June 22, 1948. B. C. KLINT 2,443,622

TOY LIFT TRUCK

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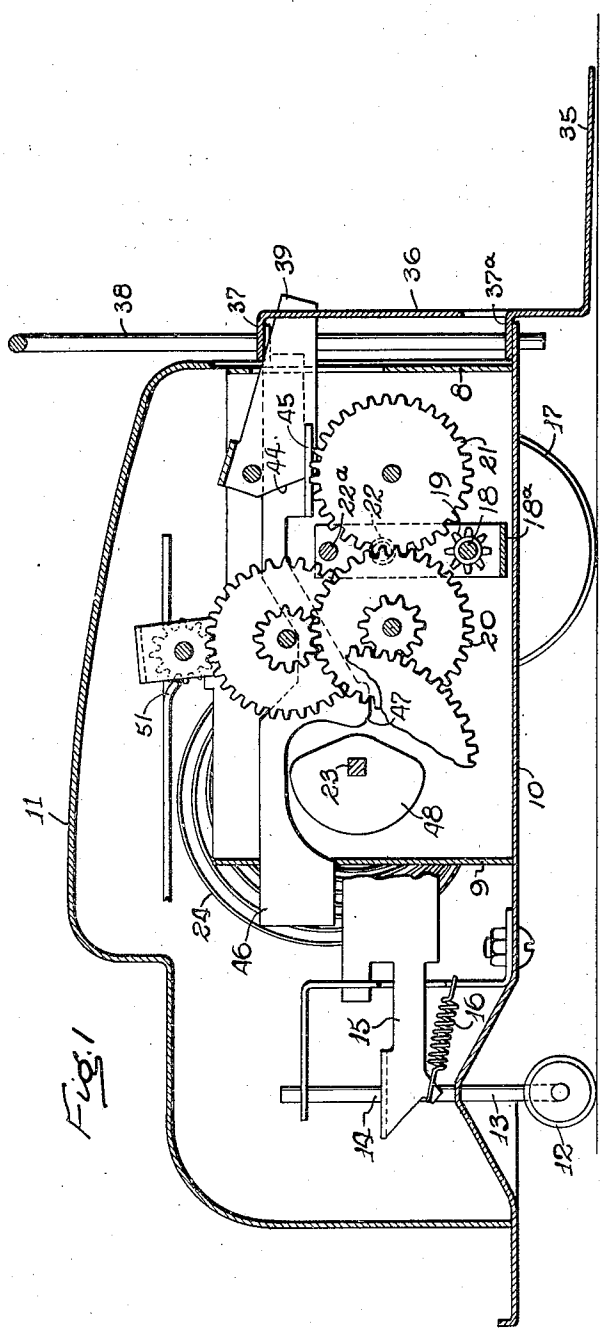


Fig. 1

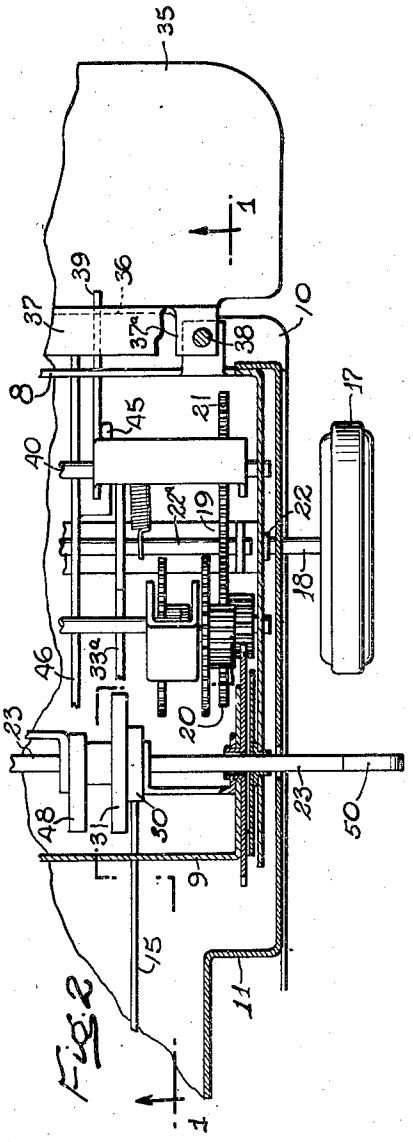


Fig. 2

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Fig. 3

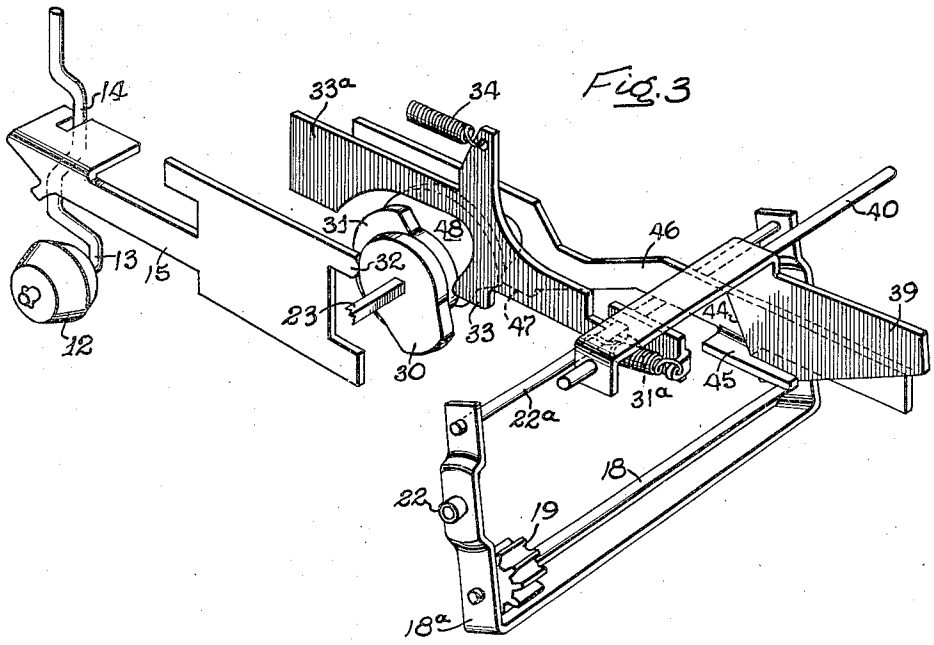


Fig. 4

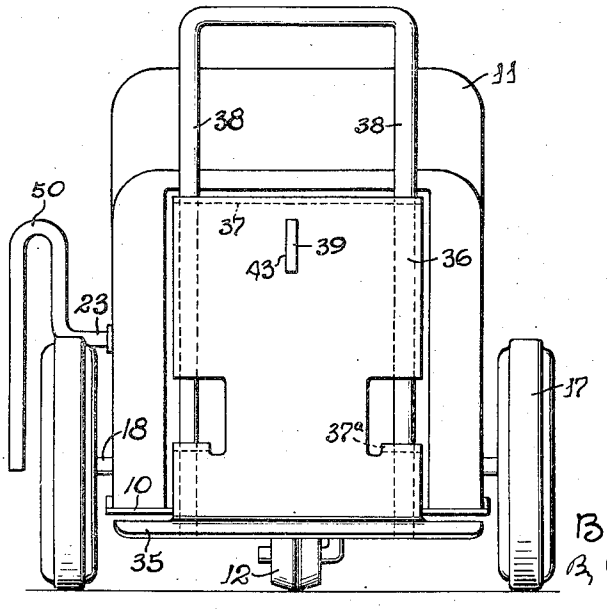
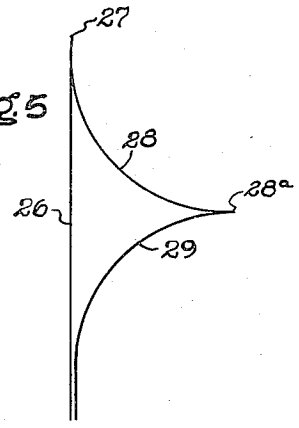


Fig. 5



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TOY LIFT TRUCK

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3 Claims. (Cl. 46—212)

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This invention relates to a vehicle toy having a forwardly projecting platform by which materials may be raised and lowered.

The general object is to provide a toy vehicle in which the platform is actuated to simulate an industrial lift truck.

Another object is to correlate the raising and lowering motions of the lift platform with the motions of the vehicle.

A more detailed object is to provide a toy vehicle which is adapted to be advanced under power, stopped for a predetermined interval and then reversed, and having a lift platform which is maintained in lowered position during the vehicle advance and is raised during the dwell.

The invention also resides in the novel structural character of the mechanism for actuating the lift platform and correlating its motions with that of the vehicle.

Other objects and advantages of the invention will become apparent from the following detailed description taken in connection with the accompanying drawings, in which

Figure 1 is a sectional view of a toy lift truck embodying the novel features of the present invention, the section being taken along the line 1—1 of Fig. 2.

Fig. 2 is a plan section with the vehicle body removed.

Fig. 3 is a fragmentary perspective view of the operating cams and their associated followers.

Fig. 4 is a front elevational view of the lift truck.

Fig. 5 is a view illustrating the path of movement of the vehicle in simulating the action of a lift truck.

The toy lift truck shown in the drawings for purposes of illustration includes a frame or chassis comprising a generally flat sheet metal base 10 with upstanding front and rear plates 8 and 9 enclosed by a body 11 which constitutes a housing for the operating parts. The rear end of the frame is supported by a single wheel 12 on the lower end of a vertical shaft 13 journaled in the frame and formed intermediate its ends with a crank 14 which is pivotally connected to the rear end of a bar 15. The latter is urged forwardly by a spring 16 and guided for endwise reciprocation on the plate 9.

The forward end of the frame is supported by wheels 17 fast on opposite ends of an axle 18 on a cradle 18a which is suspended from a pivot 22 and thus swingable longitudinally of the chassis to engage a clutch pinion 19 with one or the other of two reversely rotating gears 20 and 21

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so as to respectively propel the vehicle forwardly or backwardly. The vehicle is stopped when both clutches are disengaged with the pinion in the neutral position shown in Fig. 1.

The gears 20 and 21 are driven in opposite directions as indicated through speed increasing gearing driven from a main power shaft 23 journaled in side plates of the chassis and rotated by a spring motor including a spiral spring 24 anchored at one end to the shaft 23 and at the other end on the vehicle frame.

The steering mechanism and the reversing clutches are actuated selectively and in timed relation to cause the vehicle to traverse a predetermined path which in this instance comprises a straight forward advance 26 of the vehicle (Fig. 5), stopping of the vehicle at 27 for a predetermined time interval, reversing of the vehicle along a curve 28 followed by forward advance of the vehicle along a curve 29 into parallelism with the original path 26. This pattern is produced by cams 30 and 31 of the open face type fast on and exially spaced along the shaft 23. The periphery of the cam 30 bears against a follower 32 on the forward end of the slide 15 which actuates the steering wheel 12. A follower 33 (Fig. 3) is urged by a spring 34 into engagement with the periphery of the clutch cam 31. This follower is on a bar 33a guided in the plates 8 and 9 and its forward end is connected at 31a to a shaft 22a of the forward and reverse clutches. By shaping the cams 30 and 31 in the manner shown in Fig. 3, the vehicle will traverse the pattern shown in Fig. 5 during each revolution of the cam shaft 23.

Projecting forwardly from the front end of the vehicle is a horizontal platform 35 which is formed as a flange on a vertical plate 36 having reversely bent lugs 37a and a flange 37 which are guided on vertical rods 38 fixed to the vehicle frame in front of the body 11, the flange 37a bearing downwardly on the plate 10 to limit the downward movement of the platform 35 to a position close to the surface supporting the vehicle. The arm 39 projects forwardly from a supporting pivot 40 which extends transversely of the vehicle between the side plates. The forward or free end of the arm projects through the frame plate 8 and into a slot 43 in the plate 36 of the lift platform. A surface 44 on the arm 39 depending from the pivot 40 is engaged by a lug 45 on the forwardly projecting end of a bar 46 guided at opposite ends in the plates 8 an 9 and having formed thereon a follower 47 (Fig. 1). The latter is adapted to bear against the periph-

ery of a cam 48 fast on the shaft 23 and shaped as shown in relation to the cams 30 and 31 so as to move the follower 47 forwardly when the vehicle is dwelling at the point 27, thereby raising the platform 35 as permitted by a depression on the cam 48.

In operation of the toy, the spring 24 is wound up by turning the handle 50 (Fig. 4) on the outwardly projecting end of the shaft 23, the gears being held blocked against turning by a retractable stop 51 (Fig. 1). The handle 50 is left in the vertical position as shown in Fig. 4, thereby positioning the cam shaft to start the cycle with the platform in raised position. The cams 30 and 31 are then positioned for straight forward advance of the vehicle which occurs upon retraction of the stop 51. During the advance of the vehicle the cam 48 becomes effective to allow the follower 47 to move rearwardly and thereby lower the platform 35 to the position shown in Fig. 1. After traversing the straight path 26, the vehicle dwells at 27, during which the cam 48 becomes effective to project the follower 47 forwardly and raise the platform 35. About this time, the cam 30 shifts the follower 15 to turn the steering wheel preparatory to turning along the path 28 when the reverse clutch is engaged by the cam 31. After backing of the vehicle to the point 28^a, the cams 30 and 31 become effective to condition the steering wheel 12 for a left turn and to engage the forward clutch 19, 20, thereby causing the vehicle to advance along the curve 29 and into parallelism with the path 26 whereupon the cam 30 again turns the steering wheel 12 to the straight forward position. The cycle is thus completed in one revolution of the cam shaft 23.

By timing the motions of the vehicle and the actuation of the lift platform in the manner described above, it will be seen that the action of an ordinary lift truck is simulated closely. At the same time, the parts for effecting the various motions are formed largely as simple stampings and yet are adapted to operate reliably in service use.

I claim as my invention:

1. A toy lift truck vehicle comprising a vehicle frame, wheels supporting the frame to roll along a supporting surface, a power actuator on said frame having a rotary shaft, clutch mechanism selectively operable to connect said actuator to one of said wheels to propel the vehicle forwardly and backwardly, steering mechanism, cam means on said shaft operable during rotation of the latter to actuate said clutch and steering mechanism and cause the vehicle to advance, stop for a predetermined interval, reverse and then advance again, a horizontal platform projecting forwardly from said frame and mounted thereon for vertical movement from a lowered position adjacent the supporting surface, and means including a cam on said shaft operable in timed relation to the movements of the vehicle to maintain the platform in said lowered position during said first advance movement, to raise the platform while the vehicle is stopped, and then to maintain the platform in raised position during the succeeding reverse and advance movements of the vehicle.

2. A toy lift truck vehicle comprising a vehicle frame, wheels supporting the frame to roll along a supporting surface, a power actuator on said frame having a rotary shaft, mechanism for steering the vehicle, clutch mechanism for connecting said actuator to one of said wheels to propel the vehicle forwardly or reversely or to

cause the vehicle to stop, a horizontal platform projecting forwardly from said frame and mounted thereon for vertical movement from a lowered position adjacent the supporting surface, separate cams on said shaft, and followers operated by the respective cams to actuate said steering and clutch mechanisms, and to raise and lower said platform in timed relation.

3. A toy lift truck vehicle comprising a vehicle frame, wheels supporting the frame to roll along a supporting surface, a rotary power actuator on said frame, means driven by said actuator to propel the vehicle and cause the same to advance a predetermined distance, stop for a predetermined interval, and then reverse, a horizontal platform projecting forwardly from said frame and mounted thereon for vertical movement from a lowered position adjacent the supporting surface, and means operated by said actuator in timed relation to the movements of the vehicle to maintain the platform in said lowered position during said advanced movement and raise the platform while the vehicle is stopped.

4. In a toy lift truck vehicle of the class described, a frame, a power driven shaft mounted on said frame, wheels supporting said frame, one being driven from said shaft to propel the vehicle, means driven by said shaft to control the pattern of the path traversed by said vehicle, a lift element mounted on the front of said frame for up and down movement, and means actuated from said shaft and operable to raise and lower said lift element in timed relation to the changing motions of the vehicle.

5. In a toy vehicle of the class described, a wheeled frame, a vertically extending member mounted on one end of said frame for vertical sliding movement, a horizontal outwardly projecting flange on the lower end of said member constituting a lifting platform, an arm mounted on said frame to swing about a pivot extending transversely of the frame, the free end of said arm engaging said member, a follower mounted on said frame to slide longitudinally thereof and engageable with said arm to rock the latter when the follower is moved forwardly and rearwardly, a power rotated shaft on said frame, and means driven by said shaft for reciprocating said follower.

6. In a toy vehicle of the class described, a wheeled frame, a vertically extending member mounted on one end of said frame for vertical sliding movement, a horizontal outwardly projecting flange on the lower end of said member constituting a lifting platform, an arm pivotally mounted on said frame and engaging said member at its free end, a power rotated shaft on said frame, and cam means rotatable with said shaft to move said arm in opposite directions and hold the arm in either of two spaced limit positions.

7. A toy lift truck comprising a wheeled frame, a lifting platform mounted on one end of said frame for vertical movement, a power rotated shaft on said frame, means driven from said shaft to propel the vehicle along a supporting surface, and means actuated from said shaft and operable to effect raising and lowering of said platform in timed relation to the motion of the vehicle.

8. A toy lift truck comprising a wheeled frame, a lifting platform mounted on one end of said frame for vertical movement, a power rotated shaft on said frame, cam means rotatable with said shaft, a follower for said cam means movably mounted on said frame, and means actuated

by said follower and operable to raise said platform relative to the vehicle upon movement of the follower in one direction and to lower the platform during reverse movement of the follower.

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