Aug. 8, 1933. A. J. LAYHON 1,920,989

PORTABLE CRANE

Filed April 18, 1933

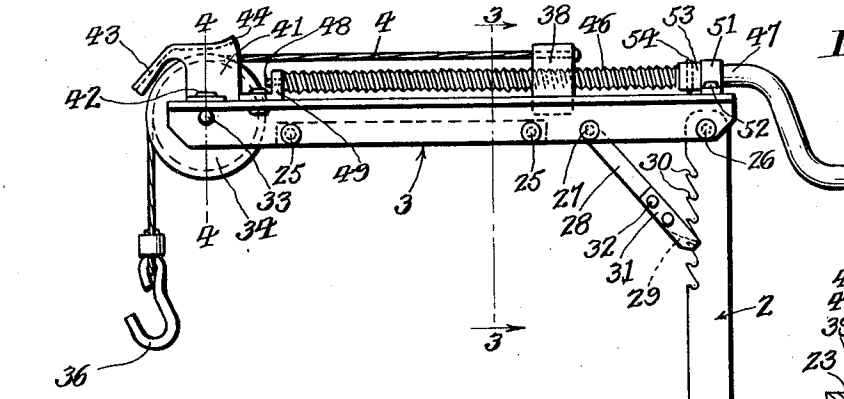


Fig. 1.

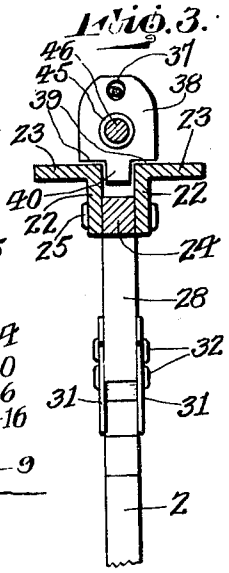


Fig. 3.

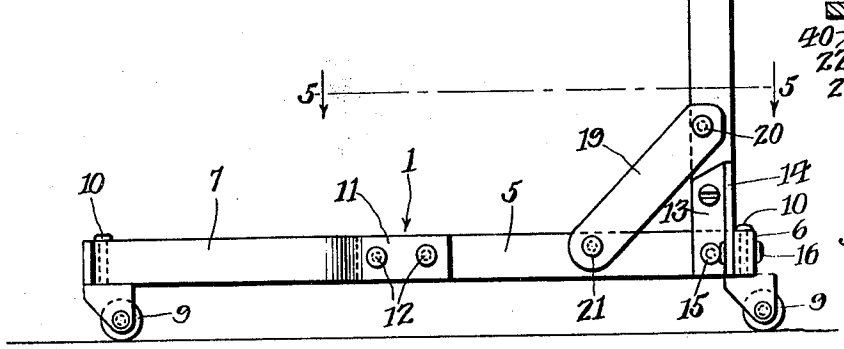
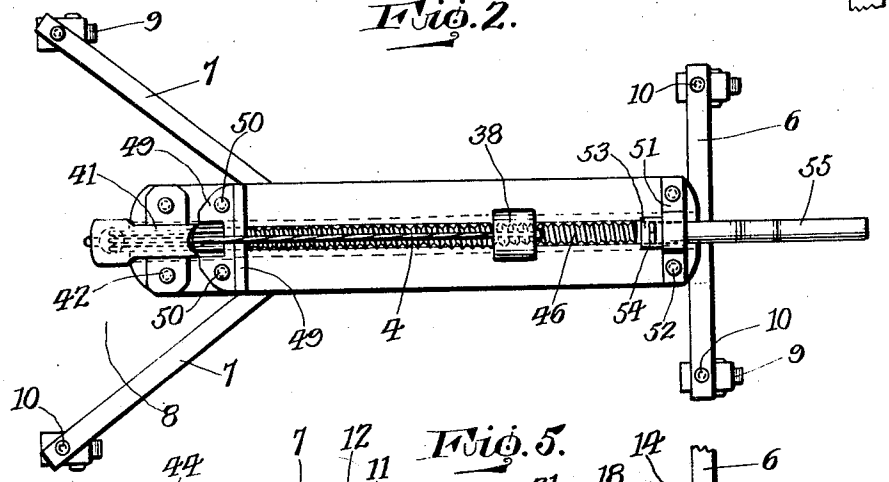


Fig. 2.



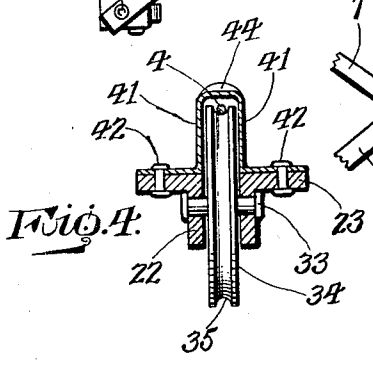


Fig. 4.

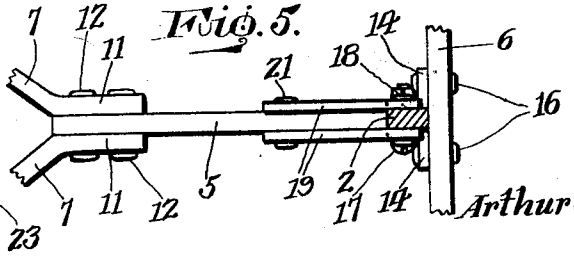


Fig. 5.

Inventor
Arthur J. Layhon.

By Geo. P. Kimmel
Attorney

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UNITED STATES PATENT OFFICE

1,920,989

PORTABLE CRANE

Arthur J. Layhon, Lowell, Mass., assignor of one-half to Raymond D. Hart, Lowell, Mass.

Application April 18, 1933. Serial No. 666,715

8 Claims. (Cl. 254—139.1)

This invention relates in general to a portable crane, and more particularly has reference to a device of this character for use in the lifting and handling of various small but heavy objects.

Previously, in devices of this kind it has been customary to provide a boom which is either fixed with respect to the base of the crane, or else is movable about a pivot located substantially on the base of the crane. Also, it has been customary to provide the end of this boom with a pulley adapted to receive a cable, and to extend this cable downwardly to a point on or near the base of the crane and there to provide a means for drawing the cable downwardly over the pulley to raise the outer end of the cable and any object which might be attached thereto. Also, the bases of such cranes have of necessity extended outwardly past the outermost end of the boom thereby preventing any object from being either lifted from or placed on the floor without the necessity of first swinging it so that it would not strike the base.

In the construction just described, several difficulties have been encountered, among the first of these being that due to the usual upwardly inclined position of the boom, it has been impossible to reach certain objects which are desired to be lifted such for example as an automobile engine or parts thereof because of the fact that the other portions of the automobile would interfere with the boom in its inclined position. Furthermore, due to the fact that the means for drawing the cable during the hoisting operation have previously been positioned on the base of the crane and have consisted essentially of a reel upon which the cable is wound, considerable difficulty has been encountered due to the fact that the cable is not always drawn directly in line with the pulley and the boom. Also during the adjustment of the boom to a high or low position, the relative position and many times the operation of the means for drawing the cable has been seriously affected and has served to limit the amount by which the boom might be adjusted.

The principal object of this invention is therefore to provide a crane of the portable type within which the defects existing in prior structures will be eliminated, by which an object may be picked up or deposited on the floor directly without swinging the object or the boom for that purpose, in which the boom is positioned in a manner to permit it to bridge many objects which could not be bridged by the booms previously in use, and in which the means for drawing the cable during the hoisting operation is positively guided at all times so that the cable will be in direct line with the pulley at the end of the boom, and also in which the entire means for drawing the cable positioned upon the boom itself as distinguished from any other part of the crane thus avoiding the complications involved in passing the cable by pivotal joints or other connections necessary to render the boom adjustable. It is also an object to make this structure readily collapsible for storing or shipping.

Other objects and advantages of this invention will become apparent from the following description taken in connection with the accompanying drawing, it being distinctly understood that the same are by way of illustration and example only and are not to be taken as in any way limting the spirit or scope of this invention. The spirit and scope of this invention is to be limited only by the prior art taken in connection with the accompanying claims.

Referring now more particularly to the drawing in which like numerals indicate corresponding parts throughout:

Figure 1 is a side view of the crane embodying this invention.

Figure 2 is a plan view of the same.

Figure 3 is a sectional view taken along the line 3—3 of Figure 1.

Figure 4 is a sectional view taken along the line 4—4 of Figure 1.

Figure 5 is a sectional view taken along the line 5—5 of Figure 1.

As clearly illustrated in the drawing, this crane structure consists in general of a base 1, a substantially upright mast 2, a boom 3 extending outwardly from the mast at a point above the base and overlying the base, a cable 4 to which the article to be hoisted is secured, and a means for moving said cable in a direction to carry out the hoisting operation.

It will be seen that the base 1 consists in general of a central beam 5 having a pair of supporting arms formed by the cross beam 6 extending laterally therefrom in opposite directions at one end which will be termed its rearward end, and having a pair of supporting arms or beams 7 extending laterally therefrom at its opposite or forward end. These arms 7 as illustrated not only extend laterally from the central beam 5 of the base but also extend beyond the end of this beam thereby leaving an open space 8 adjacent the ends of the body portion and between the two arms 7. Adjacent their outer ends, each of the arms 6 and 7 is provided with casters 9

adapted to support the base 1 so that it may be rolled wherever desired. These casters 9 are so mounted that they may be pivoted about their axes 10 to permit the base to be rolled in any direction desired.

The arms 7 are provided at their rearward ends with angularly disposed portions 11 which are rigidly secured to the opposite sides of the beam 5 by means of rivets 12 or the like.

At the rear end of the beam 5 and on opposite sides thereof there are mounted a pair of upstanding brackets 13 each having a flange 14 at right angles to the beam 5. These brackets 13 are secured in place on the beam 5 by the rivet 15 or the like which passes through the beam 5 and both brackets. The cross beam 6 is then secured to the rear faces of the flanges 14 by means of the rivets 16 or the like.

The lower end of the mast 2 is detachably secured between the upper ends of the brackets 13 by means of a bolt 17 having a nut 18 for holding it in place. At a point above the upper ends of the brackets 13, a pair of bracing arms 19 are pivotally secured to the opposite sides of the mast 2 by means such as the rivet 20. These bracing arms 19 extend downwardly and forwardly and are secured in like manner at their lower ends to the opposite sides of the beam 5 by means of a rivet 21.

The boom 3 is formed essentially of a pair of angle beams having downwardly extending flanges 22 and laterally extending flanges 23, and a spacer bar 24 secured between the flanges 22 of the angle beams to space them apart. The spacer bar 24 is secured in place by two or more rivets 25. The spacer bar 24 is shorter than the angle beams and spaced from either end thereof, and is of such thickness as to space the flanges 22 apart sufficiently to allow them to receive the upper end of the mast 2 between them. They are pivotally secured to the upper end of the mast by means such as the rivet 26. Pivotally secured between the flanges 22 by a rivet 27 at a point spaced forwardly of the mast is an adjustable bracing bar 28. The lower end of this bar is beveled off at 29 to selectively engage the notches 30 formed in the front face of the mast 2, thus adjustably positioning the boom with respect to the remainder of the device. For the purpose of guiding the portion 29 in its contact with the mast and preventing it from sliding laterally out of place, a pair of plates 31 are secured on opposite faces of the bar 28 by rivets 32 and are arranged to project past the end thereof to engage the opposite faces of the mast.

Pivotally mounted on the rivet 33 between the outer ends of the angle beams is a pulley 34 having a peripheral groove 35 for the purpose of receiving and guiding the cable 4. This cable 4 carries a hook 36 or the like at its outer end for the purpose of securing it to a load to be lifted. The inner or rearward end of the cable 4 is secured in any suitable manner within the opening 37 in a sliding block 38 carried on the upper surface of the boom 3. This block is formed with a pair of downwardly facing shoulders 39 opposing the upper surfaces of the flanges 23 and has a guiding tongue 40 projecting into and guided by the slot formed between the spaced angle beams. For additionally guiding the cable 4 over the pulley 34, a combined guide and guard member 41 is secured to the flanges 23 on opposite sides of the pulley by rivets 42 and extends over the upper edge thereof. This guard is provided with a downwardly and forwardly extending portion 43 and a flared portion 44 for the purpose of additionally guiding and guarding the cable.

The sliding block 38 is provided with a threaded opening 45 therethrough below the opening 37 for the purpose of receiving the threaded portion 46 of the shaft 47. Shaft 47 has a reduced portion 48 at its forward end journaled in a bracket 49 which is in turn secured to the flanges 23 by means of rivets 50 or the like. At the opposite end of the boom there is a bracket 51 secured to the flanges 23 by the rivets 52 and having a bearing for journalling the shaft 47. The shaft is prevented from forward endwise movement by virtue of the threaded portion thereof which is larger than the reduced bearing portion 48. It is prevented from rearward endwise movement by the sleeve 53 secured to shaft 47 by means such as key 54.

The rearward end of the shaft 46 is extended beyond the bracket 51 and bent to form a crank 55 by which the shaft may be rotated to cause the block 38 to slide back and forth in the slot between the angle beams and the hook 36 to move upward or downward as desired.

From the above description, it will be seen that a device has been provided for carrying out all of the objects of this invention, the space 8 between the arms 7 being directly below the pulley 34 and permitting objects to be raised from or lowered to the floor between these arms without the necessity of swinging either the object or the boom to avoid the base of the crane. At the same time, means has been provided for positively guiding the cable 4 and maintaining it in alignment with the pulley 34 at all times, said means being so positively guided by virtue of its engagement with the slot between the angle beams and with shaft 46 that there will be no possibility of its failing in its function. At the same time, a means has been mounted entirely upon the boom 3 for raising or lowering the cable, this means being such that it will not be interfered with by any adjustment of the boom nor in any manner changed in its operation thereby. The entire device is simple and practical and of very sturdy construction.

It is pointed out that the position of the boom is adjustable to any desired angle by virtue of the adjustable brace 28. Also it is notable that the entire device of this invention may be readily collapsed for storage or shipping purposes by merely removing the single bolt 17 so as to allow the mast 2 to pivot about the rivets 20 and 21 and lie flat against the base. The boom 3 may likewise be pivoted about the rivet 26 to lie closely adjacent the under side of the base. As will be readily seen, this allows the machine to be folded or collapsed into a much more convenient form for storing or shipping.

It is to be understood of course that various changes and modifications may be made in the details of construction and design of this invention as set forth in the above description without departing from the spirit or scope of the invention as defined in the appended claims.

What I claim is—

1. In a portable crane, an elongated base, casters for supporting said base, a substantially upright mast at one end of said base, a brace extending between said base and said mast for maintaining it in upright position with respect to said base, a boom extending from said mast in a direction to overlie said base, said boom pivotally

engaging said mast to pivot about a horizontal axis, an adjustable brace extending between said mast and said boom to adjustably position said boom with respect to said mast and to prevent it from swinging downwardly about its pivot, said boom being bifurcated at its free end, a pulley mounted in said bifurcation, a cable passing over said pulley and having one of its ends extending downwardly from said pulley and the other along the upper surface of said boom, a block secured to the last mentioned end of said cable, guide means on said block and said boom slidably mounting said block on said boom, and manually operated screw means for sliding said block outwardly and inwardly along said boom to lower and raise the downwardly extending portion of the cable, said base being bifurcated at a position below the free end of said boom to allow articles suspended by said cable to be lowered past said base.

2. In a portable crane, a base comprising an elongated body portion and laterally extending supporting arms at the opposite ends thereof, caster means adjacent the end of each arm for supporting said base, the arms at one end of said elongated body portion extending forwardly beyond the remainder of said body portion to provide an opening therebetween, a substantially upright mast at the other end of said base, a boom pivoted to said mast above said base and overlying the base, means for adjustably positioning said boom with respect to said mast, a pulley mounted on the free end of said boom and positioned directly above the aforementioned opening between the supporting arms of the base, said pulley being adapted to receive a cable, a slot in said boom, a block adapted to receive one end of such cable and having a portion slidable within said slot, and screw means on said boom for sliding said block forwardly and rearwardly in said slot.

3. In a portable crane, a base comprising an elongated body portion and laterally extending supporting arms at the opposite ends thereof, caster means adjacent the end of each arm for supporting said base, the arms at one end of said elongated body portion extending forwardly beyond the remainder of said body portion to provide an opening therebetween, a substantially upright mast at the other end of said base, a boom pivoted to said mast above said base and overlying the base, means for adjustably positioning said boom with respect to said mast, a pulley mounted on the free end of said boom and positioned directly above the aforementioned opening between the supporting arms of the base, said pulley being adapted to receive a cable, a slot in said boom, a block adapted to receive one end of such cable and having a portion slidable within said slot, and means on said boom for sliding said block forwardly and rearwardly in said slot.

4. In a portable crane, a base comprising an elongated body portion and laterally extending supporting arms at the opposite ends thereof, caster means adjacent the end of each arm for supporting said base, the arms at one end of said elongated body portion extending forwardly beyond the remainder of said body portion to provide an opening therebetween, a substantially upright mast at the other end of said base, a boom pivoted to said mast above said base and overlying the base, means for adjustably positioning said boom with respect to said mast, a pulley mounted on the free end of said boom and positioned directly above the aforementioned opening between the supporting arms of the base, said pulley being adapted to receive a cable, and means on said boom for receiving such cable and drawing it upwardly over said pulley.

5. In a crane, a base having a forward and a rearward end and comprising an elongated body portion and laterally extending supporting arms at the opposite ends thereof, caster means adjacent the end of each arm for supporting said base, a substantially upright mast at the rearward end of said base, a boom pivoted to said mast above said base and overlying the base, means for adjustably positioning said boom with respect to said mast, a pulley mounted on the free end of said boom and positioned above said base rearwardly of the caster means at the forward end of the base, said pulley being adapted to receive a cable, and means on said boom for receiving such cable and drawing it upwardly over said pulley.

6. In a crane, a base having a forward and a rearward end and comprising an elongated body portion and laterally extending supporting arms at the opposite ends thereof, means adjacent the end of each arm for supporting said base, a substantially upright mast at the rearward end of said base, a boom pivoted to the mast above said base and overlying the base, means for adjustably positioning said boom with respect to said mast, a pulley mounted on the free end of the boom and positioned above said base rearwardly of the supporting means on the arms at the forward end of the base, said pulley being adapted to receive a cable, a slot in said boom, a block adapted to receive one end of such cable and having a portion slidable within said slot, and means on said boom for sliding said block forwardly and rearwardly in said slot.

7. In a crane, a base having a forward and a rearward end and comprising an elongated body portion and laterally extending supporting arms at the opposite ends thereof, means adjacent the end of each arm for supporting said base, a substantially upright mast at the rearward end of said base, a boom pivoted to the mast above said base and overlying the base, means for adjustably positioning said boom with respect to said mast, a pulley mounted on the free end of the boom and positioned above said base rearwardly of the supporting means on the arms at the forward end of the base, said pulley being adapted to receive a cable, and means on said boom for receiving such cable and drawing it upwardly over said pulley.

8. In a crane, a base, a substantially upright mast, means detachably securing said mast to said base adjacent one end thereof, a boom pivoted to the mast above said base and overlying the base, hoisting means on said boom, means for adjustably positioning said boom with respect to said mast, and bracing means pivotally connecting said mast and said base to maintain said mast in upright position when said first mentioned securing means is in normal secured position and to permit said mast to fold against said base when said securing means is released.

ARTHUR J. LAYHON.