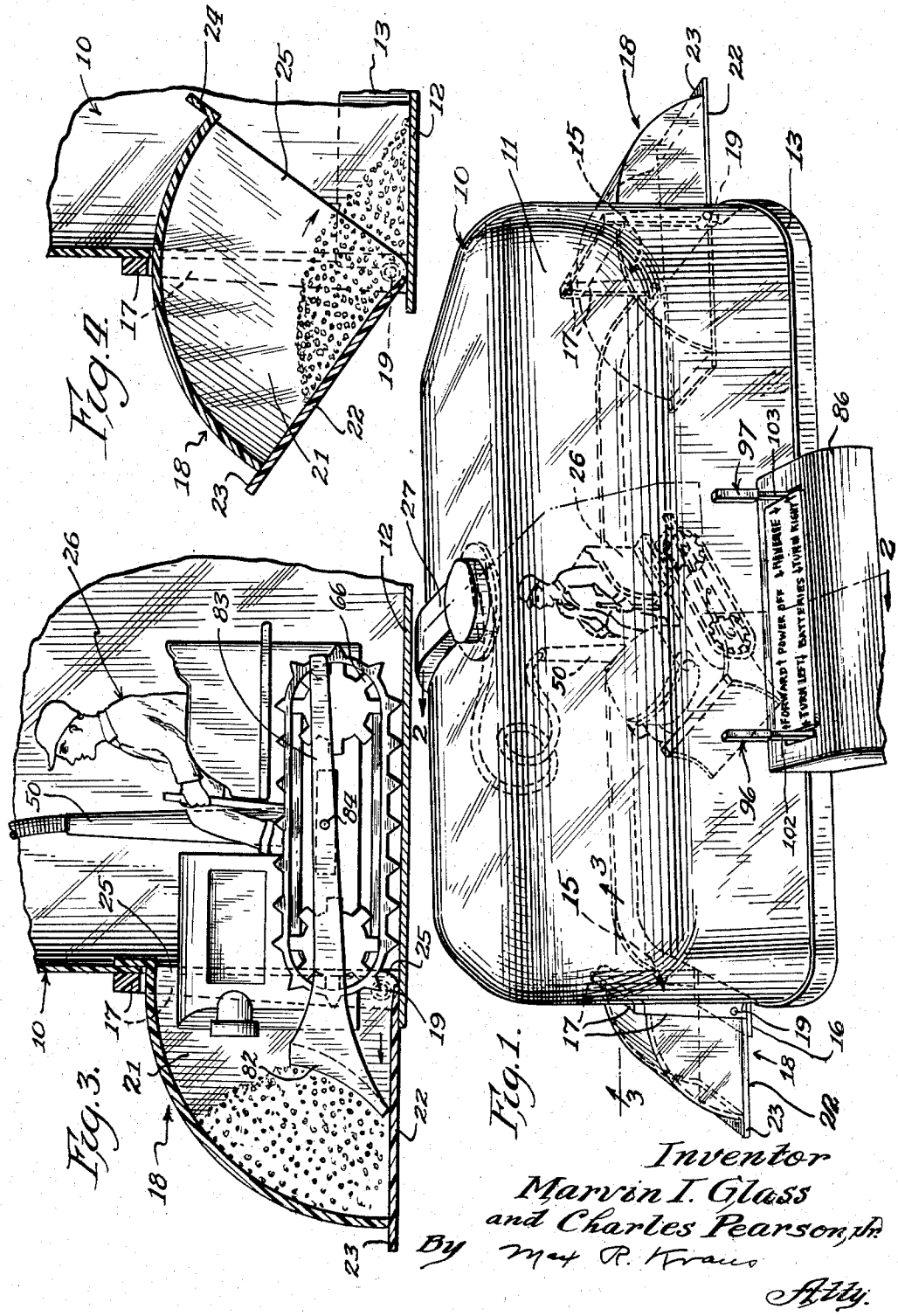
July 28, 1959 M. I. GLASS ET AL 2,896,367

REMOTELY CONTROLLED TOY VEHICLE

Filed Dec. 28, 1956 5 Sheets-Sheet 1



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Fig. 5.

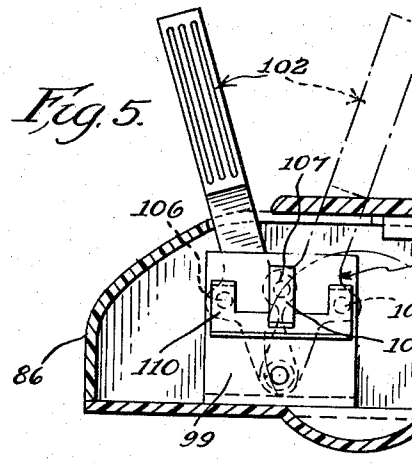


Fig. 6.

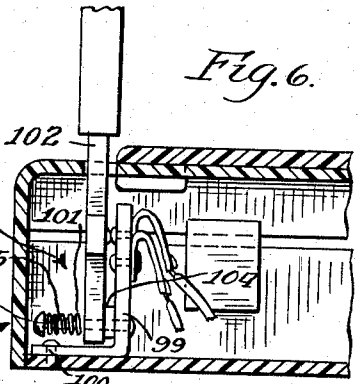


Fig. 2.

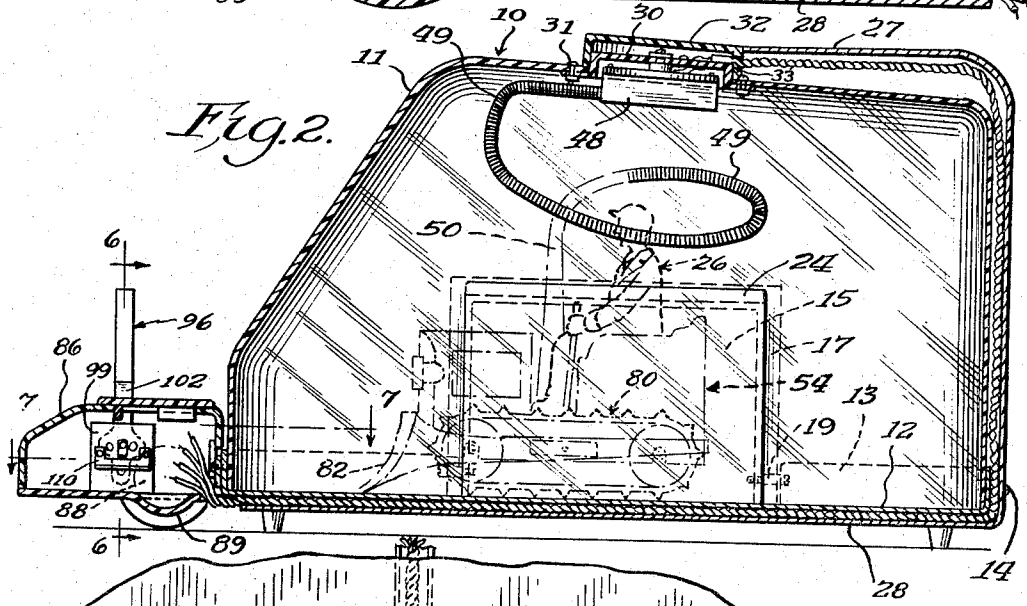
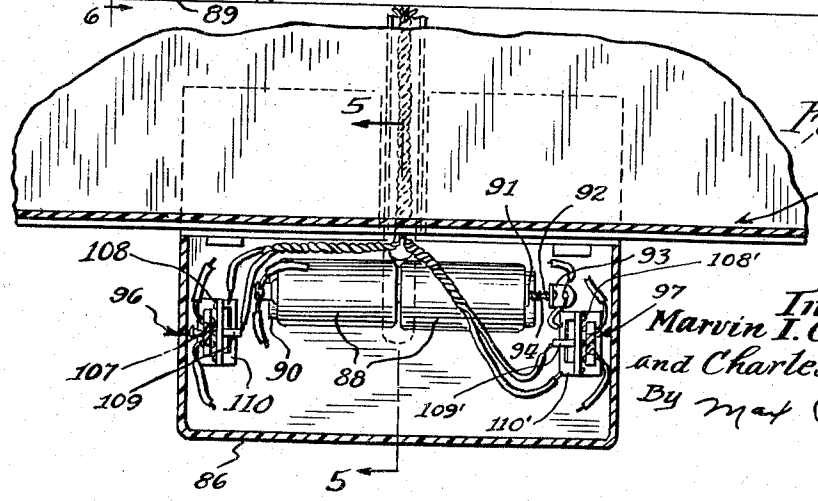


Fig. 7.



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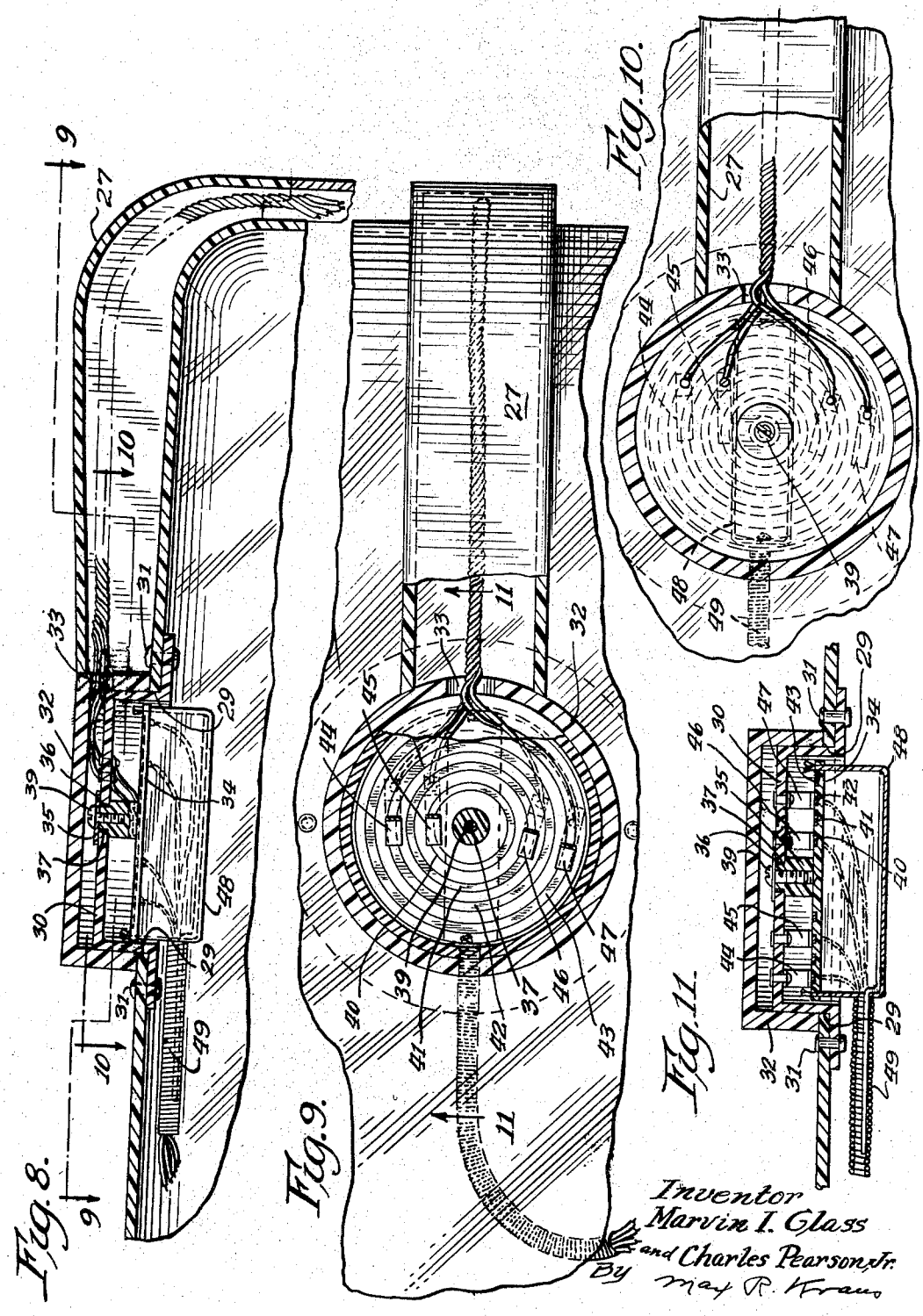
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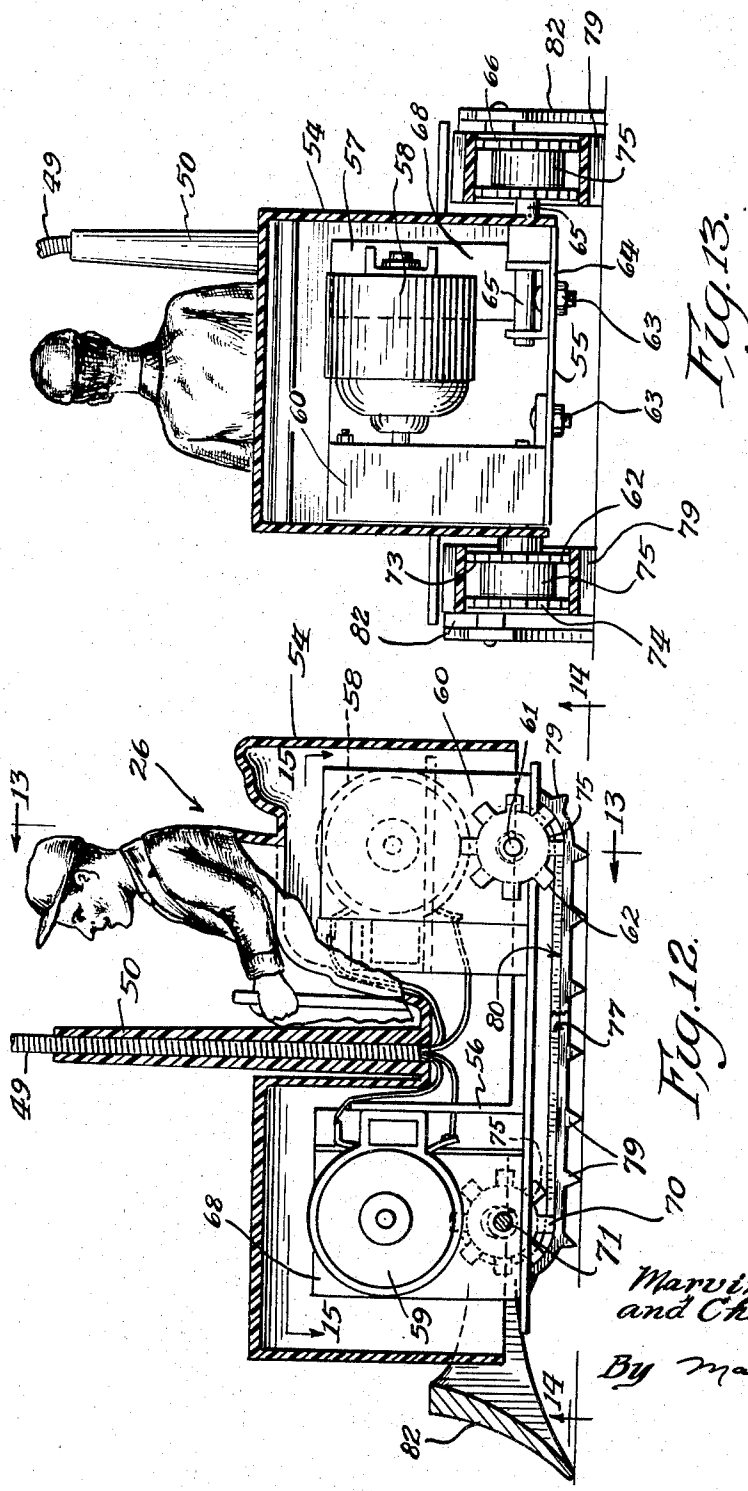


Fig. 13.

Fig. 12.

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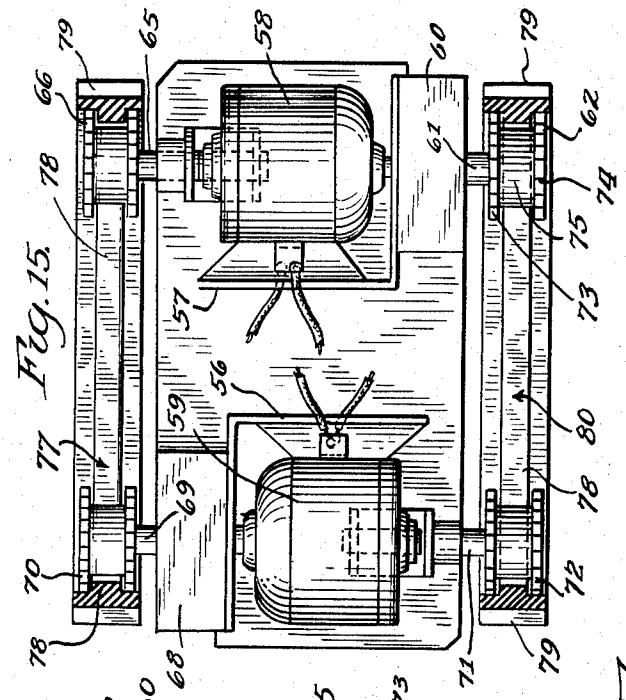


Fig. 15.

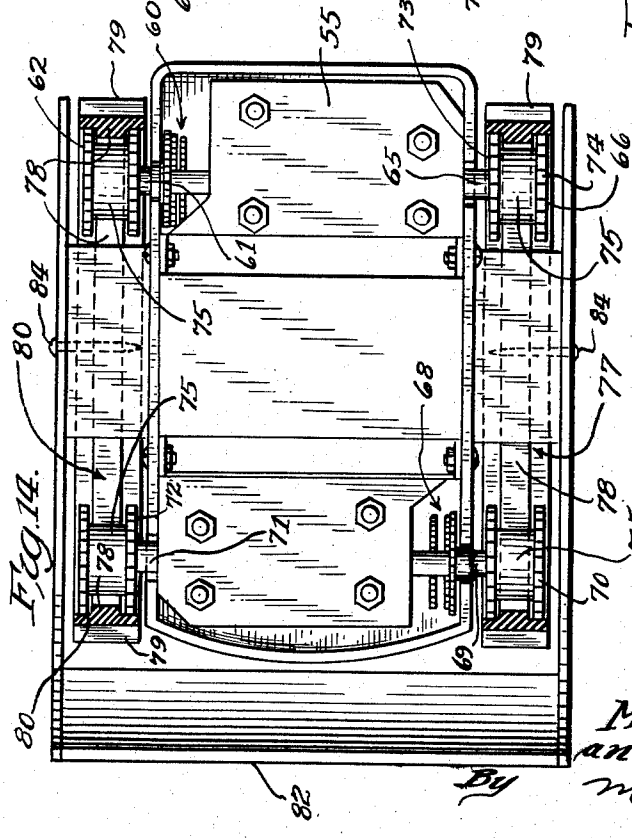


Fig. 14.

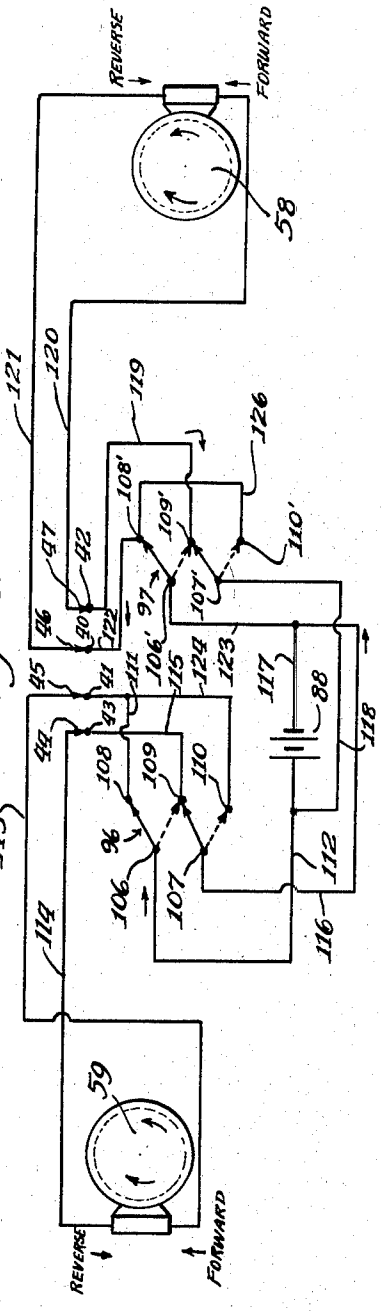


Fig. 16.

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2,896,367

REMOTELY CONTROLLED TOY VEHICLE

Marvin I. Glass, Chicago, and Charles Pearson, Jr., Elmhurst, Ill.

Application December 28, 1956, Serial No. 631,079

6 Claims. (Cl. 46—40)

This invention relates to an electrically operated toy.

One of the objects of this invention is to provide a self contained structure comprising a transparent housing or shell in which is contained a movable toy vehicle which is electrically operated by manual control means mounted exteriorly of the housing for moving said toy vehicle in said housing in controlled directions.

Another object is to provide a toy of the foregoing character in which the toy vehicle as it moves pushes an object or material simulating the actions of a bulldozer.

Another object is to provide a toy having a transparent enclosure in which is contained a granular material and a toy bulldozer, which bulldozer is operated by control means exteriorly of the enclosure to move said granular material. Said toy being self-contained and highly portable so that it may be readily moved from place to place without spilling any of the granular material from the enclosure and without doing damage to the toy.

Other objects will become apparent as this description progresses.

In the drawings:

Fig. 1 is a perspective view of the toy.

Fig. 2 is a cross sectional view taken on lines 2—2 of Fig. 1.

Fig. 3 is an enlarged view partly in cross section taken on lines 3—3 of Fig. 1.

Fig. 4 is a cross sectional view of the dumping bin in position for returning the material to the shell housing.

Fig. 5 is a view taken on lines 5—5 of Fig. 1.

Fig. 6 is a view taken on lines 6—6 of Fig. 2.

Fig. 7 is a plan view taken on lines 7—7 of Fig. 2.

Fig. 8 is an enlarged sectional view similar to the upper portion of Fig. 2.

Fig. 9 is a view taken on lines 9—9 of Fig. 8.

Fig. 10 is a view taken on lines 10—10 of Fig. 8.

Fig. 11 is a sectional view taken on lines 11—11 of Fig. 9.

Fig. 12 is a longitudinal view partially in cross section of the toy tractor.

Fig. 13 is a view taken on lines 13—13 of Fig. 12.

Fig. 14 is a bottom plan view of the tractor taken on lines 14—14 of Fig. 12.

Fig. 15 is a view taken on lines 15—15 of Fig. 12; and

Fig. 16 is a schematic view of the electrical circuit.

The toy includes a portable transparent plastic shell or housing 10 having an inclined front wall 11. The open bottom of the shell is closed by a bottom member 12 which has a peripheral upstanding flange 13 secured to the shell by fastening elements 14. The opposite ends of the shell are provided with enlarged openings 15 which have an outwardly extending ledge or lip 16. The sides and top and the opening are bounded by a frame 17. An end dumping bin generally indicated at 18 is pivotally secured as at 19 to the sides of the frame 17 to close the openings 15 of the shell. The

dumping bin which is in the shape of a quadrant has curved arcuate shaped side walls 21 and a bottom 22 which extends beyond the arcuate shaped top to provide a lip portion 23. The inner ends of the top and side members are also provided with outwardly extending lips 24 which engage the inside of the shell wall adjacent the opening when the dumping bin is in its horizontal position. As best shown in Figs. 1, 3, and 4 the dumping member communicates with the interior of the shell through the open end 25 of the dumping member and while in the position shown in Figs. 1 and 3 can receive any of the material which the tractor pushes into same. To return the material back to the shell the dumping member is tilted as shown in Fig. 4.

Contained within the shell is a toy tractor or bulldozer generally indicated at 26 which is electrically connected through a flexible cable containing the conducting wire to a control box mounted on the front of the shell housing. By manipulating the levers on the control box operation of the toy tractor or bulldozer is controlled so that it moves about in the shell housing to push the material such as cork particles or sand within the shell to any desired positions or within the dumping bins, where it may be dumped back. The entire toy is self-contained and is portable in nature so that it may be readily moved about.

As best seen in Figs. 1, 2 and 8 to 11 inclusive, a hollow arm like member 27 extends over the top of the shell and downwardly of the rear wall of the shell and is suitably secured to the shell by the fastening member 14 to form a hollow conduit with the shell for supporting the electrical conducting wires. Secured below and in spaced relation to the bottom of the shell as seen in Figs. 2 and 5 is plate 28 which forms a passageway for supporting the conducting wires that lead from the control box to the interior of the shell.

In the top of the shell, centrally positioned is a circular opening 29 in which is secured an inverted dish-shaped insulating disc 30. The disc 30 is secured to the top of the shell by suitable fastening elements 31. A cover 32 is positioned over the disc 30 and it is secured to the shell in alignment with the end of the arm 27. The cover 32 has an opening 33 through which pass the conducting wires.

Rotatably supported on insulating disc 30 is a circular insulating plate 34 which has a stem 35 provided with a reduced circular end 36 positioned in a circular opening 37 in the disc 30. The stem 35 has a bore which receives a bolt 39 to rotatably support the plate 34. The top of plate 34 has secured to it four spaced annular conductor rings 40, 41, 42 and 43. The disc 30 has secured to it four conductor blades 44, 45, 46 and 47, each of which makes wiping contact with one of the four conductor rings. Each of the wiper blades is connected by a conducting wire which passes through the conduit as previously described and is connected to the control box as will be described in connection with the circuit diagram.

The conductor rings 40 to 43 inclusive are connected by conducting wires to the motors in the tractor. Two of the conductor rings are connected to each motor as will be described in connection with the circuit diagram. Suitably secured to the plate 34 is a cup shaped housing 48 to which is secured a flexible cable 49. The opposite end of cable 49 is attached to a hollow post 50 on the tractor. The conducting wires from the conductor rings 40–43 inclusive pass through the flexible cable 49 and through the post 50 and are connected to the small motors supported in the tractor.

It will be seen that the tractor or bulldozer may be operated to move anywhere within the confines of the

shell housing and that the rotation or pivoting of the plate 34 will maintain constant electrical contact irrespective of its rotated position so that the circuit will not be broken.

The toy tractor structure will now be described. The toy tractor or bulldozer generally indicated at 26 comprises a hollow body member 54 to the bottom of which is suitably attached a bottom plate 55. Right angled brackets 56 and 57 are secured to the bottom plate 55. Secured to the rear bracket 57 is a rear small battery operated motor 58 for the purpose of operating the traction wheels on the left side of the tractor and a similar front small battery operated motor 59 for driving the traction wheels on the right side of the tractor as viewed in Fig. 15 is secured to the front bracket 56. A speed reduction gearing unit generally indicated at 60 and enclosed in a housing is secured to the longitudinal wall of bracket 57 and said reduction gears are driven by motor 58. Suitably supported on the left side of the body 54 of the tractor is a rear drive axle 61 which is connected to a rear drive wheel 62. Supported on the opposite side of plate 55 as at 63 is a bracket 64 which supports an axle 65 to which is secured rear right idler wheel 66. Wheel 66 is freely rotatable.

Secured to the longitudinal portion of the bracket 56 is a speed reduction gearing unit generally indicated at 68 which is enclosed in a housing. The right front drive axle 69 is supported in a manner similar to rear drive axle 61 and is driven from motor 59 through the reduction gears 68 to drive front drive wheel 70. Axle 71 which supports freely idler wheel 72 is supported in a manner similar to axle 65.

All of the tractor wheels 62, 66, 70 and 72 are similarly constructed and each comprises a pair of sprocket shaped wheel sections 73 and 74 separated by a hub portion 75. Each wheel may be integrally formed. As shown the driving wheels 62 and 70 are alternately positioned with respect to the freely rotatable wheels 66 and 72.

Connecting the front right driving wheel 70 and the idler right rear wheel 66 is a continuous flexible traction band 77 which has a longitudinal rib 78 which is positioned between the wheel sections 73 and 74. Transverse ribs or treads 79 are spacedly positioned on the outside of the band to facilitate traction. As the driving wheel 70 is operated by the motor 59 it will rotate the flexible band 77 and rotate the rear idler wheel 66. A similar flexible traction band is mounted over the wheels 62 and 72 and when the drive wheel 62 is driven it will rotate the traction band 80 and rotate rear idler wheel 72.

The motors 58 anrd 59 are reversible so that they can each rotate in either direction for the purpose of driving the toy tractor forwardly or for reversing the direction of the toy tractor, or for turning the tractor to the right or left as will be explained in connection with the circuit diagram.

Extending across the front of the tractor is a scoop member or blade 82 which is adjustably supported by rearwardly extending arms 83 secured to the body of the toy tractor as at 84.

The control box will now be described. This is best seen in Figures 1, 2, 5, 6 and 7. The control box indicated generally by the numeral 86 is suitably secured by fastening elements 87 to the front of the shell 10. The dry cell batteries 88 which are connected in series are secured in the bottom portion 89 of the control box. The positive of one of the batteries is positioned against a metal post 90. The negative of the other battery is positioned against a metal plate 91 which is supported on metal stem 92 slidably secured on a metal post 93. A spring 94 on the metal stem urges the plate 91 into contact with the battery. The conducting wires as will be explained in connection with the circuit diagram are connected to the metal posts 90 and 93. Suitably secured to the control box are two switch members each generally designated by the numbers 96 and 97, and each is a 3 pole double throw switch. Both of said switch members are of identical construction so only one will be described in detail and it is best shown in Fig. 6. An L-shaped plate 99 is secured as at 100 to the base of the control box. The plate 99 pivotally supports as at 101 a lever 102. The lever is supported on a rod 103 secured to the plate 99. A spacer 104 is positioned between the lever and the plate and a spring 105 is mounted on the rod to urge the lever in the direction of the L-shaped plate. The pivotal lever 102 has two spaced contact points 106 and 107. The L-shaped stationary plate has three spaced contact points 108, 109, 110. When the lever is in a straight vertical position the circuit is open as no contact points will be in engagement with each other. When the switch lever is pivoted forwardly as shown in dotted lines in Fig. 5, the two contacts 106 and 107 on the lever will make contact with the two contacts 108 and 109 on the stationary switch plate to operate the motor 59 to drive the tractor forwardly and when the lever is tilted rearwardly as shown in full lines in Fig. 5, the two contacts 106 and 107 on the lever will make contact with the contacts 109 and 110 on the stationary plate to close the circuit to motor 59 to reverse the direction of rotation of the motor to thereby drive the corresponding tractor wheels in reverse.

Each motor is operated separately by its respective switch lever. The switch lever which operates the switch member 96 operates the motor 59 and the switch lever which operates the switch 97 controls the operation of motor 58. The contact points on the switch 97 will be designated by the same numerals as those of switch 96 with the addition of a prime after each number.

The switch levers each extend through suitable slots in the top of control box 86 and an indicating panel is secured to the top of the control box for indicating the proper positioning of the switch lever to effect operation of the motor. Reference will now be made to circuit diagram shown in Fig. 16. To operate the motor 59 to drive the right front drive wheel forwardly, the switch lever 96 is pivoted forwardly, current will flow from battery 88 through conductor 112, contact 106, switch 96, contact point 108, conductors 111 and 124 conducting ring 41, conductor blade 45, conductor to 113 to motor 59, conductor 114, conductor blade 44 and conductor ring 43, conductor 115, contact 109, switch 96, contact 107, conductor 116, conductor 117 to negative of battery 88.

To operate the motor 58 to drive the left traction wheel 62 forwardly, the switch lever 97 is pivoted forwardly, current will flow from battery 88, conductors 112, 118, contact 107', switch 97 contact point 109', conductor 119, conductor ring 42, conductor blade 47, conductor 120 to motor 58, conductor 121, conductor blade 46, conductor ring 40, conductor 122, contact point 108', switch 97, contact 106', conductors 123 and 117 to negative of battery 88.

If both motors 58 and 59 are simultaneously operated as aforesaid, the tractor will move forwardly.

To reverse the rotation of the motor 59 the switch lever 96 is pivoted rearwardly as in full lines in Fig. 5, current will flow from battery 88 through conductor 112, contact 106, switch 96 (in dotted line position), contact 109, conductor 115, conductor ring 43, conductor blade 44, conductor 114 to motor 59, conductor 113, conductor blade 45, conductor ring 41, conductor 124, contact point 110, switch 96 (in dotted position), contact point 107, conductors 116, 117 to negative of battery.

To reverse the direction of the motor 58 the lever 97 is pivoted rearwardly and current will flow from battery 88, through conductors 112, 118 to contact point 107', lever switch 97 (dotted position), contact 110', conductor 126, contact 108', conductor 122, conductor ring 40, conductor blade 46, conductor 121 to motor 58, conductor 120, conductor blade 47, conductor ring 42, conduc-

tor 119, contact point 109' and switch lever 97 (dotted line position), contact point 106', conductors 123 and 117 to battery 88.

By operating both levers simultaneously as just described both motors will operate in reverse to cause the toy tractor to move in a reverse direction. For the purpose of steering the tractor to the right or to the left one of the motors is operated to move the tractor band in one direction while the other motor is operated to move to the other tractor band in a reverse direction. For example, to turn the tractor to the left, the front motor is operated to rotate the motor in a forwardly direction and the rear motor is simultaneously operated in reverse to cause the left band to move in a reverse direction from that of the right tractor band. To turn the tractor to the right the two motors are caused to be operated in a reverse direction from that just described. This is accomplished by shifting the levers 96 and 97 appropriately. A main switch is suitably provided for opening and closing the circuit to operate the toy.

The floor of the shell housing has piled thereon or spread thereon a material such as ground cork or sand or any other material consisting of fine particles. As the bulldozer moves over the floor of the shell controlled by the operation of the levers 96 and 97 on the control box, the scoop or blade member 82 will push the material forwardly to pile it up in any desired spot anywhere within the shell, or the bulldozer may be operated to pack it into the dumping bins 18 after which it may be dumped back into the shell housing by pivoting the dumping bin upwardly as shown in Fig. 4.

It will be seen that the toy is completely self contained, and highly portable so that the enclosed toy may be readily moved about by a child without damage to the toy. Furthermore, the toy bulldozer is always confined in the enclosure so that its travel is restricted and is not accessible for manual handling so it cannot be damaged by the child. The granular material will not spill from the enclosure nor can it be removed by the child except in dumping into the dump bins and vice versa.

It will be understood that various changes and modifications may be made from the foregoing without departing from the spirit and scope of the appended claims.

We claim:

1. In a self contained toy of the character described comprising a portable housing including a floor surface and a transparent hood which extends completely over said floor surface and encases said floor surface to form an integral closure therewith, an electrically operated toy vehicle held captive by and within said enclosure and having wheels for rotation on said floor surface and for moving said toy vehicle only within said enclosure, control means positioned exteriorly of said housing and fixedly secured to said housing and electrically connected to said toy vehicle for controlling the movement and direction of said toy vehicle in said enclosure, granular objects loosely positioned on the floor of said enclosure and held captive by said enclosure and engaged by said toy vehicle for moving said granular objects within said enclosure, said hood having an opening on one of the walls thereof, a dump bin pivotally secured to said enclosure adjacent said opening, said dump bin having an opening in communication with said wall opening to permit the granular material to be pushed therein by said toy vehicle, said dump bin adapted when pivoted to empty the granular material on the floor of said enclosure.

2. In a self contained toy of the character described comprising a portable housing including a floor surface and a transparent hood which extends completely over said floor surface to form an integral closure therewith, an electrically operated toy vehicle held captive by and within said enclosure and having wheels for rotation on said floor surface and for moving said toy vehicle only within said enclosure, a rotatable electrical conducting member supported on the roof of said hood and electrically connected to said toy vehicle, a control box positioned exteriorly of said housing, conducting means from said control box in electrical connection with said rotatable conducting member, said control box adapted when operated to control the movement and direction of travel of said toy vehicle in said enclosure, granular material loosely positioned on the floor of said enclosure and held captive by said enclosure and engaged by said toy vehicle for moving said granular material within said enclosure, said hood having an opening in one of the walls thereof, a dump pin pivotally secured to said enclosure adjacent said opening, said dump bin having an opening in communication with said wall opening to permit the granular material to be pushed therein by said toy vehicle, said dump bin adapted when pivoted to empty the granular material on the floor of said enclosure.

3. In a self contained toy of the character described comprising a portable housing including a floor surface and a transparent hood which extends completely over said floor surface and encases said floor surface to form an integral closure therewith, an electrically operated toy vehicle held captive by and within said enclosure and having wheels for rotation on said floor surface and for moving said toy vehicle only within said enclosure, control means positioned exteriorly of said housing and electrically connected to said toy vehicle in said enclosure, granular objects loosely positioned on the floor of said enclosure and held captive by said enclosure and engaged by said toy vehicle for moving said granular objects within said enclosure.

4. In a self contained toy of the character described comprising a portable housing including a floor surface and a transparent hood which extends completely over said floor surface to form an integral closure therewith, an electrically operated toy vehicle held captive by and within said enclosure and having wheels for rotation on said floor surface and for moving said toy vehicle only within said enclosure, a rotatable electrical conducting member supported on the roof of said hood and electrically connected to said toy vehicle, a control box positioned exteriorly of said housing, conducting means from said control box in electrical connection with said rotatable conducting member, said control box adapted when operated to control the movement and direction of travel of said toy vehicle in said enclosure.

5. In a self contained toy of the character described comprising a portable housing including a floor surface and a transparent hood which extends completely over said floor surface to form an integral closure therewith, an electrically operated toy vehicle held captive by and within said enclosure and having wheels for rotation on said floor surface and for moving said toy vehicle only within said enclosure, a rotatable electrical conducting member supported on the roof of said hood and electrically connected to said toy vehicle, a control box positioned exteriorly of said housing, conducting means from said control box in electrical connection with said rotatable conducting member, said control box adapted when operated to control the movement and direction of travel of said toy vehicle in said enclosure, and granular material loosely positioned on the floor of said enclosure and held captive by said enclosure and engaged by said toy vehicle for moving said granular material within said enclosure.

6. In a self contained toy of the character described comprising a portable housing including a floor surface and a transparent hood which extends completely over said floor surface and encases said floor surface to form an integral closure therewith, an electrically operated toy vehicle held captive by and within said enclosure and having wheels for rotation on said floor surface and for moving said toy vehicle only within said enclosure, control means positioned exteriorly of said housing and

electrically connected to said toy vehicle for controlling the movement and direction of said toy vehicle in said enclosure, granular objects loosely positioned on the floor of said enclosure and held captive by said enclosure and engaged by said toy vehicle for moving said granular objects within said enclosure, said hood having an opening on one of the walls thereof, a dump bin pivotally secured to said enclosure adjacent said opening, said dump bin having an opening in communication with said wall opening to permit the granular material to be pushed therein by said toy vehicle, said dump bin adapted when pivoted to empty the granular material on the floor of said enclosure.

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