United States Patent [19]

Anderson et al.

[11] **3,848,749**

[45] **Nov. 19, 1974**

[54] **COMBINATION CRANE AND JACK UNIT**

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[73] Assignee: **Owatonna Tool Company,** Owatonna, Minn.

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[52] **U.S. Cl.** ..... **212/8 R,** 214/DIG. 10

[51] **Int. Cl.** **B66c 23/00**

[58] **Field of Search** ..... 212/8 R, 8 A; 9/39; 240/63; 214/DIG. 10, 620, 140 R, 763, 769

[56] **References Cited**

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6,411,254	4/1965	Netherlands	214/DIG. 10

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Assistant Examiner—R. B. Johnson
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[57] **ABSTRACT**

A combination crane and jack unit having a parallelogram arm system movable to various positions in a vertical plane with means for suspending a load when operating as a crane and for supporting a load when operating as a jack, with hydraulically operated means for moving the parallelogram arms including a hand pump having a variety of positions to be adjacent an operator dependent upon the various uses of the unit and with shield means covering the parallelogram arm structure to prevent injury to an operator.

7 Claims, 5 Drawing Figures

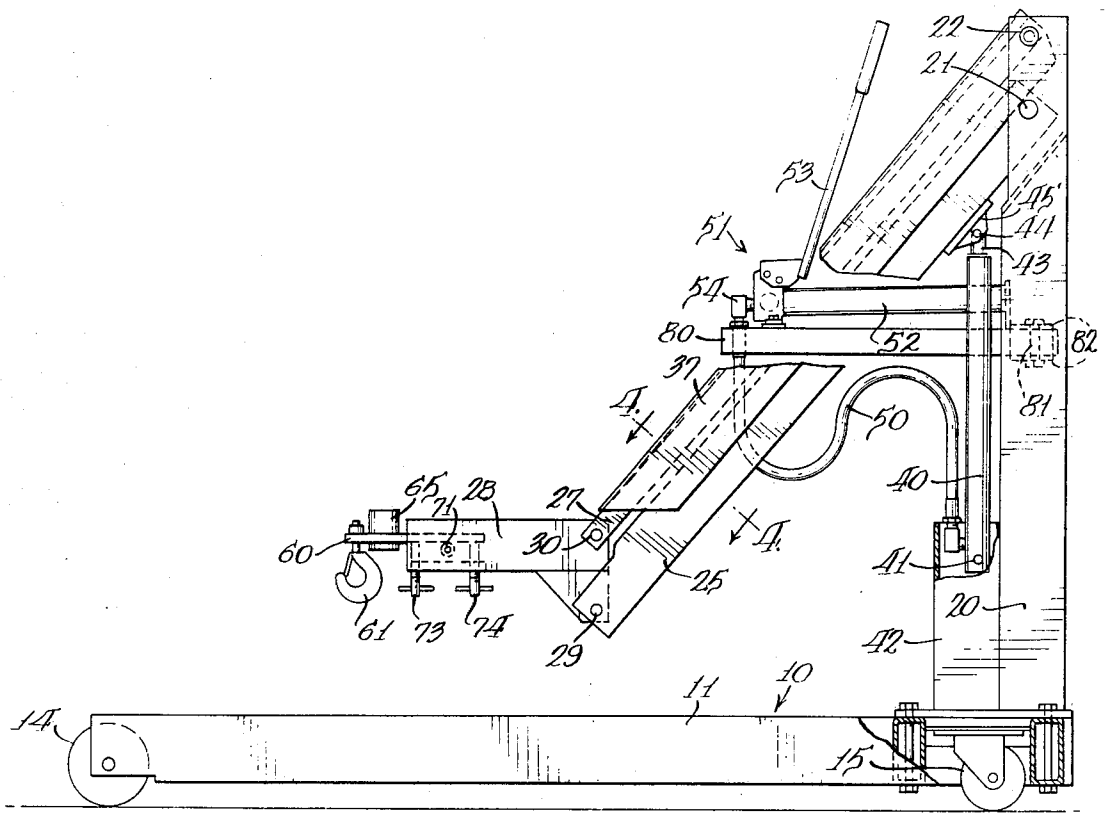
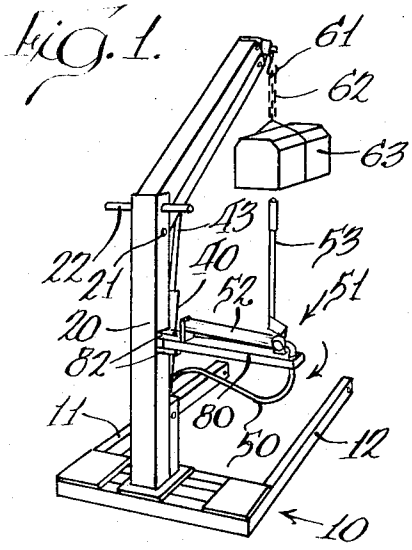


Fig. 1.



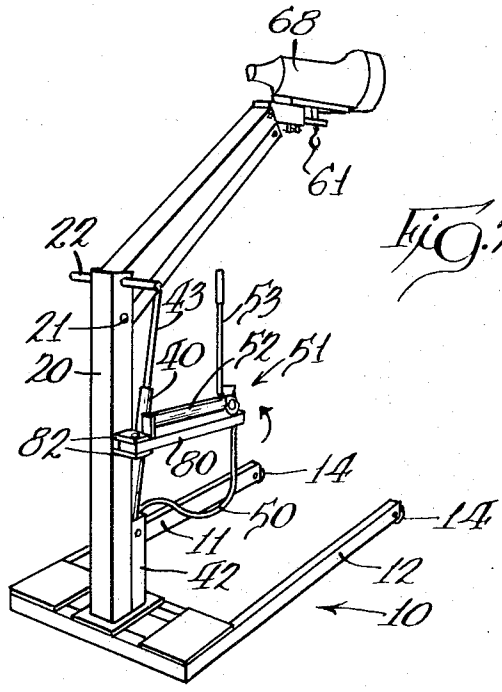
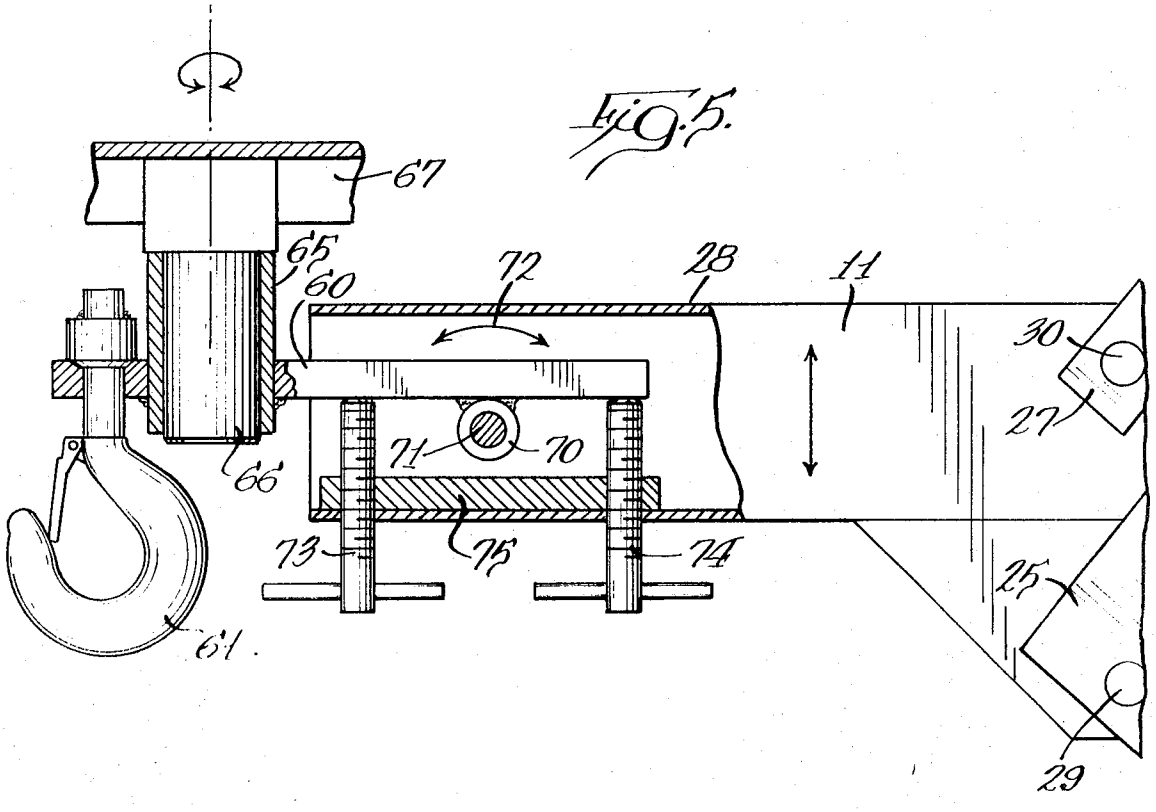


Fig. 2.

Fig. 5.



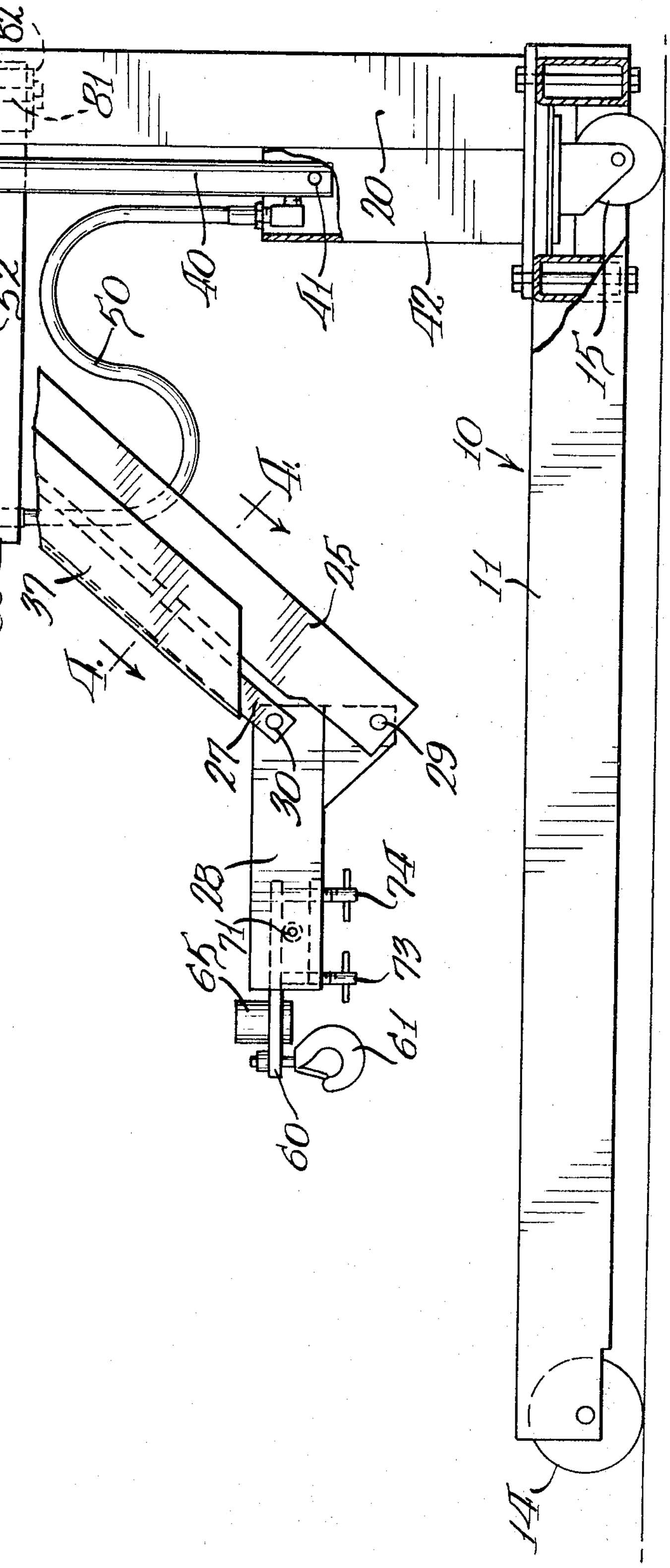

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FIG. 3.

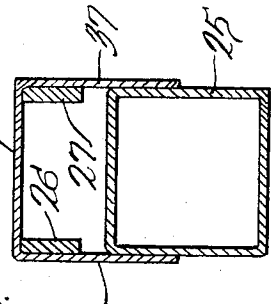
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FIG. 4.

COMBINATION CRANE AND JACK UNIT

BACKGROUND OF THE INVENTION

This invention pertains to a combination crane and jack unit particularly usable in the automotive field as a jack to position an automotive part beneath a raised vehicle or a work stand and also usable as a crane to facilitate handling of parts from above the vehicle.

The assignee hereof has, for many years, marketed a floor crane, as shown in U.S. Pat. No. 3,367,512. This floor crane does not have structure for operating as a jack.

A number of patents show lifting units with a parallelogram bar arrangement, such as Howell U.S. Pat. No. 1,751,480, Schreck U.S. Pat. No. 2,772,797, and Furuno U.S. Pat. No. 3,543,956. These patents do not show a combination crane and jack unit having all of the features disclosed herein for providing utility of the unit as either a crane or jack, with the features enhancing safety and ease of use.

A major foreign auto company has been developing a combination crane and jack unit having a parallelogram arm structure and with a hydraulic operating system including a hand pump. This unit does not have the enclosure of the parallelogram arm structure to increase the safety of use thereof, nor does it have the variable positioning of the hand pump to facilitate use of the unit.

SUMMARY

A primary feature of the invention disclosed herein is to provide a combination crane and jack unit readily usable either as a crane or a jack and with a hydraulic operating system including a hand pump positionable at different locations for ideal positioning when the unit is used either as a crane or as a jack.

Another feature of the invention is to provide a combination crane and jack unit as defined in the preceding paragraph wherein the unit has a substantial range of movement in a vertical plane whereby a load supported thereon may be positioned immediately above the floor for insertion into a work stand or, alternatively, raised to a relatively high level for positioning beneath a vehicle which is positioned above the floor on a lift and with provision for safety in use in said extreme positions.

A further feature of the invention is to provide a combination crane and jack unit as defined in the preceding paragraphs wherein the unit has a parallelogram arm structure for moving a load to a variety of positions in a vertical plane and wherein the parallelogram arm structure is shielded to prevent damage to the fingers of a user of the unit.

BRIEF DESCRIPTION OF THE DRAWING

FIG. **1** is a perspective view of the unit shown in use as a crane;

FIG. **2** is a view similar to FIG. **1** showing the unit in use as a jack;

FIG. **3** is a side elevational view of the unit shown in lowered position and with parts broken away and with the hand pump shown positioned similarly to that shown in FIG. **2**;

FIG. **4** is a transverse section, taken generally along the line **4—4** in FIG. **3**; and

FIG. **5** is an enlarged view with parts broken away of the support structure carried at the end of the parallelogram arm structure and shown at the left in FIG. **3**.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The combination crane and jack unit has a base, indicated generally at **10**, with a pair of generally parallel extending legs **11** and **12**. A floor-engaging roller **14** is carried at the outer end of each of the legs and a swivel caster **15** is carried at the opposite ends of each of the legs whereby the unit may be moved about the floor.

The mast **20** extends vertically upward from the base **10** and has a pair of vertically-spaced pivot rods **21** and **22** extending transversely therethrough, with the rod **22** having sections extending outwardly beyond the mast to form a pair of handles for engagement by an operator in moving the unit on the floor. The pivot rods **21** and **22** pivotally mount a pair of arms of a parallelogram arm structure. These arms include a lower arm **25** of generally tubular form and an upper arm formed of a pair of straps **26** and **27**. The parallelogram system is completed by a tubular support **28** pivotally connected to the arms by a pivot pin **29** for the lower arm **25** and a pivot pin **30** for the upper arm having straps **26** and **27**. Thus as the arms are moved between a lower position, shown in FIG. **3**, and an upper position, shown in FIGS. **1** and **2**, the support **28** is caused to move in a vertical plane and the support is maintained in horizontal position throughout the range of vertical movement. In this range of movement, the space between the lower arm **25** and the upper arm straps **26** and **27** varies and means are provided to block the insertion of an operator's fingers between the parallelogram arms. This structure includes a shield **35** with downturned sides **36** and **37** which span the gap between the parallelogram arms. This shield is suitably secured to the upper arm straps **26** and **27** for movement therewith and throughout the entire range of vertical movement of the parallelogram arms the depending sides **36** and **37** of the shield always span the gap between the upper and lower arms.

The unit is controlled in its vertical position by a hydraulic system including a power cylinder **40** having its lower end pivotally connected at **41** to a frame **42** secured to the mast and having its piston rod **43** pivotally connected by a pivot pin **44** to a bracket **45** secured to the underside of the lower arm **25** of the parallelogram arm structure. The supply and release of hydraulic fluid to the cylinder **40** is through a line **50** connected to a hand pump unit, indicated generally at **51**. This hand pump unit is a commercially available structure and may be of a type disclosed in an application of S. B. McClocklin, Ser. No. 294,818, filed Oct. 26, 1972, and owned by the assignee of this application. The hand pump **51** includes a cylinder **52** containing a reservoir for hydraulic fluid, with a reciprocable pumping plunger operable by a pivotally mounted handle **53** which directs hydraulic fluid from the reservoir through a fitting **54** to the line **50**. The hand pump unit further incorporates a release valve which is manually operable to permit return flow to the reservoir in the hand pump which, in this instance, would permit lowering of the piston rod **43** as caused by the weight of the parallelogram arm structure.

The support **28** has a hollow interior with a plate **60** having one end positioned therein and extending outwardly therefrom. The plate **60** rotatably mounts a depending hook **61** for engaging a chin **62** or other elongate support which is used for suspending a load, such as the load **63** shown in FIG. **1**, when the unit is to be used as a crane. The plate **60** also has a tubular member **65** secured thereto, as by welding, to receive a pin **66** of a fixture **67** for engaging beneath a load, such as a vehicle transmission **68.**

The plate **60** is mounted for adjustment and arcuate play relative to the support **28** by structure including a tube **70** secured to the underside of the plate **60** as shown in FIG. **5** and rotatably mounted on a pivot pin **71** fixed to the side walls of the support **28.** This permits rocking movement of the plate **60,** as indicated by the double arrow **72** in FIG. **5.** The position of the plate relative to the support **28** is determined by a pair of threaded adjusting members **73** and **74** which are threadably engaged in a block **75** secured to the bottom wall of the support **28.** As shown in FIG. **5,** both of the threaded adjusting members **73** and **74** abut against the underside of the plate **60** to hold the plate fixed relative to the support **28.** By advance of one threaded member and retraction of the other, the inclination of the plate **60** relative to the support **28** may be adjusted. If both of the threaded members are backed off, there will then be arcuate play of plate **60** relative to the support **28** which may be used in obtaining desired final alignment of a load, such as transmission **68,** relative to attaching parts on the underside of a vehicle.

The use of the unit as a crane is shown particularly in FIG. **1,** wherein the load **63** may be an engine which is carried at an elevated location for either insertion or after removal from a vehicle. In such use of the unit, the unit is manipulated to a position at the front of the vehicle or, in any event, adjacent the location of the engine in the vehicle. The hand pump unit **51** is positioned extending at right angles to the vertical plane of the parallelogram arm structure for maximum convenience of an operator in using the unit as a crane. This positioning is obtained by mounting the hand pump unit **51** on a bracket **80** which is pivotally mounted to the side of the mast **20** by a pivot pin **81** passing through a pair of ears **82** extending outwardly from the side of the mast.

When the unit is used as a jack, the unit will be moved to a position beneath a vehicle supported on a garage lift and to enable an operator to properly position the jack relative to the underside of the vehicle and provide for operation thereof, the hand pump unit **51** is positioned extending generally parallel to the vertical plane of movement of the parallelogram arms and as shown in FIG. **2.** This enables an operator to observe the location of the fixture **67** carried on the support **28** while, at the same time, operating the hand lever **53** to raise the jack. More specifically, an operator can use one hand to guide and position the transmission **68** while the other hand of the operator can reach the pump handle **53.**

We claim:

1. A combination crane and jack unit including a base having a plurality of floor-engaging wheels, a mast extending upwardly from said base, a parallelogram structure including a pair of parallel arms pivotally mounted at one of their ends and one above the other to the upper end of said mast, a generally horizontal support pivotally connected to the opposite ends of the arms, means for raising and lowering said arms to raise and lower said support, with said arms having a lower position extending at an angle of approximately **45°** to the mast to place said support just above said base, a first means on said support for holding a supporting chain or the like for a depending article when the unit is to function as a crane, second means on said support for holding a fixture to engage under an article when the unit is to function as a jack, said parallel arms lying one above the other, and shield means depending from the upper one of said arms and overlapping the lower one of said arms to prevent positioning of an operator's fingers between said arms.

2. A combination crane and jack unit as defined in claim **1** wherein said first means on said support includes a hook and said second means includes a plate holding a socket, and means for adjustably tipping said plate and for providing play thereof relative to the support whereby an article may be aligned while carried by the unit.

3. A combination crane and jack unit as defined in claim **1** wherein said means for raising and lowering said arms includes a generally vertically extending rod and cylinder connected between the mast and one of said arms, a hand pump operatively connected to said cylinder and having a release valve associated therewith, and means pivotally mounting said hand pump at an end thereof to one side of the mast whereby the pump may extend outwardly generally parallel to the plane of the parallel arms when an operator is using the unit as a jack and extend normal to the plane of the parallel arms when the unit is used as a crane.

4. A combination crane and jack unit as defined in claim **1** wherein said pivot mounting for one of the parallel arms to the mast is defined by a rod fixed to the mast and having exposed ends to serve as handles for guiding movement of the unit along the floor.

5. A combination crane and jack unit comprising a base with a plurality of floor-engaging wheels to render the unit portable, a vertical mast extending upwardly from one end of the base, a parallelogram structure including a pair of parallel arms each having an upper end pivotally connected one above the other to the upper end of the mast whereby said arms may move between a lowermost position at an acute angle to the mast and a raised position at an obtuse angle to the base, a generally horizontal support pivotally connected to the lower ends of said parallel arms and positionable immediately above said base when said parallel arms are in their lowermost position, means on said support for holding a fixture to engage under an article when the unit is to function as a jack including a plate movably mounted on said support, means on said support for engaging a chain or the like when the unit is to function as a crane, a fluid piston and cylinder operatively connected to one of said arms for causing movement and positioning thereof, a hydraulic hand pump connected to said piston and cylinder, and means mounting said hand pump for movement to different positions whereby the hand pump may be positioned adjacent an operator in both crane and jack uses of the unit.

6. A combination crane and jack unit as defined in claim **5** wherein said plate is pivotally mounted on said support, and a pair of adjustable bolts engageable with said plate one at each side of the pivot and adjustable

to either engage and hold the plate in a pivoted position or backed off a small amount to permit a slight pivotal play of said plate relative to said support.

7. A combination crane and jack unit as defined in claim **5** wherein said parallel arms lying one above the other, and shield means depending from the upper one of said arms and overlapping the lower one of said arms to prevent positioning of an operator's fingers between said arms.

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