ABSTRACT

AN IMPROVED ROPE ATTACHMENT ON EXTENSION BOOM FOR PICK AND CARRY TYPE CRANE

An improved rope attachment on extension boom for pick and carry type crane attachment and routing arrangement related to a crane boom assembly comprising of a fixed outer boom with at least two or more extension booms, (a) the first extension telescopically with a hydraulic cylinder and (b) a second extension boom provided with a pair of extension and retraction ropes, the extension rope being attached to one side of the fixed outer boom at its one end and is routed over a pulley fixed on the same side of the front side of the first extension boom, the said extension rope from the other side of the second extension boom being routed back to the fixed outer boom through another pulley on the first extension boom, and the said retraction rope being routed similarly from the fixed outer boom to the second extension boom through the said first extension boom and back to the fixed outer boom.

Fig.1

WE CLAIM:

1. An improved rope attachment on extension boom for pick and carry type crane attachment and routing arrangement related to a crane boom assembly comprising of a fixed outer boom with at least two or more extension booms,

(a) the first extension boom being extended telescopically with a hydraulic cylinder and (b) a second extension boom provided with a pair of extension and retraction ropes, the extension rope being attached to one side of the fixed outer boom at its one end and is routed over a pulley fixed on the same side of the front side of the first extension boom, the extension rope is being routed towards the same side but on the rear side of the second extension boom then extension rope is routed to its other side whereas the rear side being provided with an arrangement of two semi-circular pulleys mounted on opposite sides of a plate with a typical profile but conveniently facing opposite to each other so that the said plate with the said typical profile along with the semi-circular pulleys capable of being mounted on to the rear end of the second extension boom in a horizontal position, one of the said semi circular pulleys facing up side and the other semi-circular pulley facing down side of the second extension boom and one pulley with its curvature facing rear side and the other pulley with its curvature facing the front side of the second extension boom, the said extension rope from the other side of the second extension boom being routed back to the fixed outer boom through another pulley on the first extension boom, and the said retraction rope being routed similarly from the fixed outer boom to the second extension boom through the said first extension boom and back to the fixed outer boom.

2. An improved rope attachment on extension boom for pick and carry type crane attachment as claimed in claim 1, wherein in a circular guide strip is being provided over the circumference of each semi-circular pulley mounted on the said plate with a typical profile.

3. An improved rope attachment on extension boom for pick and carry type crane attachment as claimed in claim 1, where in the said plate with a typical profile and the two semi-circular pulleys mounted on opposite sides of the plate being fixed at the rear side of the second extension boom at approximately its mid -plane from bottom to the top.

4, An improved rope attachment on extension boom for pick and carry type crane attachment and routing arrangement as claimed in claim 1, wherein the extension and retraction ropes pass through the boom and the semi- circular pulley in such a manner that the extension and retraction ropes entering through one side of the second extension boom and semi-circular pulley pass out of the other side of the second extension boom and semi circular pulley smoothly.

5. An improved rope attachment on extension boom for pick and carry type crane attachment as claimed in claim 1, wherein the arrangement is mounted on cranes such as pick and carry type of cranes but not limited to this application only.

Dated this 20th day of May, 2011

(BHASKAR KUMAR DEY)
OF DASWANI & DASWANI
AGENT FOR THE APPLICANTS

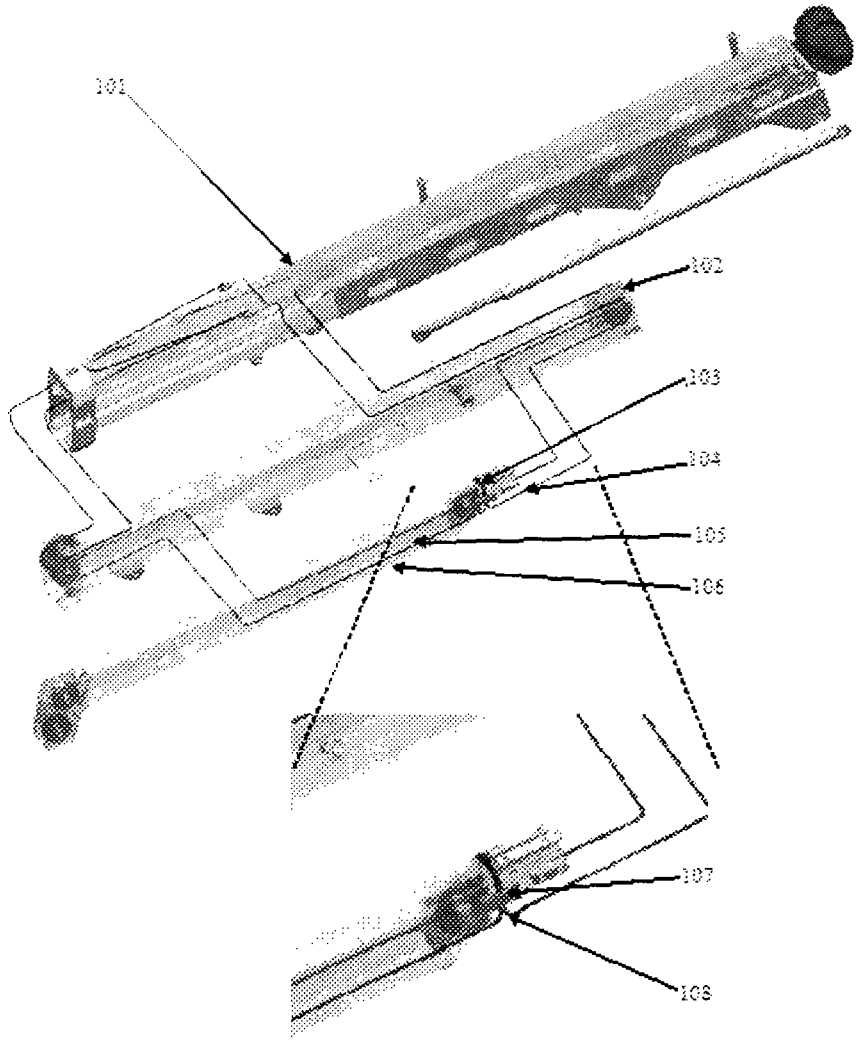

Fig 1

(BHASKAR KUMAR DEY)
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APPLICANTS' AGENT

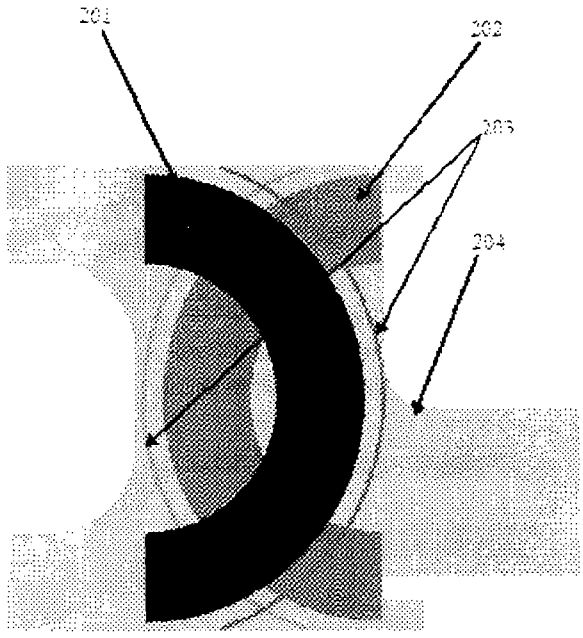

Fig 2

(BHASKAR KUMAR DEY)
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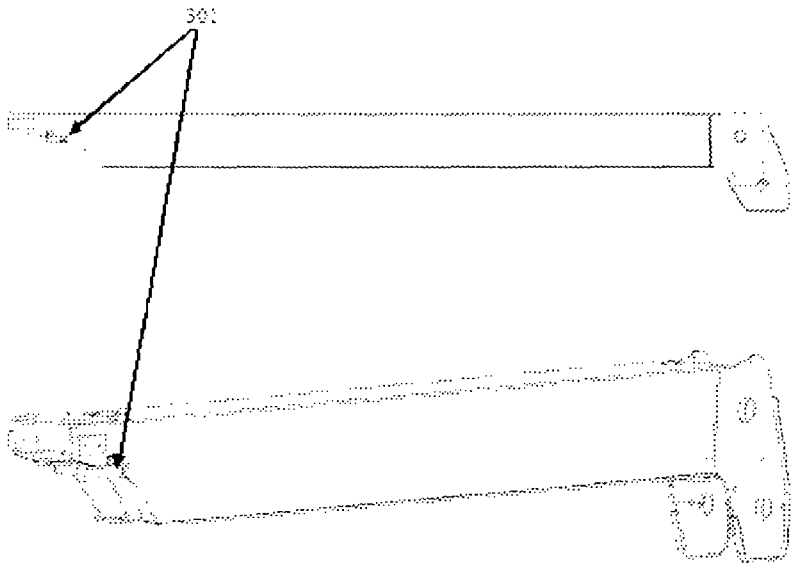

Fig 3

(BHASKAR KUMAR DEY)
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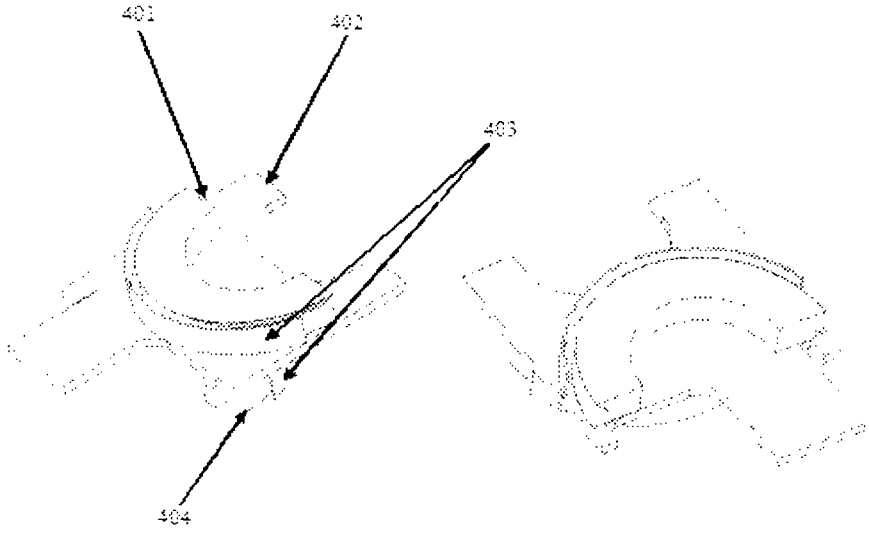

Fig 4

(BHASKAR KUMAR DEY)
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APPLICANTS' AGENT

Field of Invention:

The present invention relates to an improved rope attachment on extension boom for pick and carry type crane and more particularly an improved rope attachment method on telescopic booms for use on Pick and Carry type Cranes which describes an improved work machine boom having extension and retraction telescopic motion through a pair of ropes each for extension and retraction motion of extension boom. These extension and retraction ropes are attached to the boom so as to telescopically extend the boom and telescopically retract the boom when either of extension retraction rope is pulled within the complete telescopic boom assembly.

Background of the Invention:

In the known that pick and carry types of mobile hydraulic cranes have a telescopic boom assembly for lifting and handling the load. The boom assembly comprises of an outer fixed boom (101) attached to the crane at rear end and at least one or more extension boom members, which are disposed inside the fixed outer boom. Hydraulic cylinder is connected between outer fixed and 1st first extension boom member provided for telescopic driving in and out the first extensile boom (102). In the event of two or more extension boom members from the fixed outer boom, a multiple of hydraulic Ram means or a combination of Hydraulic ram and synchronized extension using extension (104) and retraction ropes (105) or chains are operated over a set of pulley or rollers (103). These pulleys are attached to first extension member while extension and retraction rope is routed from fixed outer boom to second extension boom member via the pulleys mounted on first extension boom member. Extension and retraction rope have a rope attachment and rope crossover arrangement on second extension boom (106) as shown in Figure 1 of the accompanying drawings.

Further extension and retraction ropes are guided from one side of second extension boom to its top surface and then back to the other side. This is for achieving rope attachment and rope crossover to one side to the other side of second extension member. This rope attachment and rope crossover is achieved by set of blocks fixed to both side walls (107) at rear end of

second extension boom. There is separate block for extension rope attachment and rope crossover and separate block for retraction rope attachment and rope cross over (108).
In case of the extension rope, one end of the rope is fixed on the outer boom. The rope is further routed from front side pulley on the first extension boom towards rear of second extension boom. On second extension boom the extension rope is guided from side towards the top surface of boom with a block fixed to the side of boom. From the top surface extension rope is further guided to the other side of boom with another side fixed block on other side of the boom. From here extension rope is further guided to first extension boom pulley and back to Outer boom. This end of extension rope is then also fixed on the outer boom.

Similarly one end of the retraction rope is also fixed to outer boom and the other end of retraction rope is routed from the rear side pulley mounted on the first extension boom and further rope is routed to second extension boom from side to top surface and again towards the other side of second extension boom. Further the retraction rope is routed from pulley on first extension boom and fixed to the outer boom in a similar way to extension rope as shown in Figure 1.

The disadvantage of such kind of arrangement is that the rope routing from side to top and back to the other side of second extension boom is susceptible to damages from rubbing with inside walls and various plate corners of second extension boom while extension and retraction of booms.

Another disadvantage of this kind of arrangement is and sharp turns. These sharp turns open strand of ropes and reduces load carrying capacity and service life of rope.

Yet another disadvantage of this arrangement is that the extension and retraction ropes are pulled to tension while assembly of telescopic Outer boom. While pulling of ropes, the ropes get damage from corners of second extension boom as the rope is routed from side wall to top surface and back to side wall of second extension boom.

The above disadvantages of the known prior art are overcome by the proposed improved system of the present invention wherein there is provided an improved rope attachment method on telescopic booms for use on Pick and Carry type Cranes having extension and retraction telescopic motion through a pair of ropes each for extension and retraction motion of boom.

Object of the Invention:

The object of this invention is to provide a new arrangement rope attachment and rope cross over in a smooth manner without need of ropes passing from top surface for routing to other side of second extension member. This arrangement is fixed at middle rear end of second extension boom in order to obviate the disadvantages sited above; a unique rope attachment and crossing arrangement is proposed which is free of disadvantages like rope rubbing with first extension inside walls, sharp turn in ropes and damage while pulling of ropes.

Brief Description of the Accompanying Drawing

We shall now describe the present invention with reference to accompanying drawings which are given by way of illustration but does not restrict the scope of present invention. These accompanying drawings provide further objects and advantages of this invention which will be more apparent from the ensuing description when read in conjunction with the accompanying drawing and wherein:

Fig. 1 shows Crane Boom assembly with fixed outer boom, first and second extension booms with hydraulic ram and extension, retraction ropes.

Fig. 2 shows plan view of semi circular pulleys mounted on both faces of plate.

Fig. 3 shows plate with semi circular pulleys mounted on rear and mid plane of second extension member.

Fig. 4 shows 3D views of semi circular pulleys mounted on both faces of plate along with rope guide plate.

Summary of Invention

According to the present invention there is provided an improved rope attachment on extension boom for pick and carry type crane attachment and routing arrangement related to a crane boom assembly comprising of a fixed outer boom with at least two or more extension booms,

(a) the first extension boom being extended telescopically with a hydraulic cylinder and (b) a second extension boom provided with a pair of extension and retraction ropes,

the extension rope being attached to one side of the fixed outer boom at its one end and is routed over a pulley fixed on the same side of the front side of the first extension boom, the extension rope is being routed towards the same side but on the rear side of the second extension boom then extension rope is routed to its other side whereas the rear side being provided with an arrangement of two semi-circular pulleys mounted on opposite sides of a plate with a typical profile but conveniently facing opposite to each other so that the said plate with the said typical profile along with the semi-circular pulleys capable of being mounted on to the rear end of the second extension boom in a horizontal position, one of the said semi circular pulleys facing up side and the other semi-circular pulley facing down side of the second extension boom and one pulley with its curvature facing rear side and the other pulley with its curvature facing the front side of the second extension boom, the said extension rope from the other side of the second extension boom being routed back to the fixed outer boom through another pulley on the first extension boom, and the said retraction rope being routed similarly from the fixed outer boom to the second extension boom through the said first extension boom and back to the fixed outer boom.

In a circular guide strip is being provided over the circumference of each semi-circular pulley mounted on the said plate with a typical profile.

In the said plate with a typical profile and the two semi-circular pulleys mounted on opposite sides of the plate being fixed at the rear side of the second extension boom at approximately its mid -plane from bottom to the top.

The extension and retraction ropes pass through the boom and the semi- circular pulley in such a manner that the extension and retraction ropes entering through one side of the second extension boom and semi-circular pulley pass out of the other side of the second extension boom and semi circular pulley smoothly.

The arrangement is mounted on cranes such as pick and carry type of cranes but not limited to this application only.

One of the objectives of the present invention is to provide a rope attachment and crossing on second extension boom which is facilitated via a set of semi circular pulley sections attached to a plate. In Figures 2 and 4 is shown a semi circular pulley 1 and semi circular pulley 2 which are fixed on to a plate.

Another objective of the invention is to fix both the semi circular pulleys (201) and (202) on to the opposite side of plate (204) and to place them opposite to each other. As shown in Figure 2, both these pulleys have a guide strip (203). The guide strip (203) assists for routing extension and retraction rope and also for preventing the rope to come out of the semi circular pulley while telescopic extension and retraction of boom and also while carrying out assembly of telescopic boom.

Yet another objective of the invention is to attach the plate with a set of semi circular pulley sections (301) to the rear end of second extension boom but at a mid surface from bottom to top as shown in Figure 3. The plate (402) on which the semicircular pulleys (401) (404) are

fixed has a special profile to provide more contact area with body of second extension boom as shown in Figure 4.

With this arrangement the extension and retraction ropes can pass from one side of the second extension boom to the other side by smooth guiding on semi circular pulley and without any need to pass from top surface of second extension boom. With such arrangement there is no need of guiding rope with blocks to change direction of rope while passing from one side to the other side of the second extension boom.