

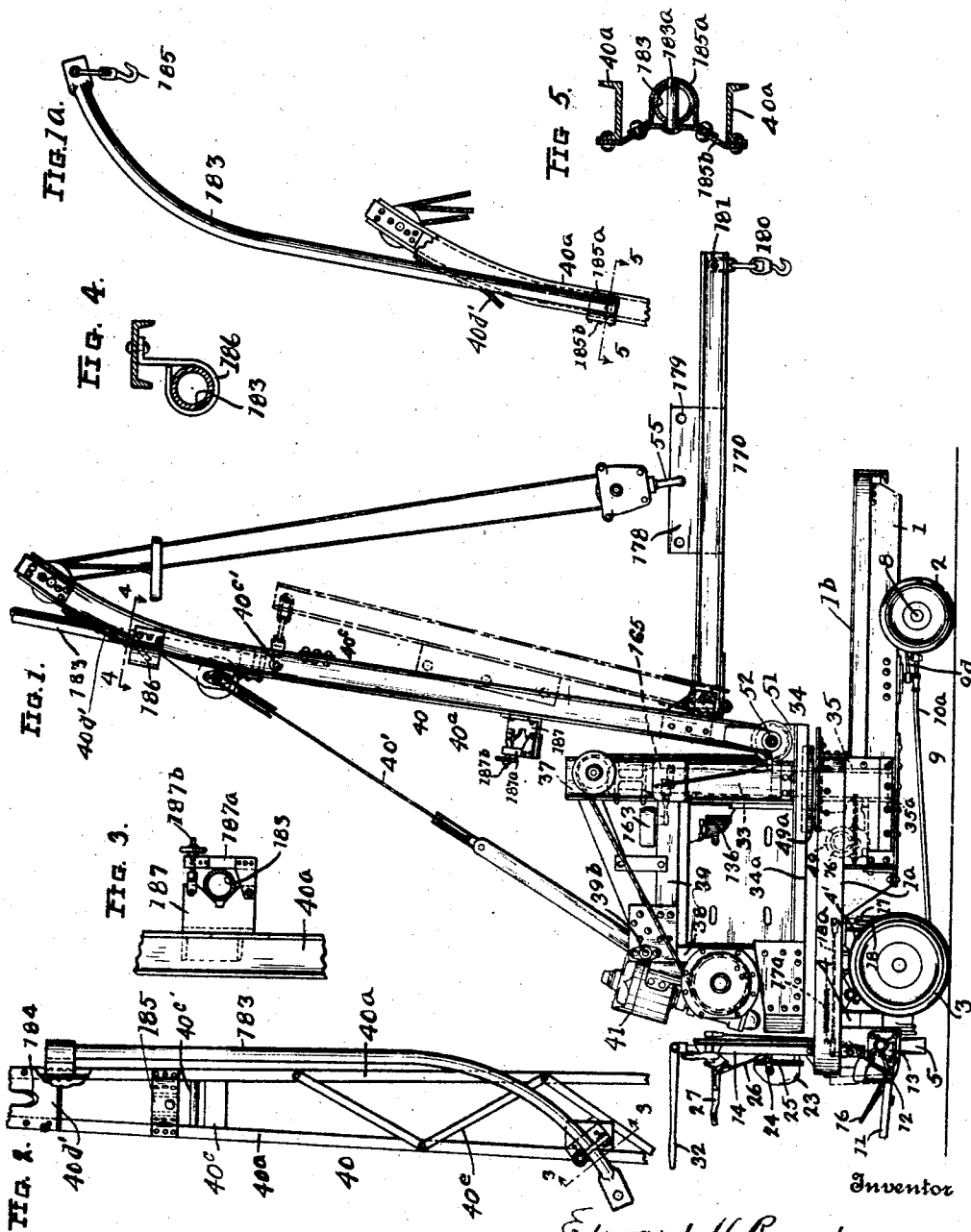
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E. H. REMDE

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LOAD HANDLING MECHANISM

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Edward H. Remde

By

Edward R. Alexander

Attorney

UNITED STATES PATENT OFFICE

EDWARD H. REMDE, OF CLEVELAND, OHIO, ASSIGNOR TO THE BAKER-RAULANG COMPANY, OF CLEVELAND, OHIO, A CORPORATION OF OHIO

LOAD-HANDLING MECHANISM

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This invention relates to a load handling mechanism, more particularly to an industrial truck of the crane type.

One object of the invention is to provide, in apparatus or mechanism of this character, an auxiliary boom capable of lifting parts, units, elements or loads and maintaining them in elevated position, whereby the apparatus may be adapted to varied uses, conditions and operations.

Another object of the invention is to provide a mechanism of this character with a separate boom, which may be correlated with the main boom to effect many different operations in supporting loads and positioning them at intermediate elevations for making assemblies, disassemblies and repairs.

Other objects of the invention will be apparent to those skilled in the art to which my invention relates from the following description taken in connection with the accompanying drawing, wherein

Fig. 1 is a side elevation of a mechanism embodying my invention.

Fig. 1a is a fragmentary side view showing the extension member.

Fig. 2 is a fragmentary plan view of the main boom showing the extension member mounted thereon in its inoperative position.

Fig. 3 is a section on the line 3—3 of Fig. 2.

Fig. 4 is a section on the line 4—4 of Fig. 1.

Fig. 5 is a section on the line 5—5 of Fig. 1.

In the form of the invention disclosed in the drawings, a boom 40 is mounted on a motor powered truck equipped with the usual facilities including electric motors and connected cable winding means.

51 indicates a pair of plates vertically disposed on the base at opposite sides of and slightly forward of the opening therein for a shaft and provided with hollow bosses which form bearings for a pivot pin 52 on which the boom 40 is pivotally supported. The plates 51 are formed with openings aligned with the bearing openings in the bosses through which the pivot pin extends.

The boom 40 preferably comprises a pair of channel members 40a arranged in spaced relation, but slightly converging toward their upper ends. The upper portions of the mem-

bers 40a may be curved forwardly and downwardly. The channel members are secured together in spaced relation by a plurality of cross-pieces 40b, 40c, 40d, 40d' and diagonal pieces 40e. At a point remote from their free ends, the members 40a are provided with upstanding plates 53, the purpose of which will later appear. The lower ends of the channel bars 40a are provided with suitable knuckles 40x through which the pivot pin 52 extends, the opposite ends of the pin being provided with nuts 54 to prevent the pin from moving endwise in the knuckles and bosses. The boom 40 is raised and lowered about the pivot pin 52 by any suitable means, but preferably by means of a cable or other flexible connection 40' connected to the operating means.

55 indicates as an entirety a member for engaging a load, whereby the load may be raised or lowered or otherwise handled. The load engaging member preferably comprises a hook depending from a casing 56, which in turn is supported or suspended from the free end of the boom 40 by a cable or other flexible connection 57, connected with the operating means.

It will be understood that the load is raised and lowered by winding the cable or rope 57 on or unwinding it from one drum of the cable winding means, and the boom 40 is swung upwardly or downwardly by winding the cable or rope 40' on or unwinding it from the other drum of the cable winding means and the support 33 is swung or rotated about the shaft 33 by the operation of the motor 76.

170 indicates an auxiliary boom adapted to be detachably and pivotally connected at its inner end to the boom 40 and supported at or near its outer end by the load engaging element 55 which detachably engages therewith. The auxiliary boom 170 may be of any desired length and is preferably formed from a pair of channel bars secured together back to back in any desired manner. The connection of the auxiliary boom 170 with the main boom 40 is preferably of the universal joint type. Near the outer end of the auxiliary boom I provide an upstanding plate 178. The plate 178 is formed with one or more openings 179, in which the hook 55 is inserted to support

the outer end of the boom 170. The plate 178 is preferably clamped between the channel bars constituting the auxiliary boom. 180 indicates a load engaging device suspended from the auxiliary boom, preferably near its free end. This device may be of any desired form, depending upon the shape and nature of the load that is to be engaged, but it is herein illustrated as a hook having a swiveled shank connected by links to a cross bar 181 supported in openings formed in the bars of the auxiliary boom 170. The device 180 may be used to detachably connect the free end of the boom 170 to the main boom 40, as shown in dotted lines in Fig. 1, to hold it in an inoperative position when not in use or when the loading engaging member 55 is being used to handle loads. When the boom 170 is moved into such position, the hook 180 may engage the edge of the cross pin 40c'. The auxiliary boom 170 may be detached by removing the hook 55 from the opening 179 and removing elements of the universal joint at its inner end. When the auxiliary boom 170 is removed or positioned in its inoperative position, the main boom 40 and the load engaging member 55 are capable of being operated in the usual manner to raise and lower loads to and from varying positions at either side of the truck frame 1. When the auxiliary boom 170 is arranged as shown in Fig. 1, the apparatus may be utilized to perform various load handling operations, for example, in making machine assemblies, the auxiliary boom 170 may be operated to lift a part, unit or element and support it while being moved to the place of assembly and there held in position while assembly is effected. By reason of the fact that the hoist mechanism is utilized to support the outer end of the auxiliary boom and its inner end has universal joint connection with the main boom 40, it will be seen that the load can be adjusted up or down and laterally to facilitate its positioning for connection with or in the machine being assembled. Furthermore, by swinging the main boom 40 up or down, adjustment of the load in an endwise direction can also be made. As the boom 170 extends laterally in a substantially horizontal direction, it can be used to support and position parts, units and elements below or underneath a frame or structural part.

In one practical application of my invention, apparatus embodying the same has been used for supporting and positioning parts and elements along and below or underneath structural parts of a locomotive during the building and assembly thereof.

The auxiliary boom 170 may be used for engaging and moving parts, units and elements where disassembly or repair of a machine is being carried out.

183 indicates an extension member adapted to be removably supported on the free end of the main boom 40 and support parts, units and

elements for assembly purposes in or at relatively high elevations or to engage the same for disassembly thereof. The extension member preferably comprises a tubular bar adapted to extend through an opening 184 formed in the plate 40a' and removably fit a socket 185, rigidly supported between the boom bars 40a near their free ends, being held therein by a pin 183a. The socket comprises a U-shaped plate 185a, connected at its ends to a cross member 185b, which is secured to the bars 40a (see Fig. 5). The extension member extends endwise from the main boom 40 and carries at its outer end a depending hook or other device 185 by means of which it may support a load. When removed from the socket 185, the extension member 183 may be removably secured to the boom 40, preferably by means of a socket 186 into which its inner end fits and a clamping block 187 carried by one of the bars 40a, the block 187 being provided with a hinged plate 187a which engages the extension member to hold it on the block 187. The plate 187a secured in clamping position by a suitable device 187b. As the extension member 183 is rigidly carried by the boom 40 and extends from the free end thereof, operation of the boom 40 will swing the outer end of the extension member to adjust its suspension hook 185 or the load carried thereby as desired.

To those skilled in the art to which my invention relates many alterations in construction and widely differing embodiments and applications of the invention will suggest themselves without departing from the spirit and scope thereof. The disclosures and the description herein are purely illustrative and are not intended to be in any sense limiting.

What I claim is:

In apparatus of the class described, the combination of a frame, a main boom pivoted at its inner end thereon, a load hoisting mechanism having a load engaging member suspended from the outer portion of said boom, an auxiliary boom connected at its inner end by a universal joint to said main boom and arranged to be engaged and operated by said load engaging member.

In testimony whereof, I have hereunto subscribed my name.

EDWARD H. REMDE.