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TOY EXCAVATOR

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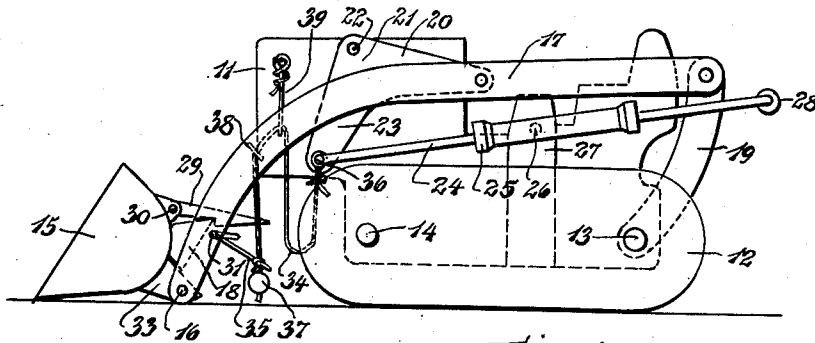


Fig. 1.

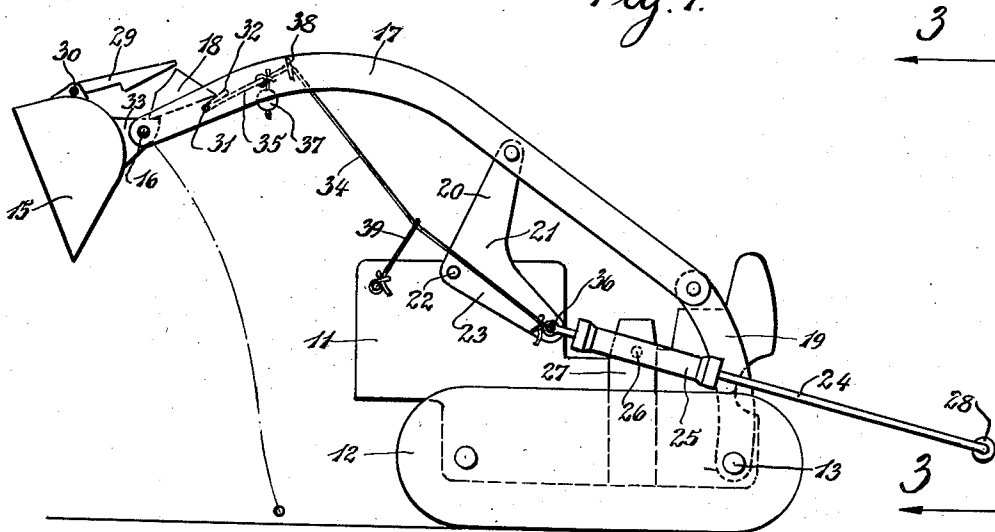


Fig. 2.

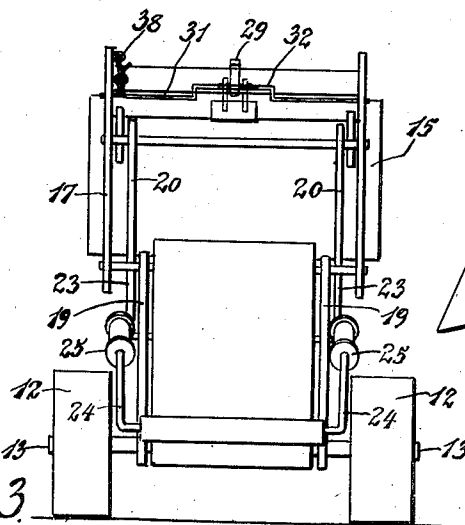
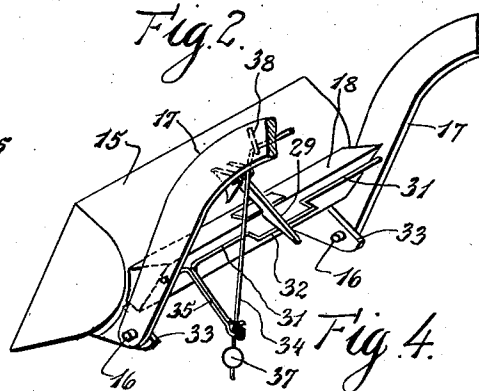


Fig. 3.



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TOY EXCAVATOR

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13 Claims. (Cl. 46-40)

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My invention relates to new and useful improvements in mechanical toys, more particularly toys simulating tractor-propelled hydraulic-operated excavators such as tractor shovels, bulldozers, scrapers, and the like.

In the manufacture and sale of such toys, the problem is to devise a mechanism that will satisfy the following special requirements:

(1) The toy must accurately preserve the general working action and appearance of the real machine.

(2) The mechanism must be simple and easy for a child to operate without damage to the working parts.

(3) The toy must be inexpensive to fabricate and assemble.

(4) The number of independent controls must be an absolute minimum, minor operative motions being wherever possible automatic.

Toys of the class described herein have in the past been difficult to manufacture and market because they have violated one or more of the above principles.

Accordingly it is the principal object of my invention to devise a mechanism for toys simulating tractor-propelled hydraulic excavators that will duplicate their action and appearance, and be sturdy and simple to operate and manufacture.

In addition to my principal object, above stated, I have worked out a number of novel and useful details, which will be readily evident as the description progresses.

My invention consists in the novel parts and in the combination and arrangement thereof, which are defined in the appended claims; and of which one embodiment is exemplified in the accompanying drawings which are hereinafter particularly described and explained.

Throughout the description the same reference number is applied to the same member or to similar members.

Figures 1 to 4 illustrate one embodiment of my invention: a toy tractor shovel comprising a toy tractor and a raisable dipper assembly.

Figure 1 is a side elevation of the tractor shovel in digging position.

Figure 2 is a side elevation of the tractor shovel, raised in dumping position, with a dotted line to indicate the path of the dipper as it is raised.

Figure 3 is a rear elevation, taken along the line 3-3, of Figure 2, showing the tractor shovel in dumping position.

Figure 4 is an isometric rear and side view of the tractor-shovel showing the dipper, the front

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portion of the dipper supporting frame, and the dipper-trip mechanism.

Referring now to Figures 1 and 2, we see that my toy tractor is of the conventional type having a main frame 11 supported by track members 12, simulating creeping traction units, which are attached to rear and front axles 13 and 14 secured to the under part of the main frame. The details of the toy tractor form no part of my invention, and are immaterial except so far as hereinafter discussed. Although a track-tractor is shown, it is obvious that any other type of ground support, such as wheels, can be used.

The dipper assembly, comprising the dipper and its supporting frame, is described and manipulated as follows. Dipper 15 is pivotally supported as at 16 by the front end of the supporting frame. The supporting frame consists of two push arms 17 located above track members 12, one on each side of the tractor, and connected at their forward end by cross piece 18 located across the front of the tractor. The rear end of each arm is pivoted to the upper end of an upwardly projecting link 19 which is pivoted at its lower end on rear axle 13. Each arm is also pivoted to arm 20 of bell crank 21 which is pivotally supported at its elbow 22 by a forward portion of the tractor, as by main frame 11. The other arm 23 of bell crank 21 is pivotally connected to the end of a rod 24, simulating in part a piston rod, which then passes rearwardly through a longitudinal hole in cylinder 25. Cylinder 25 simulates a hydraulic cylinder and is pivoted, as at 26 at the upper end of post 27 which is secured to the tractor, preferably to underlying track member 12. Rod 24 is bent to pass around the back of the tractor, this portion of the rod passing through operating handle 28 which is in the form of a hollow cylinder. Moving the handle backward and forward respectively raises and lowers the dipper along the path indicated by the dotted line in Figure 2, causing the supporting mechanism to function exactly as in a real machine.

Turning now to Figure 4, we see that when dipper 15 is in digging position (Figures 1 and 4), it bears against the front face of cross piece 18; and is locked in this position by hook 29 which is pivoted at 30 to the back of the dipper and engages the top rear corner of cross piece 18. As the dipper is raised from digging to dumping position, hook 29 is kept engaged by gravity, although it is obvious that other retaining means such as a spring or counterweight could also be used for that purpose. When the dipper

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is fully raised to dumping position (Figure 2) hook 29 is released by rotation of shaft 31 which is pivoted on the supporting frame behind cross piece 18 and has an offset cam section 32 that lifts hook 29 off cross piece 18 when the shaft 31 is rotated counterclockwise, thereby freeing the dipper for forward tilting to dump. Forward tilting of the dipper is restricted by dipper pivot ears 33, contacting the back of cross piece 18 (Figure 2). Automatic release of hook 29 for dumping when the dipper is fully raised is effected by cord 34 which is secured at one end to lever arm 35 on shaft 31 and at the other end to a point on the tractor so chosen with respect to the given length of cord that when the dipper is fully raised the cord is taut and actuates lever arm 35 to release hook 29 and at all other times during the digging cycle the cord is slack. Such a point is the pivot connection 36 between bell crank 21 and the end of rod 24, although it is obvious that other convenient points on the tractor will satisfy the above-stated conditions. To insure return of lever arm 35 to inactive position as the dipper is lowered from dumping position and the cord is slack, counterweight 37 is attached to the end of the lever, although other return means such as a spring could obviously be substituted. Guides 38 and 39 on the push arms and tractor respectively serve to keep the cord from dragging on the ground or interfering with working parts when it is slack.

Having now described and illustrated one form of my invention, I wish it to be understood that my invention is not to be limited to the specific form or arrangement of parts herein described and shown.

In the claims, when I use the term "tractor" or "vehicle" I intend indiscriminately any part of the tractor or vehicle as a whole. When I intend any particular part of the tractor or vehicle such as the main frame or the track members, wheels or other ground-engaging means, I so specify.

I claim:

1. In a material-handling device for attachment to a toy tractor, the combination of: two arms, and a material-handling implement attached to the arms; each arm being supported and manipulated by the following described mechanism: a rigid link pivotally supported by the tractor near the rear thereof and pivotally supporting the rear portion of the arm, a second link, pivotally supported by the tractor at a point forward of the first link, and pivotally supporting the arm at a point forwardly of the first link, and hand-operated mechanical means, comprising a cylinder and piston assembly, in simulation of a hydraulic mechanism to raise and lower the arm.

2. A device according to claim 1, further characterized by the fact that the raising and lowering means is applied to the second link to rotate the same and to raise the arm.

3. In a material-handling device for attachment to a toy tractor, the combination of: two arms, and a material-handling implement attached to the arms; each arm being supported and manipulated by the following described mechanism: a rigid link pivotally supported by the tractor near the rear thereof and pivotally supporting the rear portion of the arm, and a bell-crank, with its elbow pivotally supported by the tractor at a point forward of the said link, and having two arms, the first bell-crank arm being pivotally connected to the implement-

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carrying arm at a point forwardly of the link, and the second bell-crank arm being actuated by raising and lowering means, said means being hand-operated and comprising a cylinder and piston assembly in simulation of a hydraulic mechanism.

4. A device according to claim 3, further characterized by the fact that the cylinder and piston assembly is substantially horizontal; and that in lowered position the first bell-crank arm projects rearwardly and the second bell-crank arm projects downwardly.

5. A device according to claim 3, further characterized by the fact that the raising and lowering means for the implement arms are interconnected for common operation.

6. A device according to claim 3, further characterized by the fact that the raising and lowering means comprises: a pair of hollow cylindrical members simulating hydraulic cylinders; a U-shaped rod having arms serving as piston rods for said cylinders; and an operating handle attached to the crossbar of said U-shaped rod for manipulating said arms in unison relative to said cylindrical members.

7. A toy excavator operating mechanism for tilting an excavating implement comprising: a catch connected to the implement for locking it against tilting; a trip for release of said catch; a pair of members respectively simulating a hydraulic cylinder and piston; a handle attached to the piston-like member for slidably manipulating it relative to the cylinder-like member; and tension means connected to the trip and to the manipulated piston-like member whereby the catch is automatically released when the manipulated piston-like member is at one end of its stroke.

8. In a material-handling device for attachment to a toy tractor, the combination of: an implement frame and a material handling implement attached to said implement frame, said implement frame being pivotally supported near the rear thereof by the tractor and being manipulated by the following described mechanism: a bell-crank with its elbow pivotally supported by the tractor at a point forward of the rear pivotal support of the implement frame and having two arms, the first arm pivotally supporting the implement frame at a point forward of the rear pivotal support of said frame, and the second arm being operatively connected to and actuating by the piston portion of hand-operated means comprising a cylinder and piston assembly in simulation of a hydraulic mechanism.

9. A device according to claim 8, further characterized by the fact that the implement frame is pivotally supported near the rear thereof on a rigid link, said link being pivotally supported on the tractor.

10. A device according to claim 8, further characterized by the fact that said hand operated means comprises: a pair of hollow cylindrical members simulating hydraulic cylinders; a U-shaped rod having arms serving as piston rods for said cylinders; and an operating handle attached to the crossbar of said U-shaped rod for manipulating the arms of said rod in unison relative to said cylindrical members.

11. In a material-handling device for attachment to a toy vehicle, the combination of: an implement frame pivotally supported near the rear thereof by the vehicle and manipulated by the following described mechanism: a rigid

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link of fixed length pivotally supporting the implement frame and pivotally supported by the vehicle, both pivot axes of said link being distinct from and forward of the rear pivotal support of the implement frame, said link being actuated to rotate, about its pivotal support on the vehicle, by the piston portion of hand-operated means operatively connected to said link and comprising a cylinder and piston assembly in simulation of a hydraulic mechanism.

12. A device according to claim 11, further characterized by the fact that the implement frame is pivotally supported near the rear thereof on a second rigid link of fixed length, said second link being pivotally supported on the vehicle.

13. A device according to claim 11, further characterized by the fact that said hand oper-

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ated means comprises: a pair of hollow cylindrical members simulating hydraulic cylinders; a U-shaped rod having arms serving as piston rods for said cylinders; and an operating handle attached to the crossbar of said U-shaped rod for manipulating the arms of said rod in unison relative to said cylindrical members.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
830,783	Groesbeck	Sept. 11, 1906
2,345,620	Mork	Apr. 4, 1944