May 17, 1932. E. H. REMDE 1,858,903

INDUSTRIAL TRUCK

Original Filed July 24, 1929 2 Sheets-Sheet 1

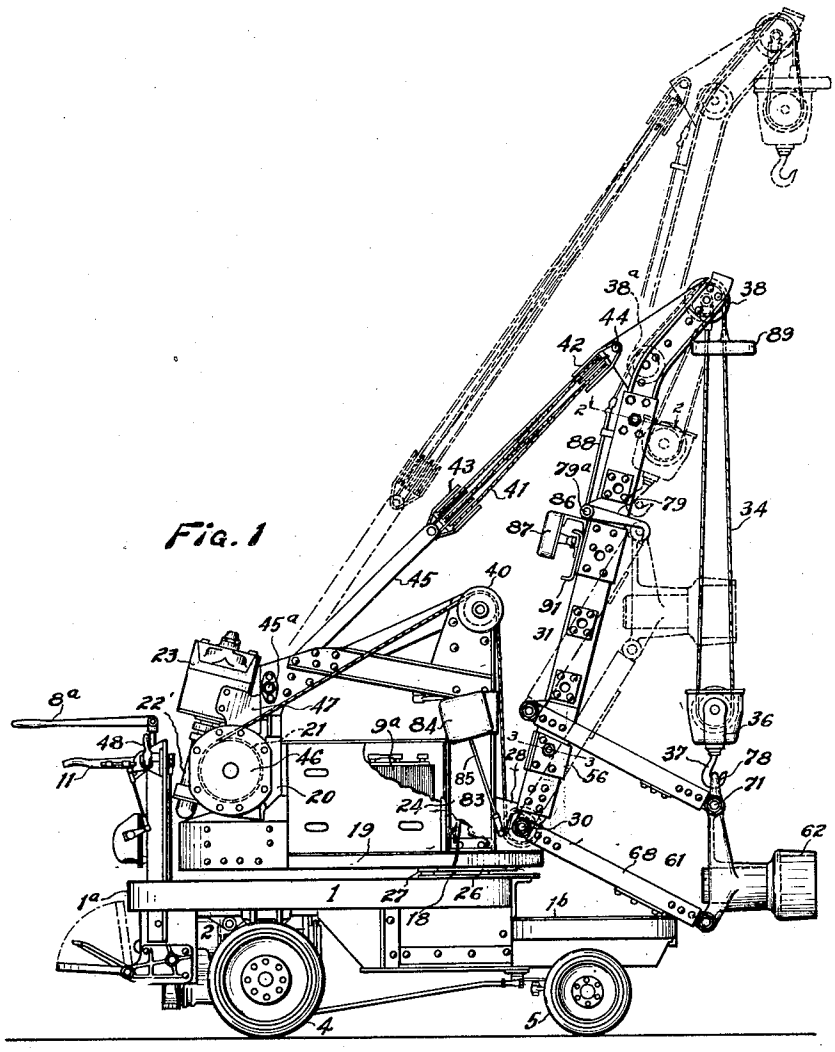


Fig. 1

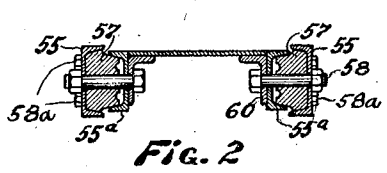


Fig. 2

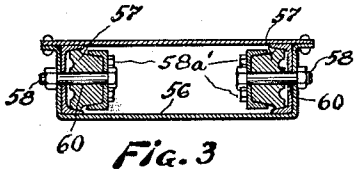


Fig. 3

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Fig. 4

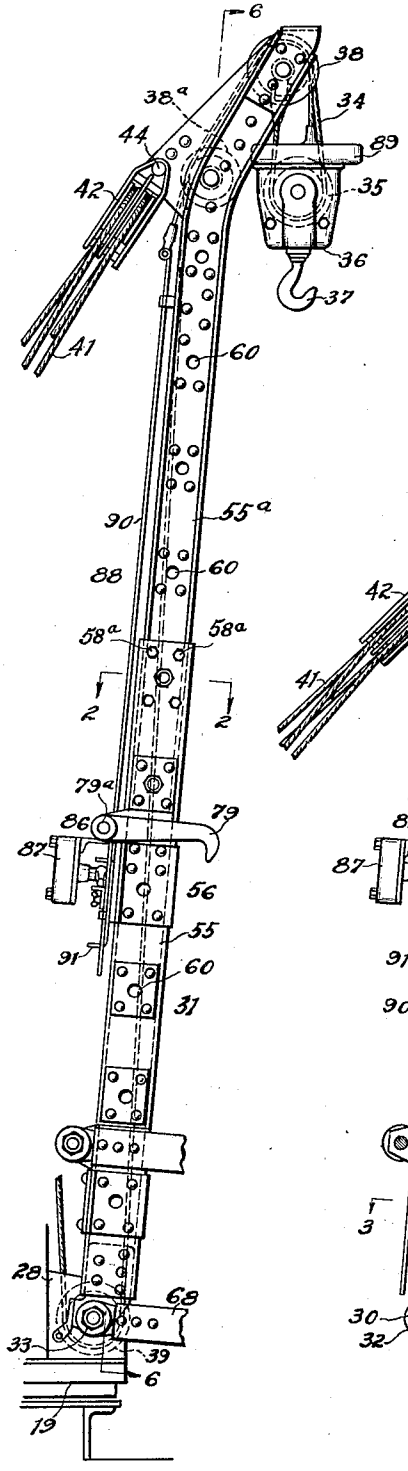


Fig. 5

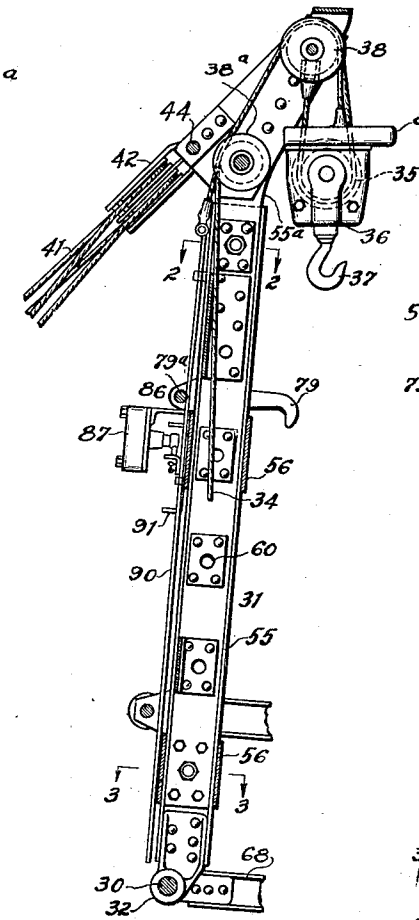
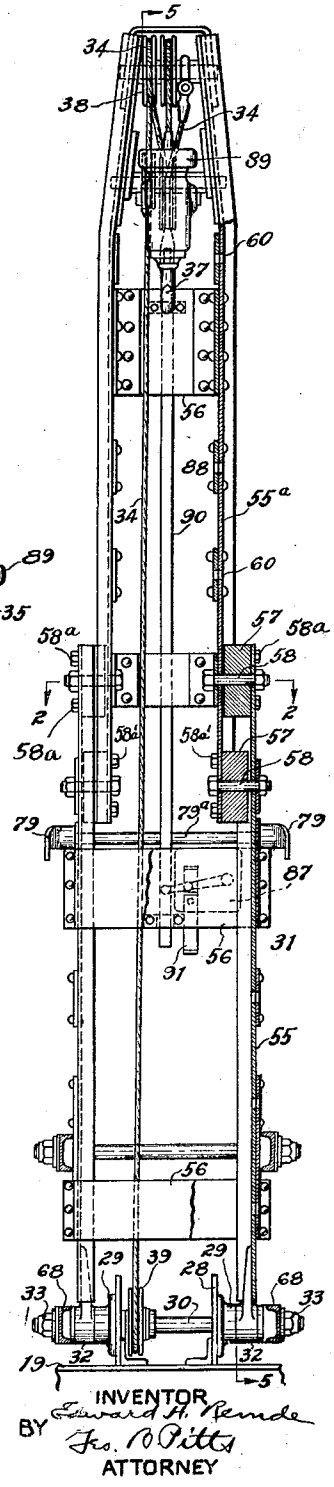


Fig. 6



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UNITED STATES PATENT OFFICE

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INDUSTRIAL TRUCK

Original application filed July 24, 1929, Serial No. 380,266. Divided and this application filed February 27, 1930. Serial No. 431,721.

This invention relates to an industrial truck provided with mechanism capable of carrying out a plurality of different operations.

This application is a division of my application filed July 24, 1929, Serial No. 380,266.

One object of the invention is to provide a truck with an improved sectional boom which may be readily extended to increase or decrease its length.

Another object of the invention is to provide an improved boom having an adjustable section and clamping means therefor adapted to rigidly support the adjustable section in various positions.

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 drawings, wherein

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

Fig. 2 is a section on the line 2—2 of Figs. 1, 4, 5 and 6.

Fig. 3 is a section on the line 3—3 of Figs. 1 and 5.

Fig. 4 is a fragmentary view showing the boom in side elevation with the boom sections in extended relation.

Fig. 5 is a section on the line 5—5 of Fig. 6, but showing the outer boom section adjusted to its innermost position.

Fig. 6 is a fragmentary view of the boom, partly in section on the line 6—6 of Fig. 4.

In the drawings, 1 indicates a frame mounted on suitable wheels, certain of which are driven by a motor 2, supplied with current from batteries 9*a*, and transmitting power through a suitable transmission mechanism within a housing (not show). The frame preferably comprises an elevated section 1*a* and a drop section 1*b*. In this form of construction a pair of relatively large wheels 4 are arranged below the elevated section 1*a* and relatively small wheels 5 are arranged below the drop section. In this arrangement the wheels 4 serve as the traction wheels driven by the transmission mechanism.

Steering and control of the truck is effected by the levers 8*a* and 11, respectively.

18 indicates a vertical shaft suitably mounted at its lower end on the frame section 1*a*. 19 indicates a frame swingably mounted at its front portion on the shaft 18. The frame 19 includes a base portion for supporting the batteries 9*a*, uprights 20 for supporting a pair of cable winding drums 21 (only one drum being shown), a power mechanism 22′ therefor and a motor 23 for the power mechanism and uprights 24 which support an upper bearing engaging the shaft 18 and co-operating with a bearing at the front end of the base portion to rotatably support the frame 19 on the shaft. The frame 19 carries a gear 26 with which a pinion meshes, the pinion being fixed to a shaft 27 which is driven by a motor, supplied with current from the batteries 9*a*, the motor, its mounting and driving means being preferably similar to corresponding parts shown in my application Serial No. 679,605 filed December 10, 1923.

28 indicates standards mounted on the front end of the base portion of the frame 19 and provided with suitable bearings 29 for a shaft or pivot pin 30 serving as the pivot or fulcrum for a boom indicated as an entirety at 31. As shown, the pin 30 extends through suitable knuckles 32 on the lower end of the boom 31 and carries nuts 33 at its ends to hold the pin against endwise movement. 34 indicates a cable anchored at its outer end to the upper end portion of the boom 31 and depending downwardly to form a suspension loop which engages a sheave 35 mounted in a yoke 36. The yoke 36 carries a load engaging element, such as a hook 37. The other leg of the cable loop reeves over a sheave 38 suitably supported on the outer end of the boom 31. From the sheave 38, the cable 34 extends to and over a guide sheave 38*a* and then to and around a sheave 39 loosely mounted on the pin 30. From the sheave 39 the cable extends to and around a sheave 40 suitably mounted on the adjacent upright 24 and from the latter sheave the cable extends to the adjacent winding and unwinding drum 21, the operation of which will

serve to raise or lower the hook 37 depending on its direction of rotation.

41 indicates a cable connected at its inner end to and adapted to wind on and off the other drum. The cable 41 is operatively connected to the upper portion of the boom 31 and operates to raise or lower the boom about its pivot pin 30 according to the direction of rotation of the drum. The cable 41 reeves through or around a pair of multi-type of pulley blocks 42, 43, the former being pivotally connected at 44 to the upper portion of the boom 31 and the latter being pivotally connected through a pair of links 45 to a transverse rod 45*a* on the frame 19.

The drums 21 are mounted in suitable casings 46 fixed to a support 47 which carries the motor 23 and the power mechanism driven thereby, the support being suitably fixed to the uprights 20. The drums 21 are fixed to shaft sections connected to and driven by the power mechanism. The power mechanism is of the differential type, the ring gear of which is preferably a worm gear in mesh with a worm fixed to the shaft of the motor 23. Both drum shafts are normally locked against rotation by a separate clutch, either of which may be disconnected by a selective mechanism, indicated as an entirety at 48, so that upon the operation of the motor 23, the latter will transmit power through the differential mechanism to rotate the adjacent drum. By providing mechanism such as just described, either drum may be rotated at the will of the operative.

The construction of the drums 21, power mechanism therefor, driving motor 23, clutches for holding the drums, the magnetic release means for the clutches and the selective mechanism forms the subject-matter of my said co-pending application Serial No. 679,605, for which reason no claims to this subject-matter are made herein.

By rotating either drum 21 it will be seen that the boom 31 may be raised or lowered or the load engaging member 37 may be raised or lowered.

The boom 31 preferably comprises inner and outer sections 55, 55*a*, respectively, the outer section being adjustable endwise on the inner section to increase or decrease the length of the boom 31, whereby it may be adapted to lift or discharge loads under varying conditions. Each boom section comprises a pair of channel bars connected in spaced relation by transverse members 56. The channels of the bars of the inner section are in opposed relation while the channels of the bars of the outer section are reversed and spaced within the planes of the bars of the inner section. In this arrangement each side bar of each section may overlap the adjacent bar of the other section to any desired extent depending on the adjustment of the outer section relative to the inner section and the channel of each side bar is disposed in opposed relation to the channel of the adjacent side bar so that they may receive between them a block 57, which may be clamped in wedging relation against the side walls or flanges of the channels to secure the sections in rigid relation in any position of adjustment, the blocks 57 having pairs of inclined walls forming wedges which engage the inner surfaces of the flanges on the opposed channels, as shown in Figs. 2 and 3. 58 indicates removable bolts which extend through aligned openings 60 in each pair of related channels and the adjacent blocks to clamp them together with the wedge blocks between them. I prefer to provide a pair of clamping devices for each pair of related channels (see Fig. 6) to insure rigidity. I provide the channels with a series of openings 60, preferably uniformly spaced, so that two openings in each channel will align with two openings in the adjacent channel in any position of adjustment of the outer boom section 55*a*. By preference, in any position of adjustment of the outer section 55*a*, the outer clamping devices are arranged near the outer end of the inner section 55 and the inner clamping devices are arranged near the inner end of the outer section 55*a*. In my form of construction each channel of one boom section is opposed to the adjacent channel of the other section and one wedge block of each pair of blocks is secured in the outer end of the channel for the inner boom section by bolts 58*a* and the other block of the pair is secured in the inner end of the channel for the outer boom section by bolts 58*a'*. Accordingly, when the outer boom section is adjusted relative to the inner boom section, the walls of the channels form guides for these blocks and serve to support the outer section in the plane of the inner section so that adjustment may be readily effected.

61 indicates as an entirety a separate mechanism for engaging, lifting and transporting a load. No claim is made to the separate mechanism as that forms the subject matter of my aforesaid original application.

78 indicates a loop provided on and extending upwardly from the load handling mechanism 61 and arranged to be engaged by the hook 37 to hold such mechanism in any desired position when it is to be used. By raising or lowering the hook 37, the load engaging member 62 of the load handling mechanism 61 may be adjusted vertically to the desired position, being limited downwardly by the engagement of the links 68 with the outer end of the frame section 15. When the mechanism 61 is not to be used, it may be raised to an inoperative position, as shown in dotted lines in Fig. 1, in which position it may be engaged by a hook 79 pivotally mounted on the boom 31, and held in such position. If desired, I may provide a hook

79 at either side of the boom, these hooks being carried by the boom section 55. A single shaft 79*a* may be provided to form a pivot for the hooks 79. When the mechanism 61 is in its inoperative position, the load engaging member 37 and boom 31 may be operated in the usual manner.

It will be noted that the separate load handling mechanism 61 is mounted on the frame 19 and therefore is disposed in cooperative relation to the hook 37 in any position to which the frame 19 may be slewed about the shaft 18; also, by arranging this mechanism in such relation, a single motor 23 is required to operate the boom 31 about its pivot, raise or lower the hook 37 and raise or lower the load engaging member 62.

83 indicates a limit switch mechanism operable to break the motor circuit, when the boom swings to a predetermined position in either direction, suitable switches being mounted within a casing 84 mounted on one of the uprights 24 and operated by a rod 85 pivotally connected to an adjacent portion of the boom 31.

86 indicates a limit switch mechanism operable to break the motor circuit, when the yoke 36 is raised to a predetermined position, a suitable switch being mounted within a casing 87 and operated by connections 88 leading to and connected to a weight 89 disposed in the path of movement of the yoke 36 or the housing carried thereby. As shown, the switch casing is mounted on the boom section 55, and the connections 88 include a rod 90 to which is adjustably secured an operating device 91 which actuates the switch. Accordingly, when the boom section 55*a* is adjusted relative to the section 55, the device 91 is adjusted on the rod 90 so as to retain the device in operative relation to the switch.

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

What I claim is:

1. In apparatus of the class described, the combination of a wheel mounted frame, a boom pivotally mounted thereon and comprising an inner section and an outer section each consisting of a pair of channel members, the channel members of the outer section being disposed within the channel members of the inner section to permit adjustment of the outer section relative to the inner section, and the adjacent channel members of said sections having their channels in opposed relation, pairs of blocks fitting within the opposed channels, one pair of blocks being secured to the inner end of the outer section and the other pair of blocks being secured to the outer end of the inner section, means for clamping the channel members and blocks together, and means for swinging said boom about its pivot.

2. In apparatus of the class described, the combination of a wheel mounted frame, a boom mounted thereon and comprising an inner section and an outer section each consisting of a pair of channel members, the channel members of the outer section being disposed within the channel members of the inner section to permit adjustment of the outer section relative to the inner section, and the adjacent channel members of said sections having their channels in opposed relation, wedge shaped blocks fitting within and engaging the side walls of the channels, and means for clamping the channel members and blocks together.

3. In apparatus of the class described, the combination of a wheel mounted frame, a boom mounted thereon and comprising an inner section and an outer section each formed of spaced channels, each channel of one section being in opposed relation to one channel of the other section, blocks secured to the outer ends of the channels of the inner section, blocks secured to the inner ends of the channels of the outer section, the blocks of one section being slidable in the channels of the other section when said outer section is adjusted relative to said inner section, and means for securing said sections in adjusted relation.

4. In apparatus of the class described, the combination of a wheel mounted frame, a boom mounted thereon and comprising an inner section and an outer section each formed of spaced channels, each channel of one section being in opposed relation to one channel of the other section, blocks secured to the inner ends of the channels of the outer section, the blocks of one section being slidable in the channels of the other section when said outer section is adjusted relative to said inner section, each block and the adjacent channel being formed with aligned openings and each channel being formed throughout a portion of its length with a series of openings uniformly spaced relative to each other and the first mentioned opening, and a bolt extending through the openings in each block and the adjacent channel and an opening in the related channel of the other section for securing said channels together.

In testimony whereof, I have hereunto signed my name.

EDWARD H. REMDE.