Sept. 20, 1971 J. T. BENTEY 3,605,358

TELESCOPIC CRANE BOOM

Filed March 28, 1969 2 Sheets-Sheet 1

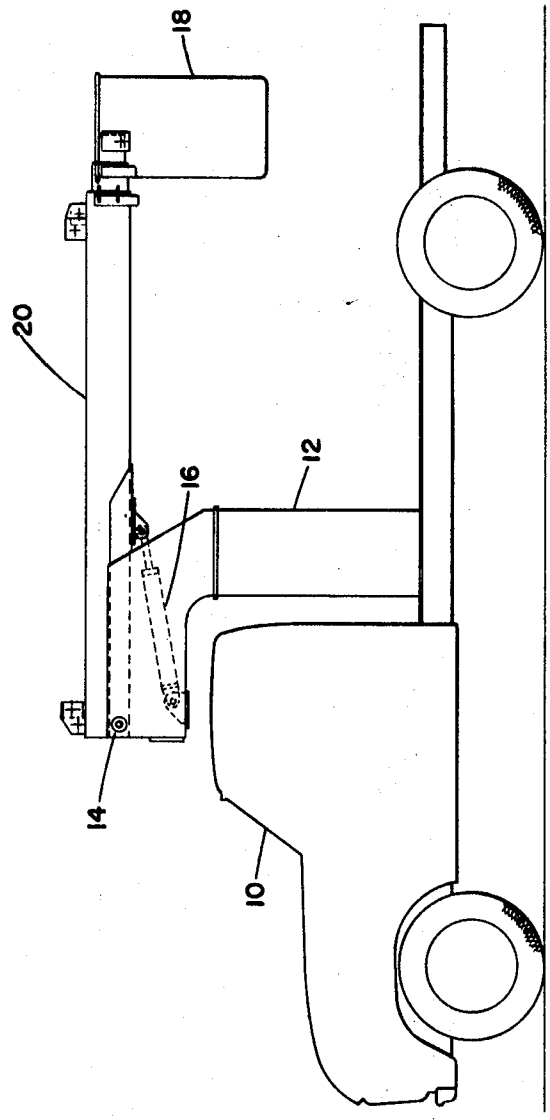


FIG. 1

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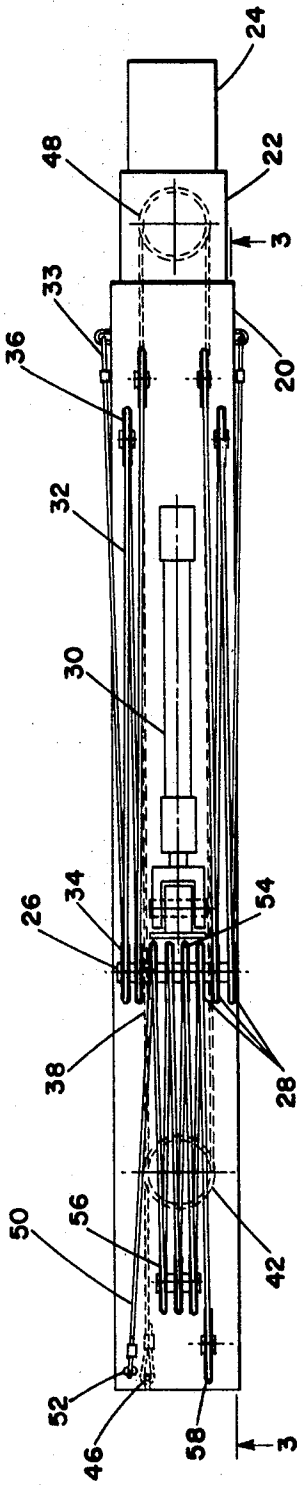


FIG.2

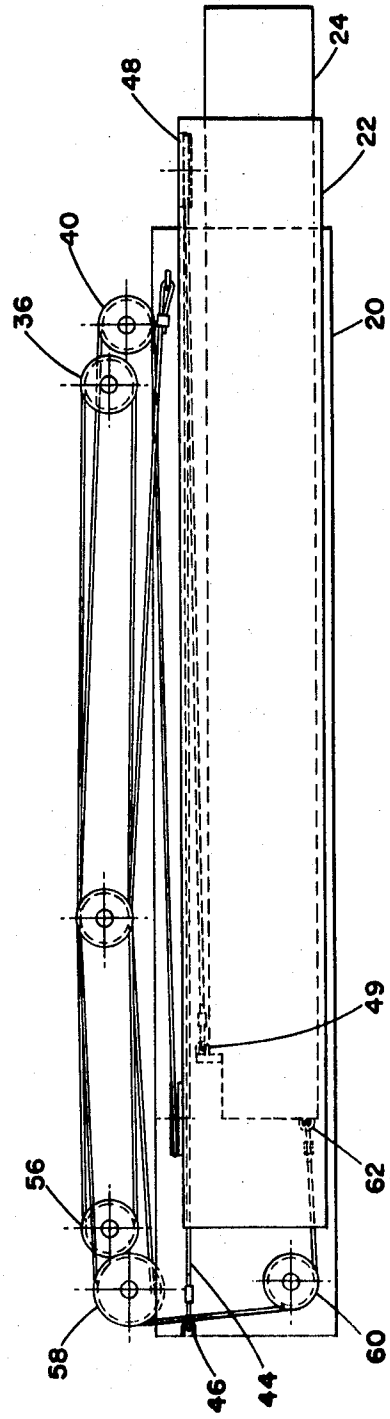


FIG.3

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TELESCOPIC CRANE BOOM

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ABSTRACT OF THE DISCLOSURE

Outer tube having a cylinder thereon moving a carriage therealong, a multiple pulley system actuated by the carriage for propelling a middle tube out of the outer tube, and a pulley system on the middle tube actuated by propulsion thereof for propelling an inner tube out of the middle tube.

BACKGROUND

Telescopic crane booms have been complicated and expensive, requiring a plurality of prime movers for extending and retracting the tubes thereof. The main objects of the present invention are to simplify and improve the construction and operation of devices of this character.

SUMMARY

According to the present invention, the telescopic crane boom comprises outer, middle, and inner tubes, a carriage movable along the outer tube, a pulley system actuated by the carriage, a cable passing over said pulley system from said outer tube to said middle tube, and means for moving the carriage down the outer tube to raise the middle tube. A second cable passing over a pulley on the inside of the outer end of the middle tube pulls an inner tube forward. The first pulley system comprises a first group of pulleys on the carriage and a second group on fixed axes at the bottom of the outer tube, over which groups the first cable passes alternately and in succession.

DRAWINGS

FIG. 1 is a side elevation of a motor truck for carrying a telescopic crane boom;

FIG. 2 is a plan of the boom shown in FIG. 1, showing the structure according to the present invention; and

FIG. 3 is a vertical longitudinal section taken along the line 3—3 of FIG. 2.

DESCRIPTION

As shown in FIG. 1, a motor truck **10** is provided with a pedestal **12** on which is mounted an outer telescopic boom tube **20** pivoted at **14** and swung up thereabout by a cylinder **16** to lift a receptacle such as a basket **18**.

As better shown in FIGS. 2 and 3, the outer tube **20** has slidable therein a middle tube **22** which in turn has slidable therein an inner tube **24**. A carriage **26** is slidably mounted on the outer tube **20** intermediate the ends thereof, and has journaled thereon a group of pulleys **28**. The carriage **26** is selectively moveable back and forth by the piston of a cylinder **30** mounted on the outer tube **20**.

A cable **32** has one end fixed as at **33** to the top end portion of the outer tube **20**, and passes under the outer pulley **34** of group **28** and up thereover on down over a fixed axis pulley **36**, then under a second pulley **38** of group **28** over a second fixed axis pulley **40**. From this pulley the cable **32** passes down through a suitable aperture and on back to loop around a bitt **42** secured on the bottom end portion of the middle tube **22**.

From the bitt **42** the cable **32** follows a symmetrical path for the other side of the outer tube **20**, and the other end is similarly fixed to the top end portion of the outer tube.

With this pulley system, when the piston of the cylinder **30** pushes the carriage **26** toward the bottom, the cable **32** looped over the bit **42** pulls the middle tube **22** outward and upward with a multiple factor of four.

As shown in FIG. 3, a second cable **44** is attached at **46** inside the bottom of the outer tube **20**, and extends upward inside the middle tube **22**, on around pulley **48** inside the top thereof, from which it returns inside the middle tube **22** and is attached at **49** to the bottom of the inner tube **24**.

As the middle tube moves upward as already described, it carries the pulley **48** therewith. The cable **44** passing thereover is pulled therealong, and propels inner tube **24** upward, twice as far as tube **22**, with a factor of eight relative to the movement of the piston of cylinder **30**.

As shown in FIG. 2, a third cable **50** is fixed at **52** to the bottom end of the outer tube **20**, and passes under the first of the middle pulleys **54** of the group **28** on the carriage. A rear set of fixed axis pulleys **56** are mounted on the bottom end portion of the outer tube **20**. The cable **50** passes over the pulleys **54** and **56** alternately and in succession, then on down over the pulley **58**. From this pulley the cable **50** passes under the pulley **60** below the bottom of the middle tube **22**, where it is attached at **62** to the bottom end of the inner tube **24**.

To collapse the extended boom, the piston of cylinder **30** is energized to move the carriage **26** upward toward the outer end of the boom. The middle pulleys **54** pull the third cable **50** about the pulleys **56** and **58** to pull down the inner tube **24** to which it is attached at **62**. The second cable **44** being attached at **49** to this inner tube **24**, pulls on the pulley **48** inside the top of middle tube **22**, to pull it back inside the outer tube **20**.

During this collapsing movement of the piston of cylinder **30**, the first cable **32** is slackened, which permits the bitt **42** to pull the slackened cable with it for the return of the middle tube **22**.

What is claimed is:

1. Telescopic crane boom comprising outer, middle and inner tubes;

a carriage movable along said outer tube intermediate the ends thereof;

power cylinder means connected between said carriage and outer tube for moving said carriage;

a pulley system carried by said carriage;

a cable having one end anchored to said outer tube and passing over one part of said pulley system and around a bitt on said middle tube and on over a symmetrical path of said pulley system with the other end also anchored to said middle outer tube;

means for moving said carriage toward the bottom of said outer tube to propel said middle tube outward from inside of said outer tube;

a pulley secured to the upper end of said middle tube;

a second cable having one end secured to the bottom of said outer tube and passing over said pulley on said middle tube and back and secured to the bottom of said inner tube;

said second cable being actuated by said movement of said middle tube for pulling said second cable over said middle tube pulley to move said inner tube out of said middle tube;

a fourth group of pulleys journaled on fixed axes near the bottom end of said outer tube; and

a third cable having one end anchored to the bottom end portion of said outer tube, and passing over said third and fourth group pulleys alternately and

in succession, and having the other end anchored to the bottom end portion of said inner tube.

2. Telescopic crane boom as claimed in claim 1, in which said means for propelling said middle tube outward from the inside of said outer tube and said means for propelling said inner tube outward from inside of said middle tube are operated by the same single prime mover.

3. Telescopic crane boom as claimed in claim 1, in which said pulley is secured to the upper end of said middle tube is mounted inside thereof.

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212—55; 254—148, 143