the quick and easy installation and removal of the hoist cable, the ring or eye bolt 81 is secured between the plates 75 and 76 and over the sheave 78, as indicated in Figs. 7 and 8. The ring bolt 81 is provided with the ring or eye 82 and ring nut 83, to which are secured the sway lines 84 and 85. Bumper strips 86 and 87, secured to the under side of the boom 14 on each side of the sheave 78, prevents wear on the wood boom from the sway and side strain of the cable 43.

The hoisting cable 43 is guided down the boom 14, and prevented from snapping or swinging out of place, by the cable guides 88 and 89. The guide 88 comprises the bracket 90, (see Fig. 10), in which is pivotally mounted the roller 91, pivotally supported by the bolt 92 in the angle irons 93, which are secured to the boom 14 by the bolts 94. The hoist cable 43 is guided by the under side of the roller 91, as indicated in Fig. 10. The

guide 89 is shown in Fig. 11, and comprises the roller 95 pivotally supported in the angle irons 96, which are secured to the boom 14 by the U-bolts 97. The cable 43 rides on the top of the roller 95, and a bolt 98, secured to the angles 96 above the roller 95 prevents the cable 43 from leaving the guide 89.

The foot braces 15 and 16 are wedge-shaped at their lower ends and shod with steel plates 99, and customarily wood blocks 100 are set under these ends to spread the load on the ground, and prevent lateral movement of the truck.

The main frame 10 and attached braces 12 and 13 are shipped in a horizontal position, as indicated in Fig. 3, and in this position the erection brace 11 forms a support for the braces 12 and 13. Studs 101, secured to the top member 102 of the brace 11 engage the braces 12 and 13 and hold them in place during shipping and handling. (See Figs. 3 and 4.) When the main frame 10 is to be erected on the truck floor 4, stakes 103 are first inserted in stake holes in the floor 4. The frame 10 is then placed on the rear of the truck floor in the position indicated in Fig. 3, with the bottom member 17 against the stakes 103. The erection cable 66 is then secured to the member 65, passed over the top member 102 of the erection brace 11, and a couple of turns taken around the sheave 104 on the winch 2. The winch is then operated, and the main frame 10 is pulled upward into position, as indicated by dotted lines in Fig. 3. The erection brace 11, when the main brace 10 is in an upright position, lies on the floor 4 of the truck, thus preventing the main frame 10 from tipping backward before the braces 12 and 13 are secured to the angles 9.

In operation, the various parts of the hoisting device are placed on the floor of the truck and driven to the desired location, such as a railroad yard or a building in process of construction. The hoisting device is then erected and assembled on the truck, and put into operation. It may be used efficiently in loading and unloading freight cars when a crane is not available. When one car is loaded or unloaded, the hoisting device and truck, as a unit, may be moved to another location. On building construction, the device may be used at one location, then moved to another location. Loads may be picked up by the hoisting device, the truck operated, and the load thus moved to a different location. This hoisting device is adapted to efficient service in a wide variety of uses, a few of which are; loading and unloading of freight, erection of structural steel, stone, concrete, and many other building materials, wrecking operations, installation of safes and other furniture through windows on the upper floors of office buildings, excavating, etc.

Referring to the construction shown in Fig. 12, 105 and 106 indicate two half round pieces of timber which are spaced from each other to form a recess to receive the two rear wheels 107. These two pieces are firmly secured together with the pieces 108 and 109 and bolts 110. When the apparatus is to be used for lifting a heavy load and the boom 14 is swung outward at the side of the truck, the rear wheels 107 are backed or drawn over the half round pieces 105 and 106 and located in the space between these pieces. The chains 111 are then connected to the pieces 108 and 109 and the angle irons 9 of the truck frame, as shown by means of the rings 112 and 113. It will be seen that the pieces 105 and 106 will operate to maintain the wheels 107 in place against movement, either forward or rearward while the chains 111 will operate to anchor the truck against any tipping or lateral movement by reason of its being connected to the pieces 105, 106 and 109, as readily understood. In other words, the truck is firmly retained in place against both longitudinal and lateral movement.

What I claim is:

1. In combination, a portable hoisting apparatus, a wheel supported truck platform, a double winding drum thereon, a tiltable triangular-shaped main frame, means for retaining the same on the truck platform, comprising hook bolts secured to said frame and to the truck platform, foot braces pivotally secured to the main frame, means for laterally retaining the main frame in an upright position, comprising a pair of stay braces each having an end pivotally secured to said frame and an opposite end removably secured to a side of said truck platform, a boom member pivotally connected to the base part of the said main frame and to the truck platform for vertical and lateral movements, a hoisting cable connected to one of the drums and supported and guided on the boom, a boom supporting cable connected to the main frame and the other drum.

2. In combination, in a portable hoisting apparatus, of a wheel supported truck, a main supporting frame, means for detachably securing said frame to the platform of the truck, a boom member, means for pivotally attaching said boom member to the said main frame and to the truck floor for movements in both a vertical and horizontal plane, said main frame having an erection frame connected to the base part of the main frame and at right angles thereto, for temporarily retaining the main frame in a vertical position, drum winding and cable means for raising and lowering the said main frame, a hoisting cable on the boom, a winding drum on the truck for operating the same, and guiding means secured on said boom for constantly maintaining the hoisting cable in

alignment with the boom for free movements during its operation in raising or lowering a weight.

3. In combination, in a portable hoisting apparatus, of a wheel supported truck, a main supporting frame, means for detachably securing said frame to the platform of the truck, a boom member, means for pivotally attaching the boom member to the main frame and to the floor of the truck for movements in both a vertical and horizontal plane, said main frame having a secondary frame that is connected to the base part of the main frame at right angles thereto, to assist in erection of the main frame and for temporarily retaining the main frame in a vertical position, drum winding and cable means for raising and lowering the said main frame, a hoisting cable on the boom, a winding drum on the truck for operating the same, and guiding means secured on said boom for constantly maintaining the hoisting cable for free movements during its operation in raising or lowering a weight, and brace means pivotally connected to the main supporting frame and detachably secured to the truck floor for retaining the supporting frame in its upright position.

4. In a portable hoisting apparatus, in combination with wheeled supporting truck, a winding drum on the truck, a triangular-shaped main frame normally located on the floor of the truck, means for detachably securing the base part of the main frame to the truck floor when raised into its operative position comprising hook devices which pass through openings in the floor, an erection frame for the main frame secured to the main frame, brace members connected to the main frame, and truck floor, and guiding means for the same on the erection frame, a cable connected to the main frame, and to the winding drum, and stake means on the platform floor of the truck for retaining the main frame in place during the erection movements, as described.

5. In a portable hoisting apparatus in combination with, a supporting truck, a winding drum on the truck, a triangular-shaped main frame normally located on the floor of the truck, means for detachably securing the base part of the main frame to the truck floor when raised into its operative position comprising hook devices which pass through openings in the floor, an erection frame for the main frame secured to the main frame, brace members connected to the main frame and truck frame and guiding means for the brace members on the erection frame, a cable connected to the main frame, and to the winding drum, stake means on the floor of the truck for retaining the main frame in place during the erection movements, as described.

6. A portable hoisting apparatus comprising in combination, a wheel supported truck, a main frame, a boom pivotally connected to the main frame and to the truck, an erecting frame secured to the main frame having members located at an angle to the plane of the main frame, whereby when the main frame is not in use and located on the truck floor the erecting frame stands in a plane substantially at right angles to the truck floor, supporting braces pivotally secured to the main frame which are guided between stops on the erecting frame when the main frame is flat on the truck floor and when the main frame is being erected to a vertical position, cable means connected to the main frame and passed loosely over the erecting frame, a winding drum on the truck for moving the main frame into a vertical position, whereby when said frame is in this position the said braces are detached from the erecting frame and connected to the truck body, as described.

7. A portable hoisting apparatus comprising in combination, a wheel supported truck, a main frame, an erecting frame secured to the main frame and to the truck floor, having members located at an angle to the plane of the main frame, whereby when the main frame is not in use and located on the truck floor the erecting frame stands in a plane substantially at right angles to the truck floor, supporting braces for the main frame which are guided between stops on the erecting frame when the main frame is in process of erection, cable means connected to the main frame and passed loosely over the erecting frame, a winding drum on the said truck for moving the main frame into a vertical position, whereby when said frame is in a vertical position the said braces are detached from the erecting frame and may be connected to the truck body, as described.

8. A portable hoisting apparatus, having in combination with a wheel supported truck having stake hole openings in its floor, stakes located in the openings, a main frame composed of a base piece and side members with the base piece in engagement with the stakes for retaining the base against movement on the truck floor when the main frame is being raised from its normally inoperative horizontal position into its operative vertical position, brace members on the main frame to limit the upward movement of the main frame, drum and cable means for moving the main frame from its normally inoperative position into its vertical position and brace means on the main frame for engaging the ground at the opposite sides of the truck to prevent lateral movement.

9. A portable hoisting apparatus, having in combination with a wheel supported truck, having stake hole openings in its floor, stakes located in the openings, a main frame composed of a base piece and side members with the base piece in engagement with the

stakes for retaining the base piece against movement on the truck floor when the main frame is being raised from its normally inoperative horizontal position into its operative vertical position, brace members on the main frame to limit the upward movement of the main frame, and drum and cable means for moving the main frame from its normally inoperative position into its vertical position comprising a drum, a cable connected to the drum and main frame and passed over the members on the main frame, and means for retaining the main frame in its vertical position.

10. A portable hoisting apparatus, having in combination with a wheel supported truck, having stake hole openings in its floor, stakes located in the openings, a main frame composed of a base piece and side members with the base piece in engagement with the stakes for retaining the base against movement on the truck floor when the main frame is being raised from its normally inoperative horizontal position into its operative vertical position, stop members on the main frame to limit the upward movement of the main frame, and means for moving the main frame from its normally inoperative position into its vertical position comprising a drum on the truck, a cable connected to the drum and main frame and passed over the members on the main frame, and brace means for retaining the main frame in its vertical position, a boom pivotally connected to the base piece and to the truck floor for vertical and horizontal movements.

11. A portable hoisting apparatus comprising in combination with a truck, a boom, a main frame, means for securing the main frame to the truck floor, a pivotal boom bearing secured to the main frame and truck floor comprising a pair of spaced channel irons secured to the floor, a plate with an opening secured to the flanges of the channel irons, the base part of the frame and the floor having an opening, a bearing member attached to the boom and a pin removably secured in the bearing and extending through the said openings in the base part, the floor and the plate, and between said channels.

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