

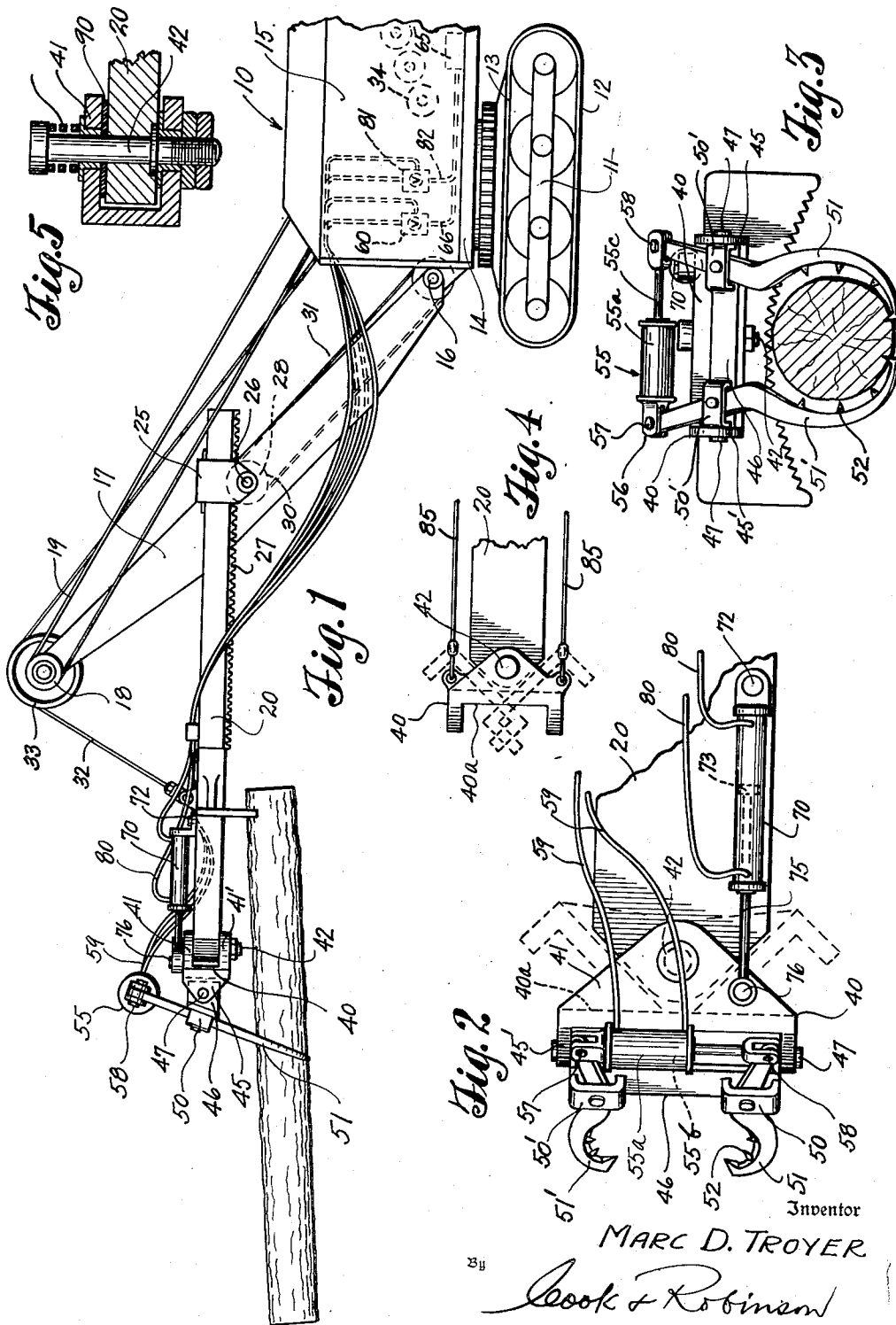
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M. D. TROYER

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LOGGING CRANE

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Inventor
MARC D. TROYER
Cook & Robinson
Attorney

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LOGGING CRANE

Marc D. Troyer, Seattle, Wash., assignor to Berger Engineering Company, Seattle, Wash., a corporation of Washington

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This invention relates to log handling devices and it has reference more particularly to improvements in log handling cranes.

Explanatory to the present invention, it will here be stated that it is a practise in present-day logging operations, to yard the logs and then, by means of machines of the steam shovel type of construction, but wherein the dipper or bucket is replaced by a pair of tongs and the dipper stick equipped with a heeling plate, to pick up the logs and lay them on a truck or car for transportation. To my knowledge, present-day machines, or cranes as so used, either have the tongs suspended from the boom or boom stick by a cable, or fixed to the end of the boom stick in definite position, to open or close in a transverse plane. Cable suspended tongs are not especially desirable because of the lack of control thereover or control afforded thereby over the log once it is free of the ground. The relatively fixed support for the tongs on the boom stick is more desirable, but not entirely satisfactory because of the requirement that a log, in order to be easily picked up by the tongs, must extend substantially in the direction of the boom.

In view of the above, it has been the principal object of this invention to overcome the disadvantages in use both in the suspended tongs and in the fixed transverse mounting of tongs, by equipping the boom stick with a pair of tongs that is so mounted that they may be turned, either manually or by power, to various angles relative to the direction of the boom and then held at that place of adjustment, thereby making it possible to engage the open tongs with a log for gripping and then lifting it even when the position of the log is at a substantial angle to the direction of the boom.

More specifically stated, the present invention resides in the equipping of the boom or boom stick with a heeling plate and with a pair of log lifting tongs; the latter being pivotally attached to a mounting block that is pivotally attached to the outer end of the boom stick by a vertically directed pivot pin to permit the paired tongs to be turned laterally to various positions within a wide angle extending equally to opposite sides of the vertical plane of the boom stick.

It is also an object of the invention to support the paired tongs in the mounting block by a base that is secured in the mounting block by a horizontal pivot pin so that the pair of tongs may swing thereon to various positions within a limited range.

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Yet another object of the invention is to provide power operated means for adjusting the tong mounting block to various positions within the angle of lateral adjustment.

Still further objects of my invention reside in the details of construction and combination of parts comprised therein and in their mode of use, as will hereinafter be fully described.

In accomplishing these and other objects of the invention, I have provided the improved details of construction, the preferred forms of which are illustrated in the accompanying drawings, wherein—

Fig. 1 is a side view of a log handling crane of steam shovel type, embodying the improvements of the present invention therein.

Fig. 2 is an enlarged, top or plan view of the set of tongs and the mounting therefor as applied to the boom stick, showing also the adjusting jack and its mode of connection with the tong mounting block.

Fig. 3 is a front view of the parts shown in Fig. 2, with log gripped by the tongs.

Fig. 4 is a view similar to that of Fig. 2, but illustrating cable connections for effecting manual adjustment of the tong mounting block to different positions relative to the boom stick.

Referring more in detail to the drawings—

The present improvement is applicable to those various types and makes of machine or cranes of power shovel type, for log lifting, employing a boom that extends upwardly and outwardly from a turntable form of support, and which is adapted to be raised or lowered to various positions; the boom being equipped with an extendable and retractable boom stick, which latter has a pair of tongs mounted at its outer end.

In illustrating the present invention, I have shown it in connection with a common form of machine of power shovel type, designated in its entirety by numeral 10. The machine comprises a base structure 11 equipped with crawler tracks 12. The base structure supports a horizontal platform 13 on which a turntable 14 is mounted in the usual manner. On the turntable is a cab 15 in which the boom and boom stick operating mechanisms and various other controls may be located; these latter not being shown in detail in the present drawings.

Hinged to the turntable, as at 16, is the main boom 17, equipped at its outer end with sheave wheels 18 over which a cable 19 is extended in the usual manner for supporting and for making the necessary adjustments in elevation of the boom.

Supported by and extended from the boom 17 in the usual way, is a boom stick 20. This is contained at its inner end in a guide bearing or housing 25, pivoted on the boom by a pivot shaft 26 in such manner as to permit up and down swinging of the outer end of the stick. The stick is equipped with a longitudinally extending rack bar 27 that is in operative mesh with a pinion gear wheel 28 fixed on the horizontal cross shaft 26, which is rotatably mounted in the boom as support for the housing 25. A sprocket wheel 30 is fixed on the shaft and a chain belt 31 extends thereover from control means in the cab for effecting the adjustments of the stick in its longitudinal direction.

To angularly adjust the boom stick in a vertical direction relative to the boom, and also to support it, a cable 32 is attached thereto near its outer end. This cable extends over a sheave wheel 33 at the outer end of the boom and to a cable winding drum 34 mounted on the turntable and under the usual form of controls. It is to be understood that the control of the boom stick, the boom, and the turntable, may be accomplished in the usual or any other suitable manner, and forms no novel part of the present invention.

Mounted at the outer end of the boom stick 20 is the tong unit mounting block or frame 40. This comprises a flat transversely directed plate 40a, formed along its upper and lower edges with integrally cast, rearwardly directed flanges 41—41' disposed at top and bottom sides of the end portion of the stick, as best shown in Fig. 3. A pivot pin 42 extends perpendicularly through the flanges and stick and thus attaches the frame or block 40 for pivotal adjustment from a neutral position, as seen in full lines in Fig. 2, to different angular positions facing toward opposite sides of the neutral position, as indicated in the dotted line showing of parts. The forward end of the stick 20 is beveled at opposite sides to provide a forwardly directed point and the block 40 is adapted to swing to positions against the laterally facing beveled surfaces which determine and limit the arc of adjustment of the block 40.

At its opposite ends, the block or frame 40 is formed with forwardly directed ears 45—45' and disposed between these ears is the base block 46 of the tong unit. This base is secured on the mounting 40 by a horizontally directed pivot pin 47 that extends through the ears and block as shown in Fig. 3. The block 46, as thus pivotally or hingedly mounted, is permitted a limited pivotal action. Formed on the base block 46, at its opposite ends and forward side, are bearings 50—50' in which a pair of tongs 51—51' are pivotally mounted. These tongs are in laterally spaced relationship as best shown in Fig. 3, and normally disposed in upright position. The lower ends of the paired tongs are curved in a manner that adapts these portions to embrace the opposite sides of a log received between them and preferably are equipped with spikes 52 to engage the log.

The upper end portions of the tongs extend above the mounting blocks, as shown in Fig. 3, and are connected at their upper ends, with opposite ends of a double acting jack that is designated in its entirety by numeral 55.

The air jack comprises an air cylinder 55a reciprocally containing a piston 55b from which a rod 55c extends. The cylinder has a lug 56 at one end connected by a pivot bolt 57 with the upper end portion of one of the tongs. The piston rod is likewise connected by bolt 58 with the upper

end portion of the other tong. Operating air is admitted from and into opposite ends of the jack cylinder through flexible hose lines 59—59, under control of a hand valve 60 that preferably is located in the cab. The valve is connected to a source of supply of air under pressure, designated at 65 by means of pipe 66.

For a controlled angular adjustment of the mounting 40, I have provided an air cylinder 70 that is pivoted at one end on the stick by pivot pin 72. The cylinder contains a piston 73 from which a rod 75 extends. The rod is pivotally connected at its end, by pivot bolt 76, to the upper flange of the block 40, as shown in Fig. 2. Air for control of the air jack 70 is admitted to the opposite ends of the jack cylinder through flexible hose lines 80—80, leading to a control valve 81 connected to the source of air supply by pipe 82.

Thus, by the manipulation of the valve 81, air may be admitted to cylinder 70 for pivotal adjustment of the block 40, to a position that will set the tongs in the best position for their application to a log. The log may be lying on the ground at a substantial angle to the direction of the boom, yet the tongs can be disposed, by turning the mounting 40, in position for easy application thereto. The adjustment of the mounting 40 has no effect on the opening or closing action of the tongs.

Where manual adjustment of the block is desired, this can be accomplished in various ways, one of which is illustrated in Fig. 4, wherein I have shown cables 85—85 attached to the top flange of the mounting 40 at opposite side of the central pivot pin 42, and extended to within the cab for hand control.

Where no control, or when hand control of the mounting 40, is used, it is desirable that a friction means be employed to yieldingly retain the mounting 40 at its different positions of adjustment, and in accomplishing this, I have applied a friction plate 90, as seen in Fig. 5, between the flange 41 and top surface of the boom stick, and a spring 93 is located between the head 42x of the pivot 42 and the top of the flange 41 to urge the flange tightly against the friction plate. This provision prevents any free swinging of the tong mounting block 40 from one side to the other, and insures that the mounting 40 will remain at any position of angular adjustment until moved to another position either by manual means or by engaging the mounting with a stationary object and shifting the stick.

The present improvement expedites the handling of logs since it is not necessary that the tongs be engaged with the log to shove it to position at which it can be received between the opened tongs. The lateral angular adjustment makes possible the picking up of logs at one angle and turning them to another for release. Also, the pivoting of the base member 46 of the tong unit provides a flexibility that is advantageous.

Having thus described my invention, what I claim as new therein and desire to secure by Letters Patent is—

1. An apparatus for loading logs comprising a mobile turntable, a boom mounted on the turntable to swing therewith, a boom-stick mounted by the boom for vertical, angular adjustment and for extension and retractive movements, a frame pivotally mounted at the outer end of the boom-stick for horizontal turning adjustment between positions facing toward opposite sides of

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the stick, a pair of laterally spaced and downwardly directed log gripping tongs pivotally mounted on the frame, power means on the stick for effecting and retaining said turning adjustments of the frame and power means connected to the tongs for controlling their opening and closing action.

2. An apparatus for the handling of logs, and the like, comprising a vehicle with a turntable mounted thereon, a boom mounted on the turntable, an extendable and retractable boom stick mounted by the boom for angular adjustment in a vertical plane, a frame pivotally mounted at the outer end of the boom stick for turning adjustment thereof horizontally between positions facing toward opposite sides of the stick, power means on the boom stick for effecting said turning adjustments of the frame, a horizontal pivot pin mounted in the frame transversely thereof, a base block mounted on the pin for limited forward and rearward rocking action, a pair of

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downwardly directed and laterally spaced tongs mounted on said base block, and power means operable for the opening and closing of the tongs.

MARC D. TROYER.

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