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(54) **WATER-POWERED TOYS**

(57)

ABSTRACT

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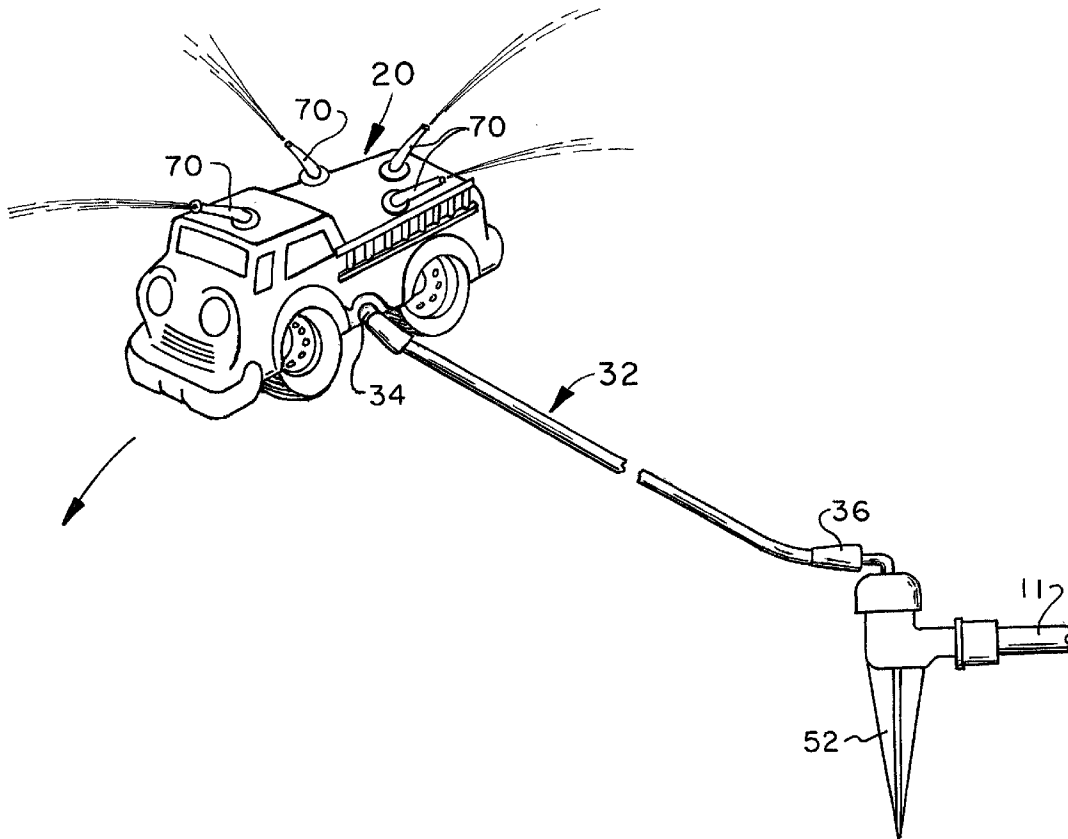
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A ground-engaging toy vehicle powered by water flowing from a garden hose. The hose is connected to a stationary portion of a stake that serves as a center of revolution for the tethered vehicle. The water leaves the stationary portion of the stake into a rotary portion, traversing through a plastic tube that serves as a tether into an impeller housing. The impeller is attached to the drive shaft that is, in turn, attached through a reduction gear box and a series of pulleys and drive belt to the four wheels of the vehicle. After the water stream of the hose has partially exhausted its energy driving the wheels, it is discharged from the impeller housing to a plurality of fluid exhaust ports to provide one or more water sprays for kids to run through. In the preferred embodiment, the toy vehicle is configured as a fire truck.



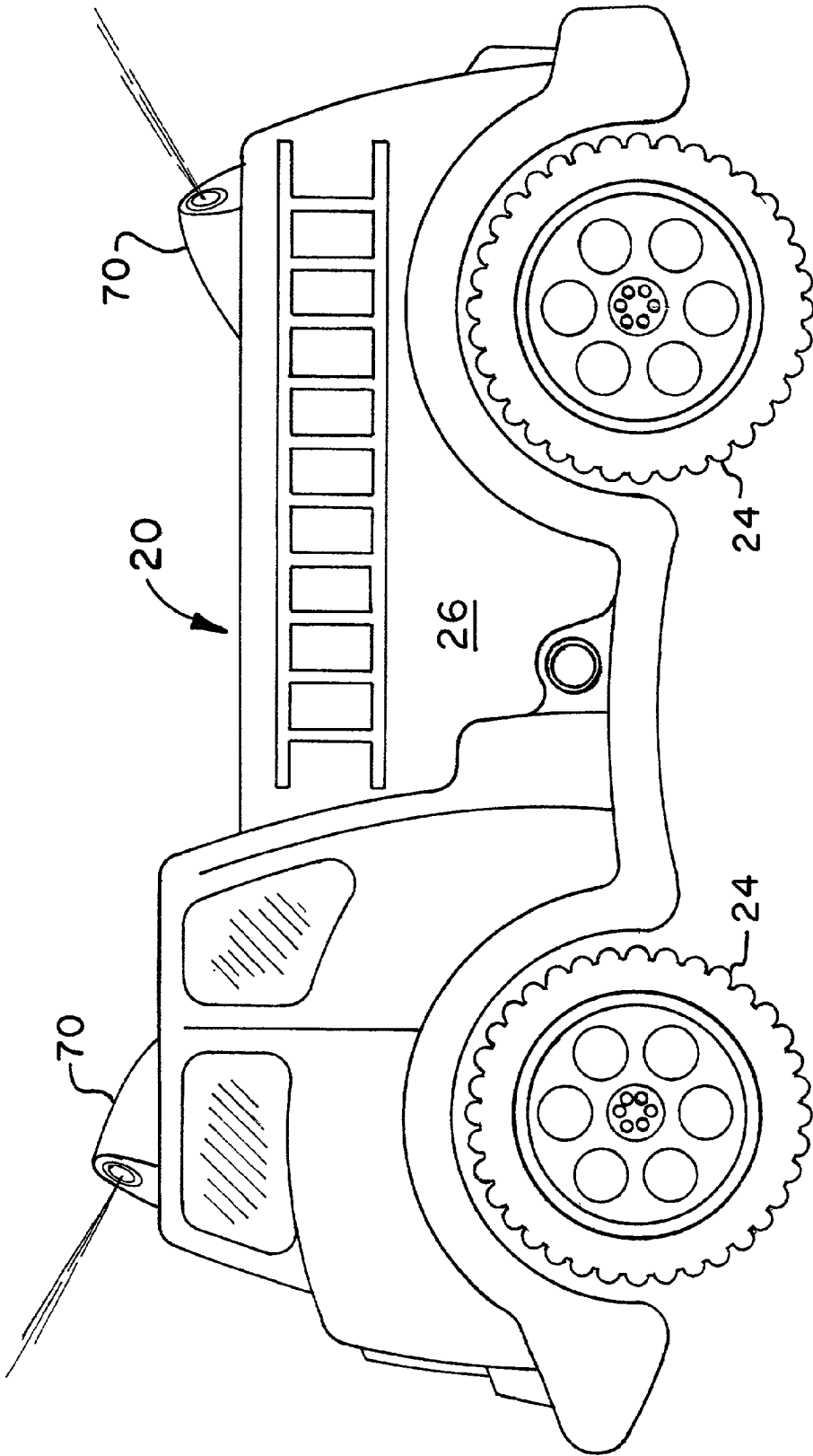
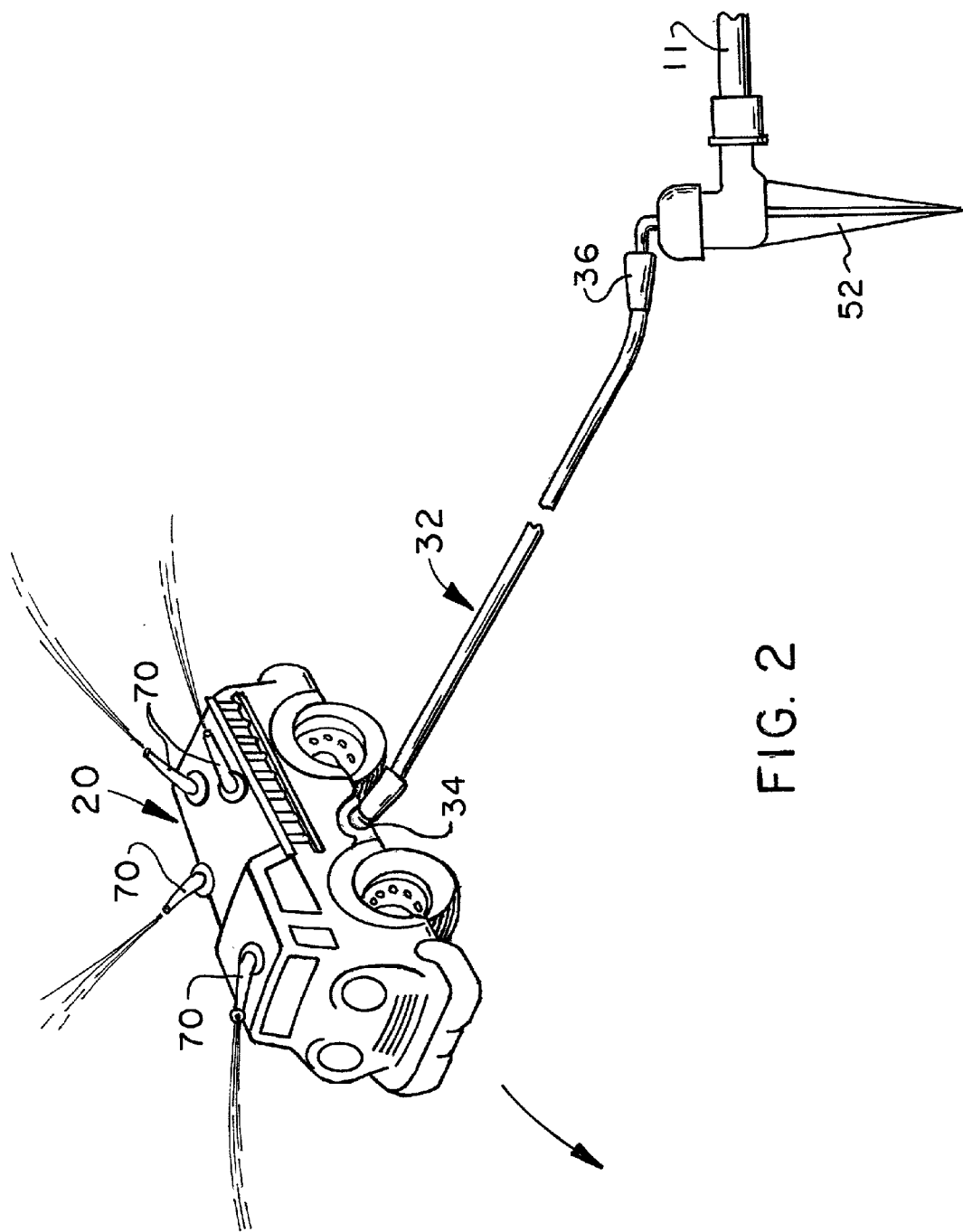


FIG. 1



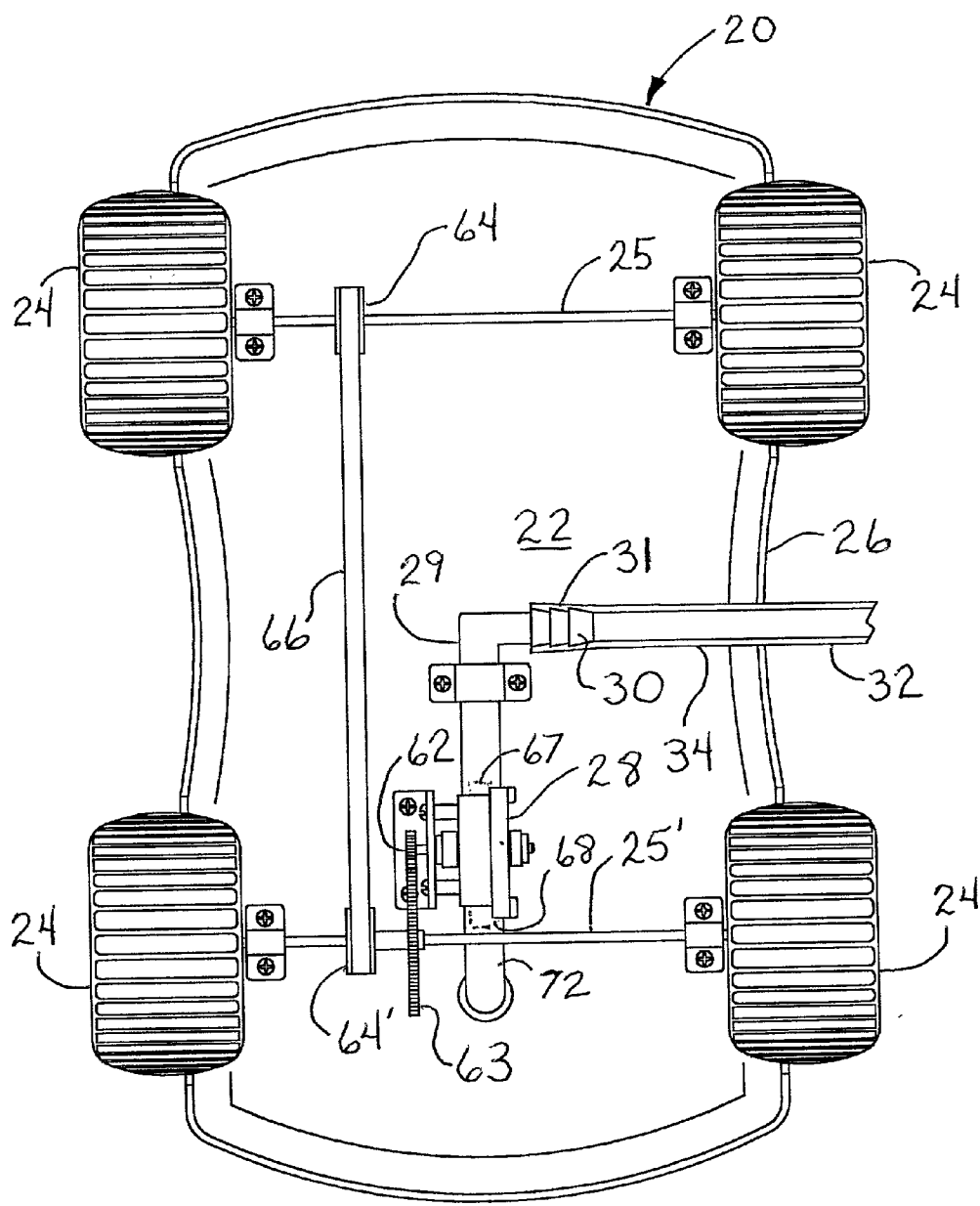
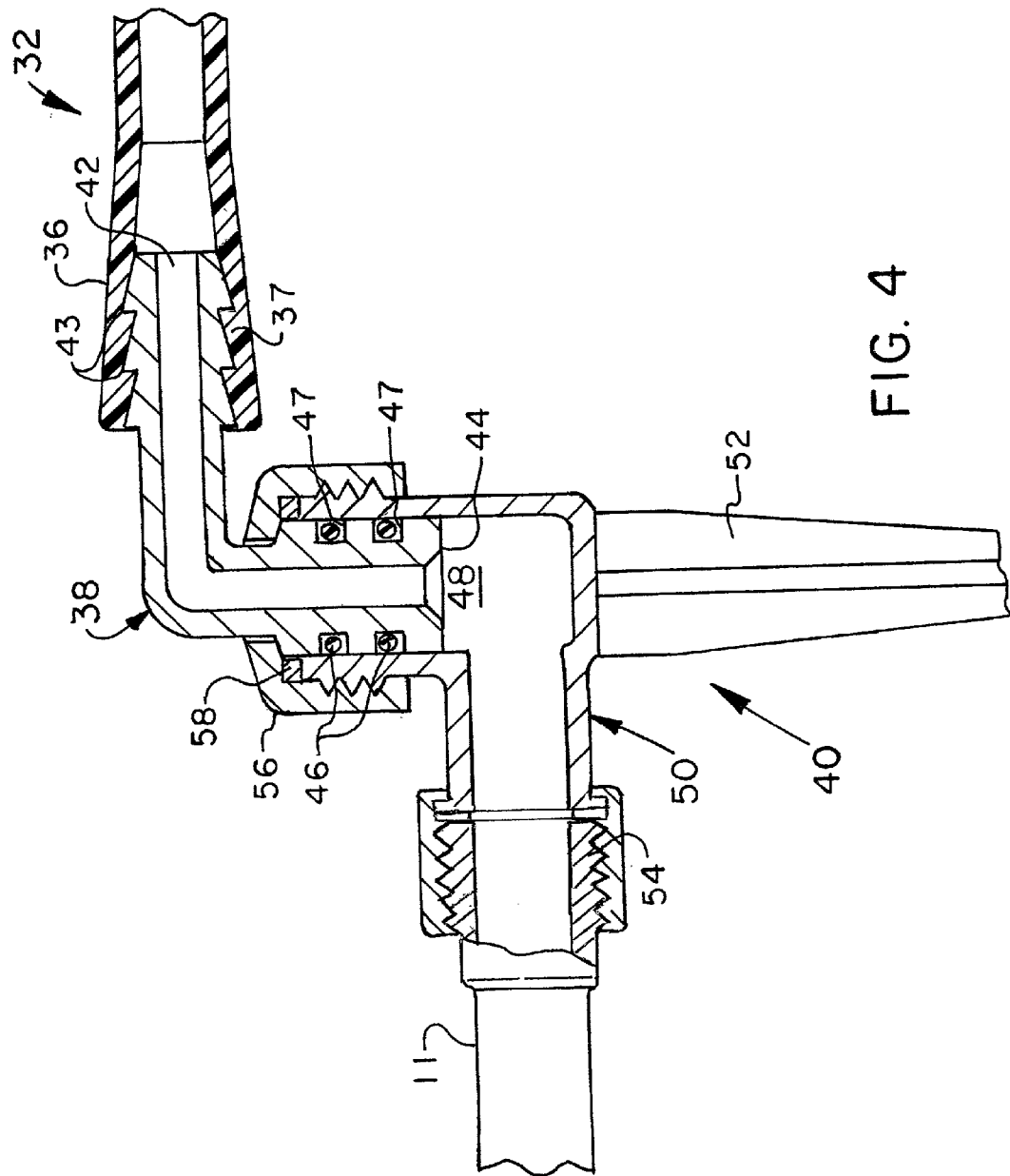


Fig. 3



WATER-POWERED TOYS

BACKGROUND AND SUMMARY OF THE INVENTION

[0001] The present invention is directed to water-powered toys. More particularly, the present invention is directed to a ground-engaging vehicle such as a fire truck, animal, or the like, which has an impeller powered by the water pressure of a hose that is drivably connected to at least one of the axles to cause the tethered toy to rotate around a stake, the water being discharged from at least one sprinkler location on the toy to provide (a) water stream(s) through which children can run.

[0002] Kids have been splashing for fun for years. Dating from way back when, kids have splashed in the discharge of a fire hydrant. More recently, children have enjoyed romping through sprinklers to cool off in the summer heat. Various types of water toys have been developed to enhance kids' fun with water. It is the purpose of the present invention to develop a water-powered toy that can enable children to enjoy playing with a toy and splashing through the water at the same time. The present invention is a water-powered toy that uses the water pressure from a garden hose to power the toy by rotating a rotary impeller attached to the ground-engaging members of the toy and discharging the effluent from one or more fluid exhaust ports to provide a sprinkler for the kids. In the preferred embodiment, the toy is a fire truck and four hoses provide sprinkling of the discharge from the rotary impeller. The toy is attached to a stake by means of a tether such that the sprinkled water is spread over a large area rather than saturating a single spot, as in the case of a stationary water source.

[0003] The present invention comprises a chassis, a plurality of ground-engaging members mounted on and supporting said chassis, a body supported by the chassis, an impeller housing being mounted on the chassis, a rotary impeller mounted within the impeller housing for converting linear motion into rotary or intermittent motion, connection means for a garden hose for conveying a flow stream having linear motion into contact with said rotary impeller, means to connect the rotary impeller to at least one of the plurality of wheels for rotation therewith; whereby the flow stream of water emanating from the garden hose impacts the rotary impeller driving said at least one of the ground-engaging members. The water-powered toy or the present invention further includes a stake positionable within a ground portion, a tether having a first end rotationally secured to said stake and a second end secured to a portion of said chassis such that the water-powered toy revolves around the stake.

[0004] The connection means of the present water-powered toy comprises a length of flexible tubing interconnected between the stake and the body, and a hose connector on the stake, the length of tubing forming the tether, such that the flow stream of water enters the hose connector on the stake, flows through the length of tubing and into the impeller housing. The toy further comprises at least one discharge port formed on the impeller housing, connecting means attaching the at least one discharge port to a plurality of fluid exhaust ports, such that the flow stream of water exits the impeller housing, is subdivided and sprinkled through the plurality of fluid exhaust ports. Preferably, the tether is rotationally secured to the stake by a sealing bearing mem-

ber. Further, it is desirable that the rotary impeller be connected to all of the plurality of wheels. It is desired that the rotary impeller be connected to the wheels through a reduction gear box to enable the vehicle to be slowed to a reasonable speed. It is an optional feature that there be at least two speeds, a slow speed and a fast speed, from which the kids can choose through a flip of a switch.

[0005] Various other features, advantages and characteristics of the present invention will become apparent to one of ordinary skill in the art after a reading of the following specification.

BRIEF DESCRIPTION OF THE DRAWINGS

[0006] The preferred embodiment(s) of the present invention is/are described in conjunction with the associated drawings in which like features are indicated with like reference numerals and in which

[0007] FIG. 1 is a side view of a first embodiment of the water-powered toy of the present invention;

[0008] FIG. 2 is a perspective view of the first embodiment showing each of the elements;

[0009] FIG. 3 is a bottom view of the first embodiment showing the drive train with parts broken away for clarity; and

[0010] FIG. 4 is a cross-sectional side view of the water supply stake used in the first embodiment.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENT(S)

[0011] A first embodiment of the water-powered toy of the present invention is shown in FIGS. 1-3 generally at 20. Water-powered toy 20 comprises a chassis 22 and two pairs of ground-engaging members 24 (in this embodiment, wheels), one pair each mounted on axles 25, 25' respectively, axles 25, 25' being rotationally attached to chassis 22. Body 26 is supported on chassis 22 and, in this embodiment, is depicted as a fire truck but, as will be appreciated may take other ground-engaging vehicle configurations, as well. Further, the body 26 may be, and preferably is, made integral with the chassis 22. Impeller housing 28 is mounted on chassis 22, shown in FIG. 3 as mounted on the underside of the chassis 22 for ease of illustration but, where the chassis 22 and body 26 are separate, housing 28, preferably, will be mounted above the chassis 22 surrounded by portions of body 26.

[0012] A rotary impeller (not shown) of conventional design is housed within impeller housing 28 and is used to convert linear motion of the water stream in garden hose 11 (FIG. 2) into rotary motion of the impeller and, eventually, one or more of wheels 24. As shown in FIG. 3, chassis 22 is equipped with a short length of hose 29 having a hose barb 30 which is engaged by complementary shaped fixture 31 to attach a first end 34 of a length of plastic tubing 32 thereto. It will be appreciated that alternative means, could be employed to provide a water-tight seal between the tubing 32 and stem 30. Opposite end 36 of tubing 32 is secured to a rotary portion 38 of ground-engaging stake 40.

[0013] Impeller housing 38 has one input port 67 and at least one discharge port 68. Discharge port(s) is/are connected to fluid exhaust ports 70 depicted in this embodiment

as fire hose nozzles by connecting means 72. It will be appreciated that connecting means 72 could comprise a single hose that split twice to provide fluid flow to the four fluid exhaust ports 70 as shown here or, alternatively, if impeller housing 38 was fashioned with four discharge ports 68, each fluid exhaust port 70 could have its own dedicated connecting means 72. If impeller housing 38 were equipped with two discharge ports 68, each connecting means could be split once to supply two exhaust ports 70. Once the water from hose 11 has imparted the bulk of its momentum to the impeller within housing 38, it is sprinkled out of fluid exhaust ports 70 so that the kids can enjoy its cooling spray.

[0014] As shown in FIG. 4, opposite end 36 of tubing 32 is equipped with a fixture 37 that can be axially pushed onto hose barbs 43 to sealingly engage protruding end 42 of rotary portion 38. Rotary portion 38 is formed as an L-shaped member with the other end 44 of member 38 being received in fluid passageway 48 of ground-engaging stake 40. A pair of O-rings 46 are received in recesses 47 to form a bearing that can effect sealing engagement that permits relative rotation between rotary portion 38 and stationary portion 50. Stationary portion 50 has a ground-entering taper 52 that is cruciform in cross section and a connection 54 to which garden hose 11 may be attached. Cap 56 threads onto an outer portion of fluid passageway 48 with gasket 58 cooperating with O-rings 46 to provide a fluid tight connection.

[0015] Drive shaft 60 transmits rotational force from the impeller in housing 28 to at least one wheel 24 and, preferably to all four, through reduction gears 62 and 63. Gears 62 and 63 reduce the rotational rate of wheels 24 from that produced by the impeller. Stub (or auxiliary) shaft 67 which exits gear box 62 has pulley 64' mounted thereon. Pulleys 64 and 64' are mounted on axles 25 and 25', respectively, and interconnected by drive belt 66 to transmit rotational drive from axle 25' to axle 25.

[0016] In operation, hose 11 is attached to stake 40 and its taper 52 pushed into a ground portion. Plastic tubing 32 is clipped to hose barbs 43 on the rotary portion 38 of stake 40 and onto barb 30 on body 26 of water-powered toy 20. Plastic tubing 32 serves as both a conduit for water flow from hose 11 to impeller housing 28 and a tether for maintaining the toy 20 attached to the stake 40, allowing the ground-engaging toy 20 to revolve around stake 40. When the spigot to which hose 11 is attached is turned on, water will flow through connection 54 into stake 40, through rotary portion 38 and tubing 32 into impeller housing 38 driving wheels 24 through reduction gears 62 and 63, pulleys 64 and 64', and drive belt 66. The water flows out of impeller housing 28 through discharge port 68 into connecting means 72 and is sprinkled/sprayed out fluid exhaust ports 70 providing one or more streams of water for the kids to romp through.

[0017] Various changes, alternatives and modifications will become apparent to one of ordinary skill in the art following a reading of the foregoing specification. For example, although the body 26 has been described as a fire truck, obviously it could take other forms such as the body of an animal, a hippopotamus or crocodile for example. In such an instance, the rotary impeller could be connected to the ground-engaging members (feet) through linkages or cams to effect sequential movement of the limbs to drive the

animal forward. It is intended that any such changes, alternatives and modifications as fall within the scope of the appended claims be considered part of the present invention.

I claim:

1. A water-powered toy comprising

- a) a chassis;
- b) a plurality of at least three ground-engaging members mounted on and supporting said chassis;
- c) a body attached to said chassis;
- d) an impeller housing being mounted on said chassis;
- e) a rotary impeller mounted within said impeller housing for converting linear motion into rotary motion;
- f) connection means for a garden hose for conveying a flow stream having linear motion into contact with said rotary impeller;
- g) means to connect said rotary impeller to at least one of said ground-engaging members for movement thereof;

whereby the flow stream of water emanating from the garden hose impacts said rotary impeller driving said at least one of said ground-engaging members.

2. The water-powered toy of claim 1 further comprising a stake having a first stationary portion positionable within a ground portion, a second rotary portion with a tether having a first end connected to said rotary portion and a second end secured to a portion of said body such that said water-powered toy revolves around said stake.

3. The water-powered toy of claim 2 wherein said connection means comprises

- i) a length of tubing interconnected between said stake and said body, and
- ii) a hose connector on said stationary portion of said stake,

said length of tubing forming said tether, such that the flow stream of water enters said hose connector on said stake, flows through said length of tubing and into said impeller housing.

4. The water-powered toy of claim 3 further comprising at least one discharge port formed on said impeller housing, connecting means attaching said at least one discharge port to a plurality of fluid exhaust ports mounted on said body, such that the flow stream of water exits said impeller housing being subdivided and is sprinkled through said plurality of fluid exhaust ports.

5. The water-powered toy of claim 4 wherein said at least one discharge port comprises two discharge ports and each of said two discharge ports, in turn, distributes the flow stream to two fluid exhaust ports.

6. The water-powered toy of claim 1 wherein said means to connect said rotary impeller to said at least one of said ground-engaging members connects said rotary impeller to all of said ground-engaging members.

7. The water-powered toy of claim 6 wherein said means to connect said rotary impeller to all of said ground-engaging members further comprises a reduction gear box.

8. The water-powered toy of claim 7 wherein said ground-engaging members comprise a plurality of four wheels.

9. The water-powered toy of claim 7 wherein said means to connect said rotary impeller to all of said ground-engaging members further comprises a pair of axles each mount-

ing a pair of said plurality of wheels and an auxiliary shaft extending from said reduction gear box.

10. The water-powered toy of claim 8 wherein said means to connect said rotary impeller to all of said plurality of wheels further comprises three pulleys, one attached to each of said pair of axles and one attached to said auxiliary shaft, said three pulleys being interconnected by an endless drive belt.

11. The water-powered toy of claim 1 wherein said body is integral with said chassis.

12. The water-powered toy of claim 11 wherein said body is configured as a fire truck.

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