April 11, 1950 H. J. KIPPER 2,503,340

MECHANICAL EDUCATIONAL TOY

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Fig. 1.

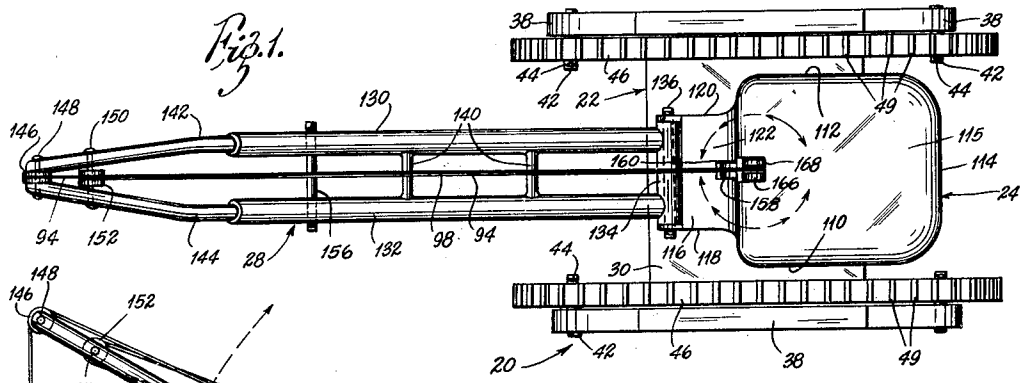


Fig. 2.

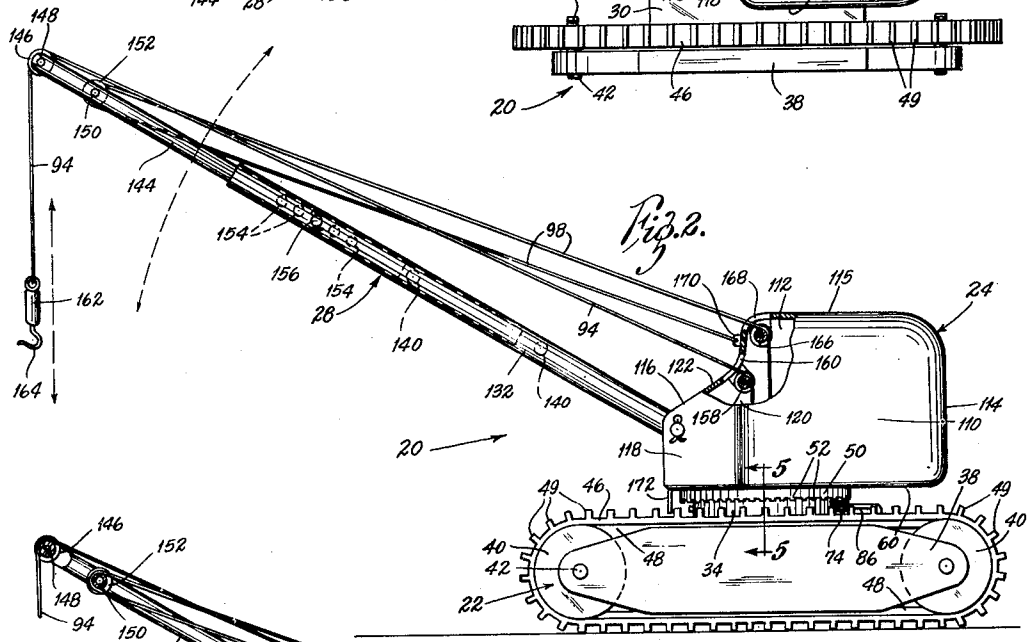


Fig. 4.

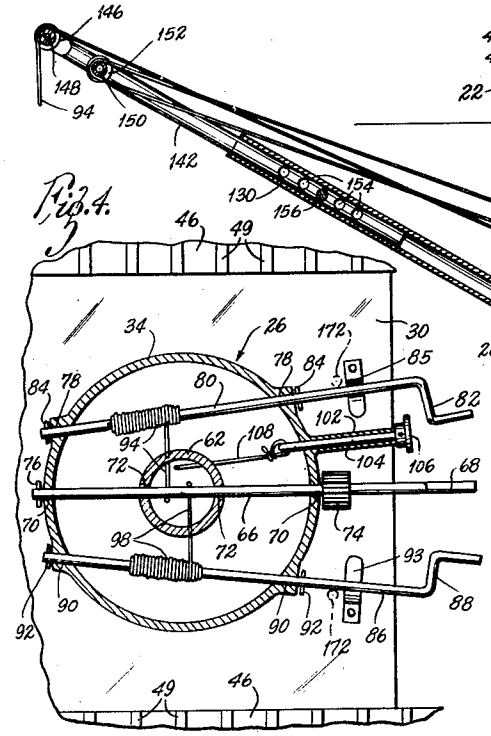
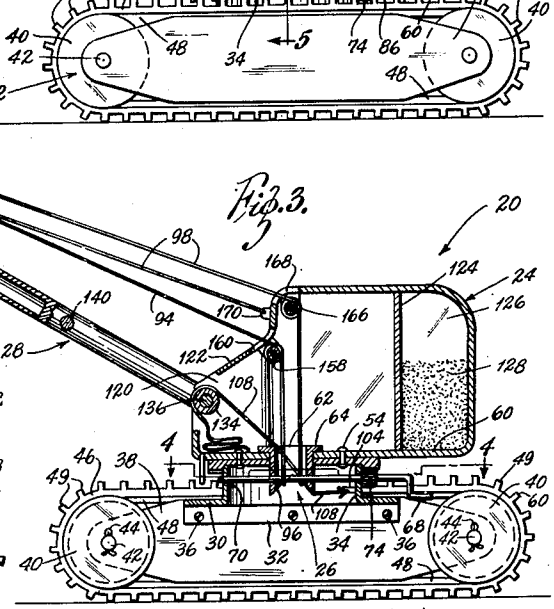


Fig. 3.



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Fig. 5.

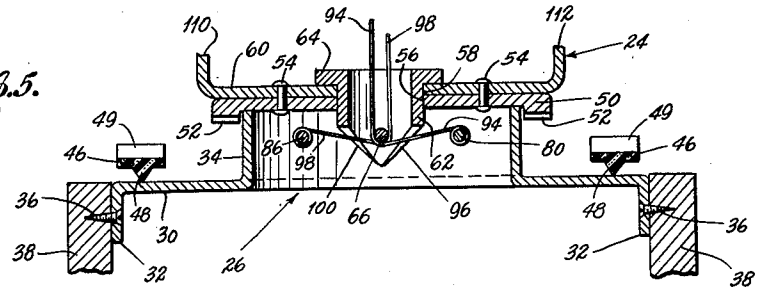


Fig. 6.

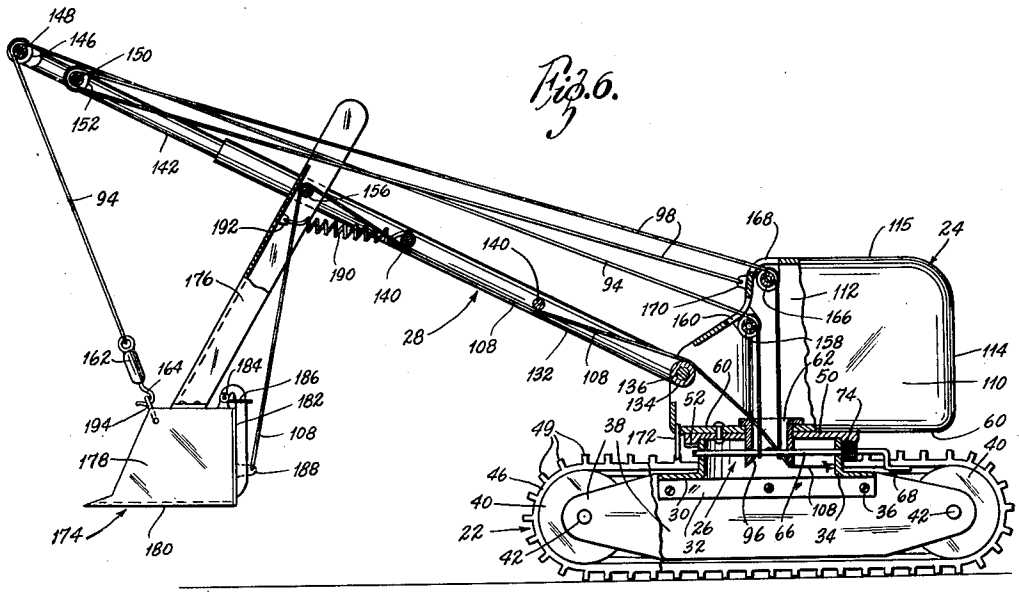
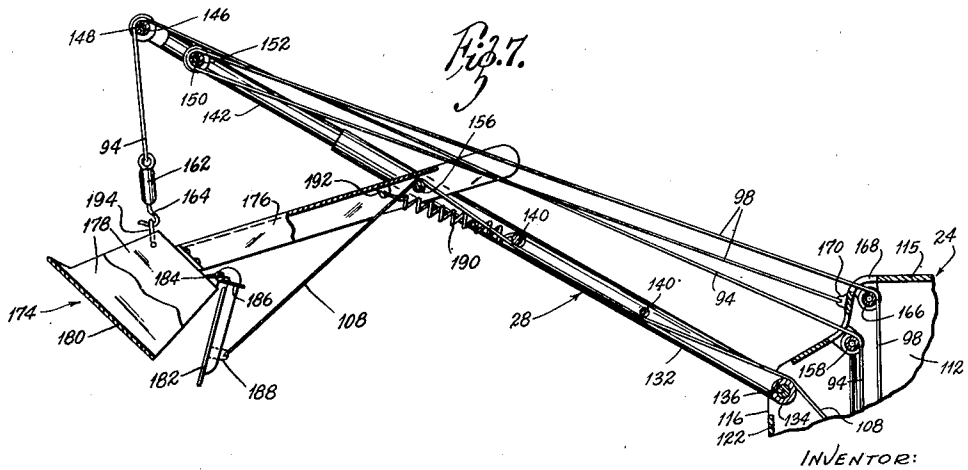


Fig. 7.



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MECHANICAL EDUCATIONAL TOY

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7 Claims. (Cl. 212—69)

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The present invention relates generally to toy constructions, and more particularly to an educational mechanical toy power crane and power shovel involving novel features of construction and maneuverability

An object of the present invention is to provide a novel mechanical toy which incorporates features of operability or maneuverability.

Another object is to provide a novel mechanical toy which incorporates rotating, pivoting and longitudinally moving elements in a manner to provide full maneuverability or operability without confliction or snarling of the several elements.

Another object is to provide a novel mechanical toy including features adapting it to be operated as a crane or a power shovel.

Another object is to provide a novel mechanical toy in which the controls for operating the several movable components thereof are located as an easily accessible group.

Another object is to provide a novel mechanical toy in which a plurality of operating lines or cables are disposed to allow for rotation and pivoting of elements of the device without fouling of the lines or cables.

Other objects are to provide a novel mechanical toy which is of simple and sturdy construction, inexpensive and easy to fabricate, and readily operated and maneuvered.

The foregoing and other objects and advantages of the present invention are apparent from the following description taken with the accompanying drawings, in which:

Fig. 1 is a top plan view of a preferred embodiment of the present invention, the adaptation taking the form of a power crane;

Fig. 2 is a side elevation of the toy power crane shown in Fig. 1, a portion of the cab being broken away and sectioned in part to show operating details;

Fig. 3 is a central longitudinal section through the power crane shown in Fig. 1, a portion of the remote leg of the telescopic boom being also shown in section;

Fig. 4 is an enlarged section on the line 4—4 of Fig. 3 directed to details of the operating mechanism;

Fig. 5 is an enlarged fragmentary, transverse, cross-sectional view through the cab mounting and operating cranks;

Fig. 6 is a central, longitudinal, sectional view of the present invention, the adaptation taking the form of a power shovel, parts being shown in side elevation; and

Fig. 7 is a fragmentary, central, longitudinal sectional view showing the boom and associated power scoop, the scoop being in dump position.

Referring to the drawings more particularly by reference numerals, there is shown in Figs. 1 through 5 a toy power crane, generally designated 20, which is constructed in accordance with the teachings of the present invention. Broadly, the toy power crane 20 includes a mobile base 22, a cab 24, an operating or maneuvering mechanism 26, and a boom 28.

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The mobile base 22 includes a horizontal frame member 30 having a downwardly turned flange 32 along two opposed edges and a circular, upwardly turned, central internal flange 34. The frame member 30 may be readily made as a simple stamping. Each of the flanges 32 is secured by suitable screws 36, or the like, along the top edge of an elongated member 38. The members 38 are reduced at each end, as shown, and receive grooved discs 40 at such ends by means of suitable studs 42 anchored in the elongated members 38. Cotter pins 44, or the like, retain the discs 40 on the studs 42. An endless tread 46 is disposed about each pair of discs 40 and includes an internal flange 48 for cooperating with the grooves in the discs 40, and outwardly directed lugs 49. The members 38 and the discs 40 may be made of wood, metal, or the like, and the endless tread 46 of rubber or other similar material.

The operating or maneuvering mechanism 26 (Figs. 4 and 5) is disposed atop the mobile base 22 and includes a crown gear 50 resting on the internal flange 34, the teeth 52 being outside of the flange 34 and downwardly directed. The cab 24 is secured to the top face of the crown gear 50 by suitable rivets 54, or the like. A centrally disposed aperture 56 in the crown gear 50 and an aligned aperture 58 in the floor 60 of the cab 24 snugly receive a sleeve 62, the sleeve 62 having a flange 64 resting on the cab floor 60. A crank member 66 having a crank handle 68 extends through aligned apertures 70 in the flange 34 and aligned apertures 72 in the sleeve 62 (Fig. 4), thereby rotatably anchoring the crown gear 50 with its superposed cab 24 to the flange 34 of the mobile base 22. The crank member 66 has a pinion 74 secured thereto, as by a set screw or the like, beneath and in engagement with the teeth 52 of the crown gear 50. A cotter pin 76, or the like, through the end of the crank member 66 remote from the handle 68, cooperates with the pinion 74 to prevent longitudinal movement of the crank member 66.

Extending through aligned apertures 78 in the flange 34 is a second crank member 80 having a crank handle 82. Cotter pins 84, or the like, prevent withdrawal of the crank member 80. A leaf spring 85, secured to the frame member 30, frictionally engages the crank member 80 to maintain it in selected position. A third crank member 86 having a handle 88 extends through aligned apertures 90 in the flange 34. Cotter pins 92, or the like, prevent withdrawal of the crank member 86. A leaf spring 93 engages the crank member

86 in the manner leaf spring 85 engages crank member 80. A cord or cable 94 is wound about the crank member 80 interiorly of the flange 34 and is led through a V-notch 96 (Figs. 3 and 5) in the sleeve 62, thence underneath and against the crank member 66 as a guide, and thence upwardly through the sleeve 62. Similarly, a cord or cable 98 is anchored to and wrapped about the crank member 86 and is led through a V-notch 100 in the sleeve 62 opposed to the V-notch 96, thence under and against the crank member 66, and upwardly through the sleeve 62. Further mention of the cables 94 and 98 is made below. For ease of operation and accessibility, the crank members 80 and 86 are in the same horizontal plane as the crank member 66, being in divergent relationship to each other so that the crank handles 68, 82 and 88 form an operating group.

Extending from the flange 34 between the crank members 66 and 80 (Fig. 4) is a tubular member 102 which reciprocably receives a small rod member 104 having a head 106. A cord or cable 108 is secured to the free end of the rod member 104 and extends upwardly through the sleeves 62. Further consideration is given below to the cable 108.

The cab or compartment 24 is preferably of the streamlined configuration clearly shown in the drawings and comprises side walls 110 and 112, rear wall 114, top 115, and a front protruding portion 116 including side walls 118 and 120 and a sloping front wall 122. The bottom 60 is referred to above. A partition 124 in the cab 24 provides a rear compartment 126 in which sand 128, or the like, is disposed. The sand 128 may be placed in the compartment 126 at the time of fabrication or a suitable opening (not shown) may be provided for subsequent filling of the compartment 126.

The boom 28 comprises spaced tubular legs 130 and 132 secured to a transverse sleeve 134 pivotally mounted on a pin 136 suitably supported by and anchored to the walls 118 and 120 of the protruding portion 116 of the cab 24. Spacers 140 maintain the legs 130 and 132 in secured spaced relation. Telescopically associated with the legs 130 and 132, respectively, are tubular legs 142 and 144. The legs 142 and 144 converge at the top (Fig. 1), receiving between the ends a pulley 146 mounted on a pin 148 which also maintains the legs 142 and 144 in shown associated relation. A second pin 150 is disposed through the legs 142 and 144 below the pin 148 and receives a pulley 152. Each leg 142 and 144 has a plurality of apertures 154 selectively adapted to receive a removable cross member 156 supported in suitable aligned apertures in the legs 130 and 132.

The before-mentioned cable 94, after leaving the sleeve 62, passes over a pulley 158 supported in struck-out portions of the sloping front wall 122, passes through an opening 160 in the sloping front wall 122 formed by the struck-out portions, and is led over the pulley 146. The cable 94 receives at its free end a member 162 having a hook 164.

The cable 98, after leaving the sleeve 62, is led over a pulley 166 supported by struck-out portions of the sloping front wall 122 and top 115, thence passes through an opening 168 in the sloping front wall 122 and top 115 at the juncture formed by the struck-out portions, thence passes around the pulley 152 and returns to anchorage in an ear 170 formed from material of the sloping front wall 122 or secured thereto.

The cable 108, after leaving the sleeve 62, passes over the transverse sleeve 134 and is shown coiled on the floor 60 of the cab 24 when the present invention is employed as a power crane (Fig. 3). The cable 108 may be attached to one of the spacers 140, if desired, for convenience.

A downwardly extending stop pin 172 is secured to the bottom 60 of the cab 24 adjacent the front end and is adapted to contact the crank members 80 and 86 to prevent 360° rotation of the cab 24.

Referring to Figs. 6 and 7, the present invention is shown as a power shovel. A scoop 174 is pivotally mounted on the removable cross member 156 through the medium of a supporting arm 176 of U cross section. The scoop 174 has solid opposed sides 178 and a bottom 180 which are closed at the rear by a pivoted gate 182 pivoted to the scoop by a suitably mounted pin 184. A coil spring 186 biases the gate 182 into closed position. The previously described cable 108 is secured at its free end to a suitable eye member 188 fixed to the outer face of the gate 182, the cable 108 being trained under the spacers 140 and over the transverse cross member 156. A tension spring 190 is secured at one end to a bracket 192 fixed to the supporting arm 176 and at the other end to the upper spacer 140, thereby biasing the scoop 174 in a counterclockwise direction. A bail 194, pivoted between the sides 178 of the scoop 174, is engaged by the hook 164 of the member 162.

The remaining elements and parts of the exemplification shown in Figs. 6 and 7 are, of course, identical with the same parts in elements shown in Figs. 1 through 5 and, hence, require no further description at this point.

Operation

When the present invention takes the form of a power crane, the legs 142 and 144 are usually withdrawn to the maximum extent in relation to the legs 130 and 132 in order to achieve maximum boom length. In the drawings, an intermediate extension relationship is shown to preserve space. Of course, any extension relationship may be employed.

Rotation of the crank member 66 through manipulation of its handle 68 effects rotation of the crown gear 50 and therethrough the rotation of the cab 24 with its associated boom 28. As illustrated, the cab 24, with its boom 28, may be rotated through approximately 285°, the stop 172 restricting movement between the crank members 80 and 86. However, if desired, the stop 172 may be otherwise based than shown and a rotation of substantially 360° achieved. It is to be observed that the crank member 66, which rotates the cab 24, also cooperates with the sleeve 62 to maintain the cab 24 and the movable base 22 in operative relationship, an important feature of the present invention. The relationship of the sleeve 62, the crank member 66 and the flange 34 is such that the fit in respect to the crown gear 50 and the cab bottom 60 is snug to prevent wobbling of the cab 24, yet sufficient clearance is present to permit easy rotation of the crown gear 50 and the cab 24.

The boom 28 is raised and lowered through the medium of the crank member 86 and its associated cable 98. Rotation of the handle 88 of the crank member 86 winds or unwinds the cable 98 to raise or lower, respectively, the boom 28, the weight of the boom 28 being sufficient to effect downward movement when the crank handle 88 is manually rotated in the lowering direction. The

leaf spring 93 retains the crank member 86 in selected position.

Rotation of the handle 82 of the crank 80 and the consequent winding or unwinding of the cable 94 effects the raising and lowering, respectively, of the hook 164. The weight of the member 162 is sufficient to keep the cable 94 taut. The leaf spring 85 retains the crank member 82 in selected position.

It is manifest that the cables 94 and 98 are threaded underneath the crank member 66 and through the sleeve 62 in a manner to prevent snarling and abrasive wear.

When the present invention takes the form of the power shovel, the boom 28 is normally in minimum extension, as shown in Figs. 6 and 7. The aforesaid manipulation of the cable 94 through the crank member 80 to raise the hook 164 effects clockwise pivoting of the scoop 174, the spring 190 moving it in the opposite direction. The raising and lowering of the boom 28 is, of course, the same as just described. The pivot gate 182 is opened to permit materials picked up by the scoop 174 to dump by rearward longitudinal movement of the rod 104 (Fig. 4), return movement of the gate 182 to closed position being effected by the spring 186.

It is manifest that there is herein disclosed a mechanical toy which achieves all of the objects and advantages sought. It is to be understood that modifications of the present invention which will be apparent to those skilled in the art are considered to be within the scope of the present invention, which is limited only by the claims which follow.

What is claimed is:

1. A mechanical toy comprising a support including a base member, a cab mounted on the base member for rotation in respect thereto, means for rotating said cab including a crank member, and means for securing said cab to said base member for said rotation including a centrally disposed member in engagement with said cab, said crank member extending through apertures in a portion of the base member and through apertures in said centrally disposed member to maintain said cab anchored for rotation.

2. A mechanical toy comprising a support, a cab rotatably mounted on the support, means for rotating the cab, a boom extending from the cab and pivotally supported thereby, means for raising and lowering the boom, a member suspended from the boom end and supported thereby, means for raising and lowering said suspended member in respect to the boom end, each of said three means including a member disposed below the level of the bottom of the cab, said last three members being disposed as an operating group.

3. A mechanical toy comprising a support, a cab rotatably mounted on the support, means for rotating the cab, a boom extending from the cab and pivotally supported thereby, means for raising and lowering the boom, a member suspended from the boom end and supported thereby, means for raising and lowering said suspended member in respect to the boom end, each of said three means including a crank member disposed below the bottom of a cab and forming an operating group, each of said second and third means also including a cable trained around the crank member of the said first means and connected to its respective operated member.

4. In a mechanical toy, a support including a base member, a cab mounted on the base member

for rotation in respect thereto, means for rotating said cab including a crank member, a boom pivotally mounted in said cab and rotatable therewith, means for raising and lowering the boom, a member depending from the front end of the boom and adapted to be raised or lowered in respect thereto, means for raising and lowering said depending member, and means for securing said cab to said base member for rotation including a centrally disposed member in engagement with the cab bottom, said crank member extending through apertures in a portion of the base member and through apertures in said centrally disposed member to maintain said cab anchored for rotation, said boom raising and lowering means including a crank member rotatably mounted in apertures in the said portion of the base member, said depending member raising and lowering means also comprising a crank member rotatably mounted in apertures in the said portion of the base member.

5. A mechanical toy comprising a base, a superstructure rotatably mounted on said base, a member engaging said superstructure, a crank member securing said member to said base and therethrough maintaining said superstructure in place, and a pinion secured to said crank member operatively engaging teeth secured to said superstructure for rotating the same through manipulation of said crank member.

6. A mechanical toy comprising a base, a superstructure mounted thereon, a boom member pivotally mounted on said superstructure, a member suspended from said boom, a pair of crank members disposed beneath the superstructure and supported by said base, a line secured to each crank, one line being operatively connected to said boom and the other to said member for raising and lowering each, and a member in the same plane with said cranks and disposed therebetween, said lines being trained beneath said member from said cranks to prevent snarling.

7. A mechanical toy comprising a base, a superstructure rotatably mounted on said base, a member having an opening therethrough engaging said superstructure, means securing said member to the base and said superstructure in place, means for rotating said superstructure, a boom member pivotally mounted on said superstructure, a member suspended from said boom, a pair of crank members disposed beneath the superstructure and supported by said base, and a line secured to each crank member, one line being connected to said boom member and the other to said suspended member, said lines being trained through the opening of said member.

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