March 2, 1965 M. I. GLASS ETAL 3,171,230

ELECTRICALLY ACTUATED SOUNDING TOY

Filed Feb. 25, 1963 5 Sheets-Sheet 1

Fig. 1

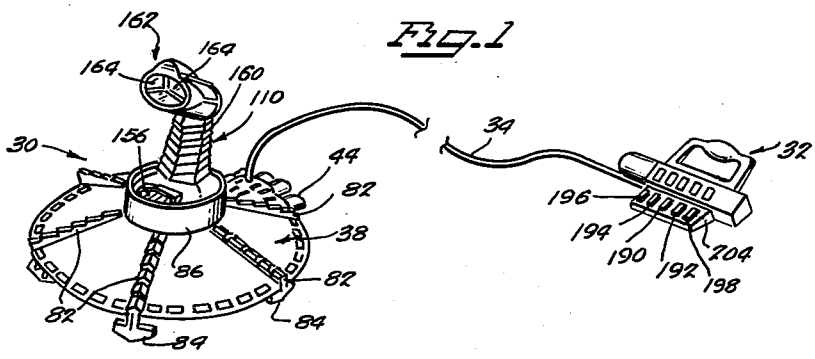


Fig. 2

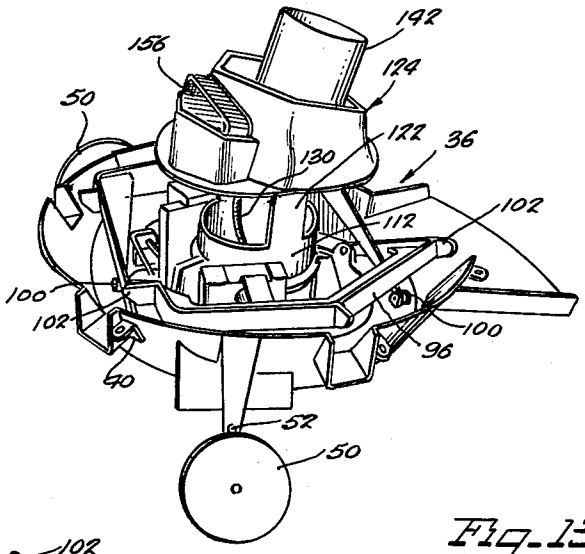


Fig. 6

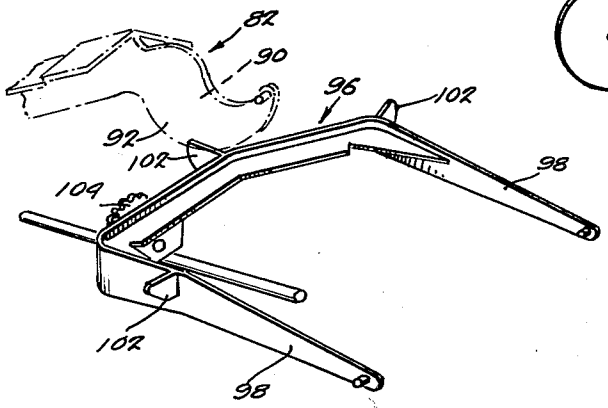
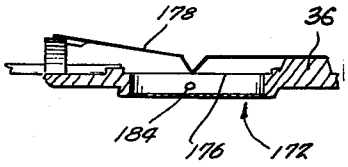


Fig. 13



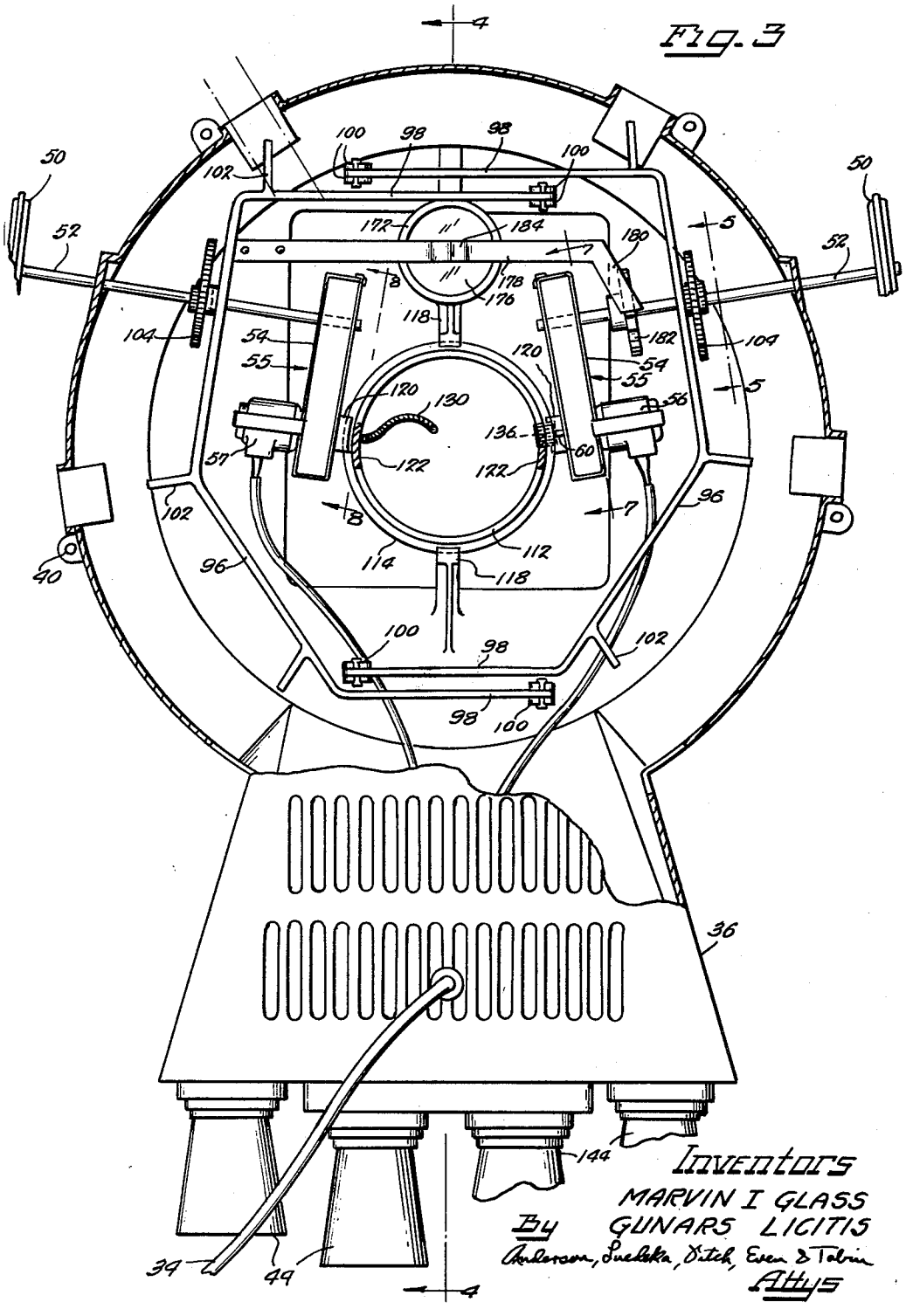
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ELECTRICALLY ACTUATED SOUNDING TOY

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Fig. 3



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ELECTRICALLY ACTUATED SOUNDING TOY

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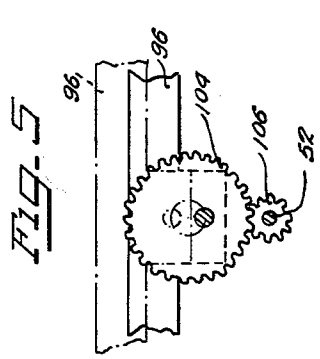


Fig. 5

Fig. 4

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ELECTRICALLY ACTUATED SOUNDING TOY

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Fig. 7

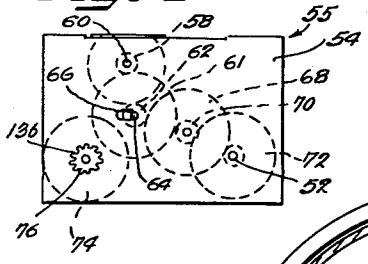


Fig. 10

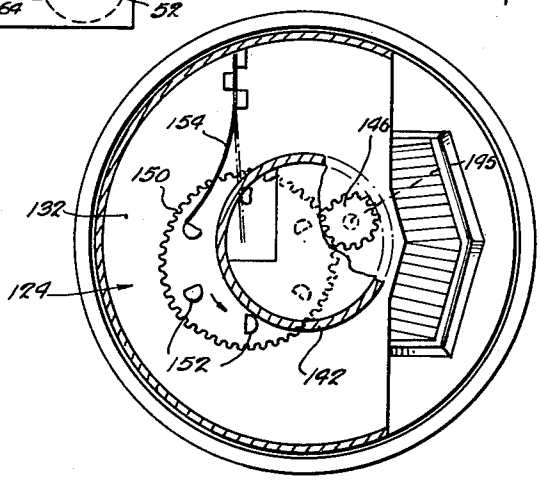


Fig. 11

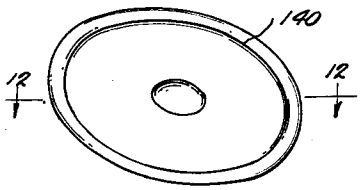


Fig. 9

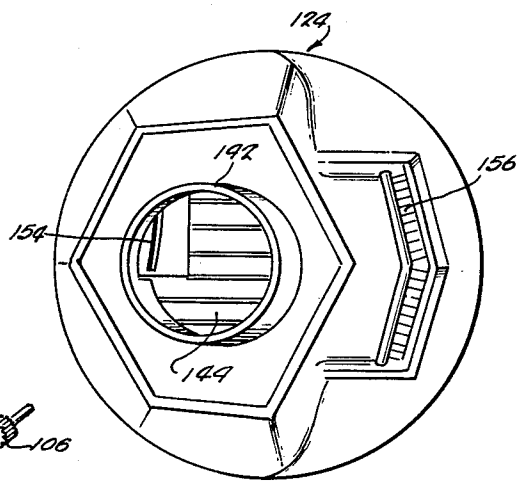
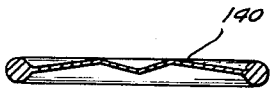


Fig. 12



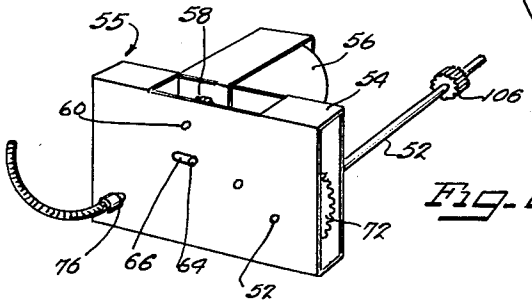


Fig. 8

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ELECTRICALLY ACTUATED SOUNDING TOY

Filed Feb. 25, 1963 5 Sheets-Sheet 5

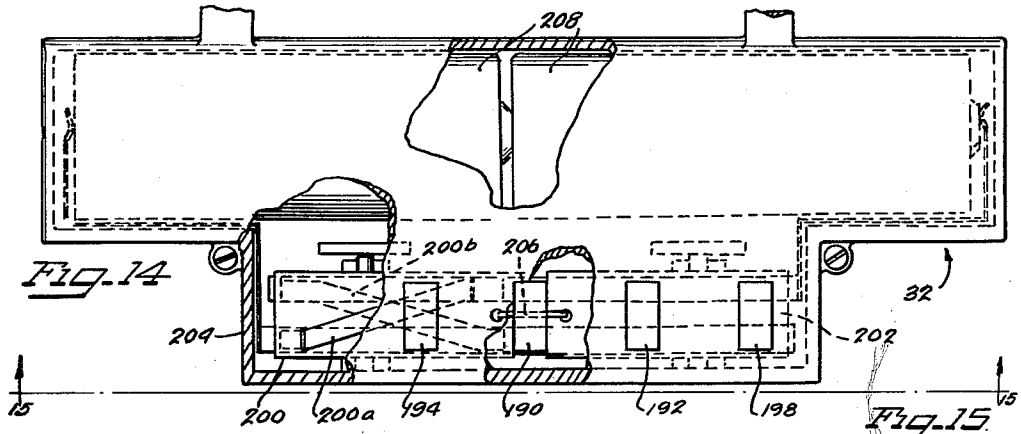


Fig. 14

Fig. 15

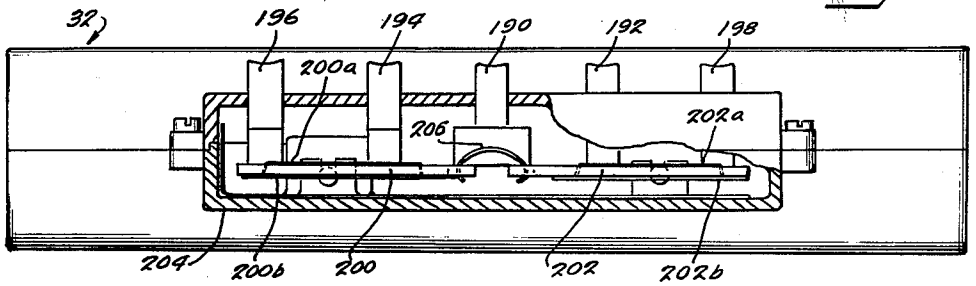


Fig. 17

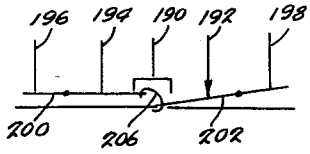


Fig. 18

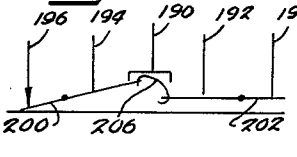


Fig. 19

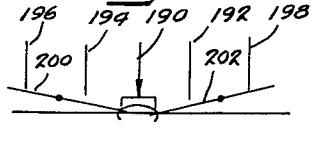
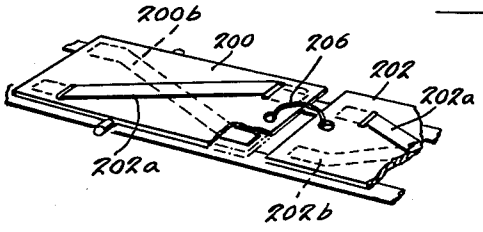


Fig. 16



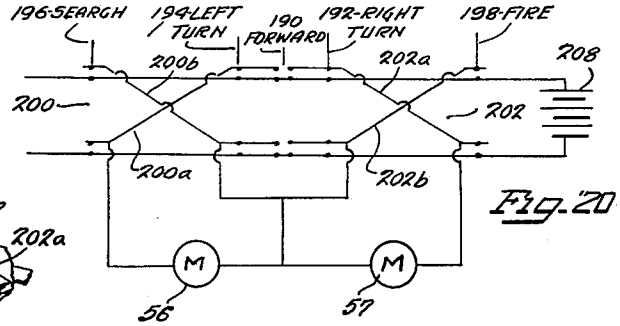


Fig. 20

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United States Patent Office 3,171,230 Patented Mar. 2, 1965

3,171,230

ELECTRICALLY ACTUATED SOUNDING TOY

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Filed Feb. 25, 1963, Ser. No. 260,629
11 Claims. (Cl. 46—232)

This invention relates to a toy and, more particularly, to a self-propelled action toy and to features thereof.

Various types of self-propelled toys are well known in the trade and often incorporate action features such as are found in toy army tanks and the like. Remote control of such a toy is simetimes provided. With the advent of the space age there has been a general interest in space craft and futuristic devices and the present invention is particularly concerned with providing a self-propelled action toy having an extra-terrestrial appearance and action.

It is, therefore, the primary object of this invention to provide a new and amusing toy. A related object is to provide such a toy which is self-propelled and articulated. A further related object is to provide such a toy which may be remote controlled.

Another object is provision of a new and amusing toy operable for searching the space about the toy and firing projectiles in a sweeping manner about the toy. A further object is provision of a new and amusing toy having the above described features and including appendages operable in a manner to provide a crawling effect for the toy.

These and other objects of the invention are more particularly set forth in the following detailed description and the accompanying drawings of which:

FIGURE 1 is a perspective view of a preferred embodiment of the invention;

FIGURE 2 is an enlarged, perspective view, with parts removed for clearer illustration;

FIGURE 3 is a still further enlarged, top plan view of the toy, with portions broken away and/or in section to more clearly illustrate particular portions of the toy.

FIGURE 4 is a fragmentary, vertical sectional view taken generally along the line 4—4 in FIGURE 3;

FIGURE 5 is a fragmentary, sectional view taken generally along the line 5—5 in FIGURE 3;

FIGURE 6 (Sheet 1) is a fragmentary, perspective view of part of an appendage actuating mechanism seen also in FIGURE 3, with a portion of the appendage shown in phantom lines;

FIGURE 7 (Sheet 4) is a sectional view of a gear train transmission taken generally along the line 7—7 in FIGURE 3;

FIGURE 8 is a fragmentary perspective perspective view of another gear train transmission and motor taken generally along the line 8—8 in FIGURE 3;

FIGURE 9 is a top view of the head portion of the device, with parts removed for clearer illustration;

FIGURE 10 is a sectional view of the head portion taken generally along the line 10—10 in FIGURE 4;

FIGURE 11 is a perspective view of a disc type projectile adapted to be fired by the device;

FIGURE 12 is a sectional view taken generally along the line 12—12 in FIGURE 11;

FIGURE 13 (Sheet 1) is an enlarged sectional view of a noisemaker device, taken along the line 13—13 in FIGURE 4.

FIGURE 14 is an enlarged, fragmentary bottom view of the remote control unit shown also in FIGURE 1, with parts broken away for clearer illustration;

FIGURE 15 is a view taken generally along the line 15—15 in FIGURE 14, with parts broken away for clearer illustration;

FIGURE 16 is a fragmentary perspective view of a part of switch blades shown in FIGURES 14 and 15;

FIGURES 17, 18 and 19 are schematic views illustrating the construction and operation of the remote control unit; and

FIGURE 20 is a schematic wiring diagram of the remote conrtol system.

The invention is, in brief, directed to a toy, and more particularly, to a self-propelled and remote controlled toy having articulated appendages operable in a manner giving a random walking or crawling illusion. An articulated head of the toy has a "flashing eye," and the head is movable for searching the space about the toy and firing projectiles in a sweeping manner about the toy. Noisemaker means is provided for further enhancing a child's interest in the toy, and is combined with the previously mentioned features in providing a futuristic mechanical spider-like toy.

More particularly, and with initial reference to FIGURE 1, the toy includes a spider-like object 30 which might exist on another planet. The toy is self-propelled and a remote control device 32 having a cable 34 is connected with the toy 30. The toy includes a suitable frame 36 (FIGURE 2) mounting a squat, inverted dish-shaped body 38. The body may be secured to the frame in any suitable manner and in the illustrated embodiment is detachably secured to the frame by bolts (not shown) extending through flanges 40 on a peripheral wall of the frame and threadedly received in boss portions 42 (FIGURE 4) of the body 38. A rear portion of the body is provided with outwardly flared tubes 44 to simulate jet or rocket propulsion means, and the remote control cable 34 extends through this portion of the body.

Means for supporting the toy on a suitable surface and causing it to traverse a desired path, as straight ahead or to either side, is provided in the illustrated embodiment in the form of a caster wheel 48 (FIGURE 4) depending from the rear of the frame 36 and a pair of driving wheels 50 (FIGURES 2–4) on opposite sides of the frame. When the toy is operatively assembled these wheels are concealed from normal view by the body 38. With particular reference to FIGURE 3, each wheel 50 is supported by an independent shaft 52, with each shaft being journalled in a portion of the frame 36 and in an associated housing 54 of a transmission 55, one such housing mounted on either side of the frame. As illustrated, each transmission is associated with a separate source of power, here in the form of a reversible electric motor 56, mounted on the respective transmission housing 54 for driving the associated wheel 50 in a forward direction upon operation of the respective motor in a first or forward direction. Thus, when these motors operate together in the forward direction the spider-like toy 30 is driven straight ahead, and when one of the motors is inoperative and the other motor is operating the object turns to the side away from the operating motor.

With reference to FIGURE 7, the transmissions 55 are substantially identical and each includes a gear train having a drive pinion 58 mounted on a motor shaft 60 of the respective motor and drivingly meshed with a gear 61 of a shifting idler cluster including a pinion 62 mounted on a shaft 64 journalled at opposite ends in elongated slots 66 in opposite sides of the transmission housing 54. In order to distinguish the two motors, the one appearing toward the right in FIGURE 3 is indicated by the numeral 56 and the motor at the left portion of the figure is 57. Responsive to operation of the respective motor (56, 57) in the forward direction, the motor form of sets of legs, one such set on either side of the end of the slot 66 with the idler cluster pinion 62 in meshed driving engagement with an intermediate gear

68 of a cluster including a pinion 70 in meshed engagement with a driving gear 72 fixedly mounted on the wheel shaft 52. Upon operation of the motor in a second or reversed direction, the motor shaft pinion 58 rotates in a reverse direction and positions the idler cluster at the opposite end of the slot 66 so that the idler cluster pinion 62 is in meshed driving engagement with another gear 74 mounted on a shaft 76, as will be more fully discussed hereinafter. Thus, a reverse drive transmission is provided. The propelling means is such as to drive the toy 30 at a relatively consistent high rate of speed for a self-propelled toy.

It should be noted that the wheels 50 are in generally vertical planes converging forwardly of the toy, that is toed inwardly, and should the body 38 engage a vertical abutment the appropriate wheel will be driven independently of the other wheel for freeing the object from the abutment.

Appendage means provides for a crawling illustion as the object 30 moves across the supporting surface, and herein this means operates at a rate slower than that indicated by the speed of the object across the surface so as to give a generally awkward and powerful appearance. As illustrated the appendage means is in the form of sets of legs, one such set on either side of the body 38 and mounted on the frame 36. In the illustrated embodiment each set includes three legs 82, each having a foot 84 which depends from the outer peripheral edge of the body 38 in the normal inoperative position as shown in FIGURE 1 wherein both sets of legs are lowered and generally coplanar with the body 38. Each leg 82 has a generally step-shaped upper surface and is independently pivoted on the body 38. More particularly, an open ended cylinder 86 (FIGURE 4) extends upwardly from the center of the body 38 and has a lower double wall portion defining a continuous downwardly opening notch 88 receiving the inner end 90 of each leg 82. The inner ends 90 have a generally arcuate lower edge surface 92 resting on an actuator member 96 (FIGURE 6), one actuator member for each set of legs 82. Each actuator member 96 is generally U-shaped and has free ends of its legs 98 mounted on the frame 36 for pivotal movement about generally horizontal axis. More particularly, these free ends are each mounted between a pair of lugs, as 100, of the frame 36. As may best be seen in FIGURE 3, the legs of these actuator members are partially overlapped. Thus, as an actuator member 96 pivots upwardly the associated set of legs 82 also pivot upwardly because of engagement of the arcuate surface 92 of each leg 82 with a respective lug 102 extending outwardly from the respective actuator member 96. It should be noted that a center one of the lugs 102 is spaced farther from the actuator pivot axis, so that it moves upwardly a great distance, and, therefore the associated center leg of each set of legs moves upwardly a greater amount than the outward legs of the set to provide a more interesting action.

Leg actuating means is provided for causing the sets of legs to move up and down as previously described, and herein this means includes the actuator members 96 and a gear 104 (FIGURES 5 and 6) eccentrically journalled on the respective actuator member 96 and drivingly meshed with a pinion 106 on the wheel shaft 52, so that when the respective shaft 52 is rotated the associated actuated member is caused to move up and down. Preferably this gearing on the right and left wheel shafts, respectively, is arranged out of phase and the operation of the motors 56 and 57 during use of the toy is such that the two sets of legs move up and down in a random, non-uniform manner.

With reference to FIGURE 1, a head assembly 110 is surmounted on the body 38 and is operable for searching movement about the object 30. More particularly, and with reference to FIGURES 3 and 4, a cylindrical member 112 has an outwardly extending continuous annular flange 114 received in notches 116 in diametrically opposed supports 118 and 120, of the frame 36 for rotation of the cylinder 112 about a generally upright axis. A pair of diametrically opposed arms 122 (FIGURES 2 and 4) extend upwardly from the cylinder 112 and at their upper ends pivotally mount a base 124 of the head so that the base may pivot and tilt about a generally vertical but slightly inclined axis. Cooperating stop means, in the form of abutment surfaces 126 and 128 on the arms 122 and the base 124, respectively, are provided for limiting such tilting movement of the head. Means for automatically causing the head to rotate and tilt in this manner is provided by a resilient cable sheath 130 having one end mounted in a bottom wall 132 of the base for rotation with respect to the base, and having an opposite end mounted in the transmission housing 54 located to one side of the upright pivotal axis of the cylinder 112, as shown in FIGURES 8, so that the arching of the sheath between its ends cause the head to tilt.

Means for rotating the head 110 is provided in the form of a series of gear teeth 134 in a bottom edge of the cylinder 112, the teeth 134 being drivingly meshed with a pinion 136 on the outer end of the shaft 76 of the previously dsclosed transmission shown in FIGURE 7. Thus, when the motor 56, which is drivingly associated with this transmission, operates in reverse direction, the idler cluster pinion 62 is engaged with the gear 74 on the shaft 76 thereby rotating the head 110 about a generally upright axis.

Firing means is provided for firing disc-like projectiles 140 (FIGURES 11 and 12). In the illustrated embodiment the projectiles are fired in a manner to sweep about the object 30 when the head 110 is rotating, or to fire in the same general direction when the head 110 is stationary. Herein this firing means is in the form of a cylindrical magazine 142 (FIGURES 2, 4 and 9) extending upwardly from the base 124 of the head for receiving a stack of the discs 140 and feeding the discs one at a time to a receiver portion defined by an upper surface of an intermediate wall 144 of the base, as may best be seen in FIGURE 4. With a disc 140 received on the wall 144, and upon reverse operation of the motor 56 shown on FIGURE 8 a cable 145, extending through the cable sheath 130 and connected at one end to the transmission shaft 76 and at an opposite end to a driving pinion 146, is rotated. The pinion 146 is in turn meshed with a firing gear 150 having a plurality of upwardly extending peripheral tabs 152 which sequentially engage an end of a leaf spring 154 mounted at an opposite end on the base 124, thus flexing the spring as shown in FIGURE 10 so that when the tab disengages the spring 154, the spring flips forwardly to drive the lowermost disc 140 outwardly through a muzzle opening 156 in the base 124. The head 110 includes an upwardly extending neck 160 which provides a cover removably telescoped on the magazine 142.

In order to further hold a child's interest in the toy, an attention getting device is surmounted on the neck 160, and is illustrated in the form of a "flashing eye" 162. The eye is provided with three generally vertically coplanar sections 164 each in the form of a "Varie-Vue" changing color device, as is well known in the trade. These devices 164 change apparent color depending on the direction from which they are viewed. Briefly, three devices 164 are each vertically polarized and in the preferred embodiment change color between red and blue, and green and blue, as the eye is viewed from a given location with the head 110 moving. Thus, the eye 162 gives the appearance of flashing in different colors and searching as the head 110 rotates or as the toy 30 moves.

Noisemaker means for proving an initially loud sound which gradually diminishes is provided in the illustrated embodiment in the form of a pump actuated whistle device. With particular reference to FIGURES 3, 4 and 13, a whistle 170 is formed integrally with the frame 36 and communicates with a pump 172 defined by a cylin-

drical pocket having a flexible diaphragm 176 closing the top of the pocket. A spring type actuator arm 178 is relatively long to provide prolonged vibration when set in motion. The spring arm 178 has one end fixedly secured to the frame 36 and an opposite end 180 defining a cam follower riding on a multilobe cam 182 fixedly mounted on one of the wheel shafts 52, as may best be seen in FIGURE 3. Thus, when this shaft is rotating the actuator spring 178 is moved upwardly by the cam 182 and then released from the cam lobe so as to flip downwardly, whereupon a depending center portion 184 of the spring arm 178 vibrates and repeatedly strikes the diaphragm 176 causing air to be intermitently expelled into the whistle 170 with constantly diminishing force thus providing an initial lound sound which gradually diminishes.

Manually toperable remote control means for operating the object 30 is provided in the form of the remote control unit 32 as may best be seen in FIGURES 1 and 14–20. This remote control unit is provided with five push-buttons including a center push-button 190 for causing the object 30 to move in a forward path, a right turn push-button 192 immediately to the right of the center push-button for causing the object to turn to the right, a left turn push-button 194 immediately left of the center push-button for causing the object to turn to the left, a search push-button 196 outwardly of the left turn push-button 194 for causing the head 110 to rotate in a searching manner, and a firing push-button 198 outwardly from the right turn push-button 192 for causing the firing mechanism to fire a disc as 140 from the head 110.

In the illustrated embodiment, as illustrated in the wiring diagram of FIGURE 20, the remote control push-buttons are associated with suitable switch means for starting and stopping, and controlling the direction of operation of the two motors 56 and 57, thus operating the object 30 as previously described. More particularly, the push-buttons are operatively associated with switch blades 200 and 202 each pivoted at their centers on a body 204 of the remote control unit 32. The switch blades 200 and 202 each have crossed contact strips 200*a* and 200*b*, and 202*a* and 202*b*, respectively, the control strips of each blade being insulated from each other. The blades are inter-connected by a generally U-shaped spring 206 received in openings in adjacent centrally located ends of the switch blades to prevent the blades from being positioned to cause a short circuit, as will become apparent. An appropriate wiring circuit for the remote control unit 32 and the motors 56 and 57 is shown in FIGURE 20 for supplying power to the motors 56 and 57 from batteries 208 contained in a chamber in the remote control unit 32, as may best be seen in FIGURE 14.

The operation of the remote control unit push-buttons is as follows: when forward self-propelled operation of the object is desired the center push-button 190 is depressed so that the switch blades 200 and 202 are in the position shown in FIGURE 19, thus connecting the batteries 208 in circuit for forward operation with the motors 56 and 57. When it is desired to turn the object 30 either to the right or the left, the appropriate push-button 192 or 194 is depressed. In the event that a right turn is desired, upon depressing the right turn push-button 192 the switch blade 200 returns to normal position and the switch blade 202 has its inner end depressed as shown in FIGURE 17, so that the left turn motor 56 is in operative and the right turn motor 57 is in circuit with the batteries 208 for forward operation. When it is desired to rotate the head 110, the search push-button 196 is depressed, as shown in FIGURE 18, thus reversing the direction of operation of the right turn motor 56 for rotating the pinion 136 and thus rotating the head 110, as previously described. Similarly, when it is desired to fire one or more discs 140 from the head 110, the firing push-button 198 is depressed, thus depressing the outer end of the switch blade 202 to reverse the direction of operation of the left turn motor 56 and thereby actuating the firing mechanism as previously described. The number of discs fired is determined by the length of time the firing push-button is depressed.

Thus, an amusing toy which may be remotely controlled by a child is provided. The child may selectively operate the toy by proper actuation of the remote control unit 32. When desired, the child may fire one or more discs 146 from the toy. In addition to the control features provided for amusing a child and holding the child's interest, the appendages in the form of the legs 80 operate in an unusual manner in relationship to the speed of the toy to further hold the child's interest.

To summarize the operatoin of the toy, a child may depress any one of the three centrally located push button 190 to move object 30 forward or to turn it to either side. By depressing the search push-button 196 the head 110 is caused to rotate whereupon the eye 162 changes its apparent color and appears to be searching the area about the object. Upon the child depressing the firing push-button 198, one or more discs 140 are fired from the head, the number of discs fired depending on the length of time the firing push-button is held down.

While this invention has been described with particular reference to certain features in a particular environment, various changes may be apparent to one skilled in the art and the invention is therefore not to be limited to such features or environment. Various of the features of the invention are set forth in the following claims.

What is claimed is:

1. A toy comprising a body, propelling means operable for moving said body along a supporting surface, appendage means supported on the body and movable relative to said body as the latter is propelled along said surface, a head mounted on said body and operable to rotate relative to said body, and means for selectively firing objects from said toy through trajectories determined by the position of said head relative to said body.

2. A toy comprising a body, means supporting said body and operable for moving said body along a supporting surface, appendage means supported on the body and movable relative to said body as the latter is propelled along said surface, a head mounted on said body and operable to rotate relative to said body, means for selectively firing objects from said toy through trajectories determined by the position of said head relative to said body, and drive means connected with said supporting means, appendage means, head and said firing means for operation thereof.

3. A toy comprising a body, drive means carried by said body and operable for moving said body in any selected direction across a supporting surface, appendage means carried by the body and including a plurality of legs movable relative thereto, at least one of said legs moving a vertical distance greater than the movement of another one of said legs, and said legs each moving at a rate slower than that indicated by the speed of said body for providing a crawling illusion as said toy moves across said surface, and a head rotatably mounted on said body and operable by said drive means to provide a searching effect through a complete, circular rotation of the head relative to said body.

4. A toy comprising a body, drive means carried by said body and operable for moving said body in any selected direction across a supporting surface, appendage means carried by the body and connected with said drive means for movement relative to said body at a rate slower than that indicated by the speed of said body for providing a crawling illusion as said toy moves across said surface, a head rotatably mounted on said body and operable by said drive means to provide a searching effect through rotation of the head relative to said body, and firing means carried by said head and connected with said drive means for operation thereby to fire objects from the toy.

5. A toy comprising an object including a body, power driven means operable for moving said body across a sup-

porting surface, appendage means movably supported on said body and operable by said power driven means to provide a crawling illusion, said appendage means including a plurality of legs movable relative to said body with at least one of said legs moving a vertical distance greater than the movement of another of said legs, a head rotatably supported on said body for complete, circular movement about a generally vertical axis, and means on said head operable to provide the illusion of searching about the object as said head rotates.

6. A toy comprising an object including a body, power driven means operable for moving said body across a supporting surface, appendage means movably supported on said body and operable by said power driven means to provide a crawling illusion, a head rotatably supported on said body and connected with said power driven means for movement about a generally vertical axis, means on said head operable to provide the illusion of searching about the object as said head rotates, and firing means carried by said head and connected with said driven means for operation thereby to fire objects through different trajectories determined by the position of said head relative to said body.

7. A toy comprising an object including a body, propelling means carried by said body and operable for moving said body at a predetermined speed and in a selected direction across a supporting surface, appendage means movably mounted no said body for providing a crawling illusion as said object moves across said surface, said appendage means including two sets of legs, one set on each side of said body, appendage actuating means within said body and connected with said propelling means for raising and lowering said sets of legs, a head rotatably mounted on said body and operable for movement about a generally upright axis and having a flashing eye giving the illusion of searching about the object as said head moves, and firing means on said head and operable for firing projectiles to sweep the area about said object.

8. A toy comprising an object including a body, a plurality of wheels mounted in supporting relation to said body, propelling means connected to said wheels and operable for moving said body at a predetermined speed and in a selected direction across a supporting surface, appendage means movably mounted on said body for providing a crawling illusion as said object moves across said surface, said appendage means including two sets of legs, one set on each side of said body, appendage actuating means within said body and connected with said legs and said propelling means for raising and lowering said sets of legs, a head rotatably mounted on said body and connected with said propelling means for driven movement about a generally upright axis, firing means on said head connected with said propelling means and operable for firing projectiles to sweep the area about said object, noisemaker means operably connected with said propelling means for providing an appropriate sound, and remote control means for selectively operating said propelling means, for causing rotation of said head, for operating said noisemaker, and for operating said firing means.

9. A toy comprising a mechanical spider-like object including a squat body, propelling means carried by said toy and operable for moving said toy in any selected direction, appendage means movably mounted on said body and operative at a rate slower than that indicated by the travelling speed of said body for providing a crawling illusion as said toy moves across said surface, said appendage means including two sets of legs, one set on each side of said body, appendage actuating means within said body operable for raising and lowering said sets of legs in a manner such that each set moves independently of the other set and the individual legs of each set move different distances, a head surmounted on said body and operable for pivotal movement about a generally upright axis and for tilting movement relative to said axis, firing means on said head and operable for firing projectiles through trajectories determined generally by the position of said head, noisemaker means operable for providing an appropriate sound, and remote control means connected with said propelling means, head and firing means.

10. A toy comprising, a mechanical spider-like object including a squat, inverted dish-shaped body, propelling means including wheels supporting said body and operable for moving said body in any selected path across a supporting surface, said wheels being directed in paths converging forwardly of said body, appendage means movably mounted on said body and connected with said propelling means for movement thereby at a rate slower than that indicated by the travelling speed of said body for providing a crawling illusion as said object moves across said surface, a head mounted on said body and connected with said propelling means for pivotal movement about a generally upright axis, said head having an upwardly extending neck and a multi-colored polarized eye surface giving the illusion of searching about said object and changing apparent colors as said head moves, and firing means fixedly oriented on said head and connected with said propelling means for firing disc-like projectiles so that said projectiles sweep the area about said object as said head moves, and manually operable remote control means for selectively operating said propelling means and for controlling the operation of said head and said firing means.

11. A toy comprising a mechanical spider-like object including a squat, inverted dish-shaped body having opposite sides, propelling means including wheels supporting said body and operable for moving said body through any selected path across a supporting surface, appendage means movably mounted on said body and operative at a rate slower than that indicated by the speed of travel of said body for providing a crawling illusion as said object moves across said surface, said appendage means including at least two sets of legs, one set on either side of said body, and leg actuating means connected with said propelling means and operable responsive to operation of said propelling means for raising and lowering said sets of legs and for raising at least some of the legs of each set different distances, a head mounted on said body and operable for pivotal movement about a generally upright axis and for tilting movement relative to said axis, and firing means fixedly oriented on said head and connected with said propelling means for firing disc-like projectiles so that said projectiles sweep the area about said object as said head moves, and noisemaker means operable for providing an initially loud sound which gradually decays, and manually operable remote control means for selectively operating said propelling means, rotating said head and for operating said firing means.

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