

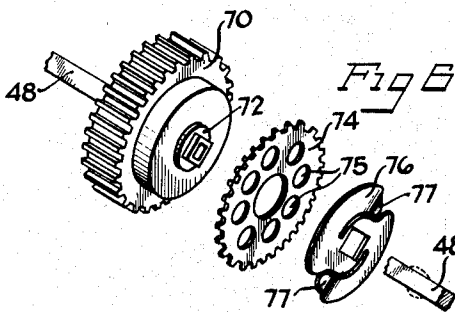
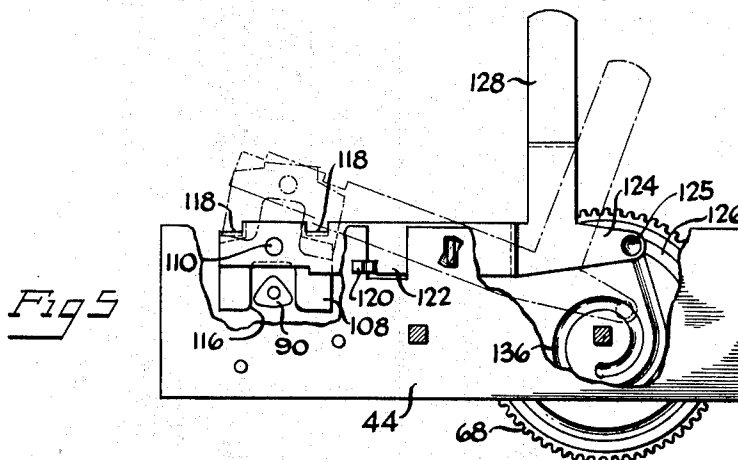
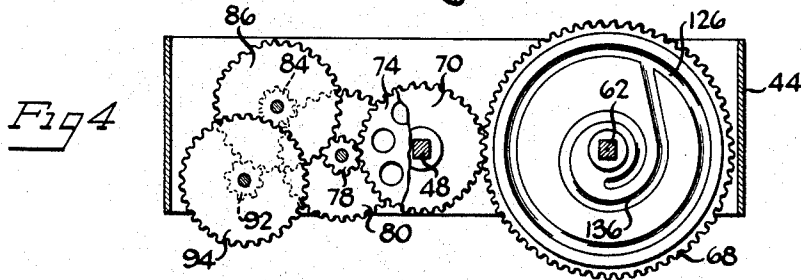
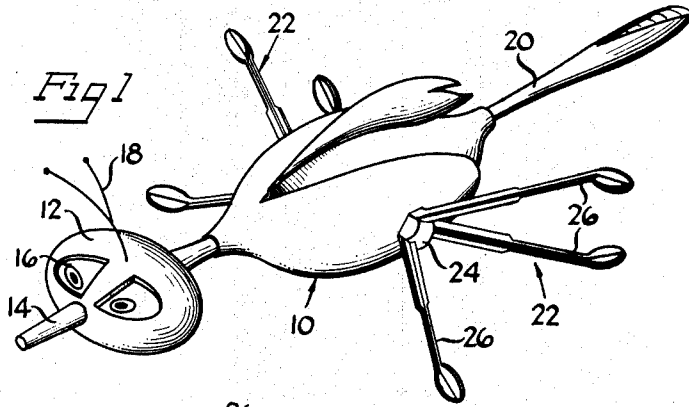
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M. I. GLASS ET AL
MOTOR DRIVEN TOY BUG

3,226,878

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2 Sheets-Sheet 1



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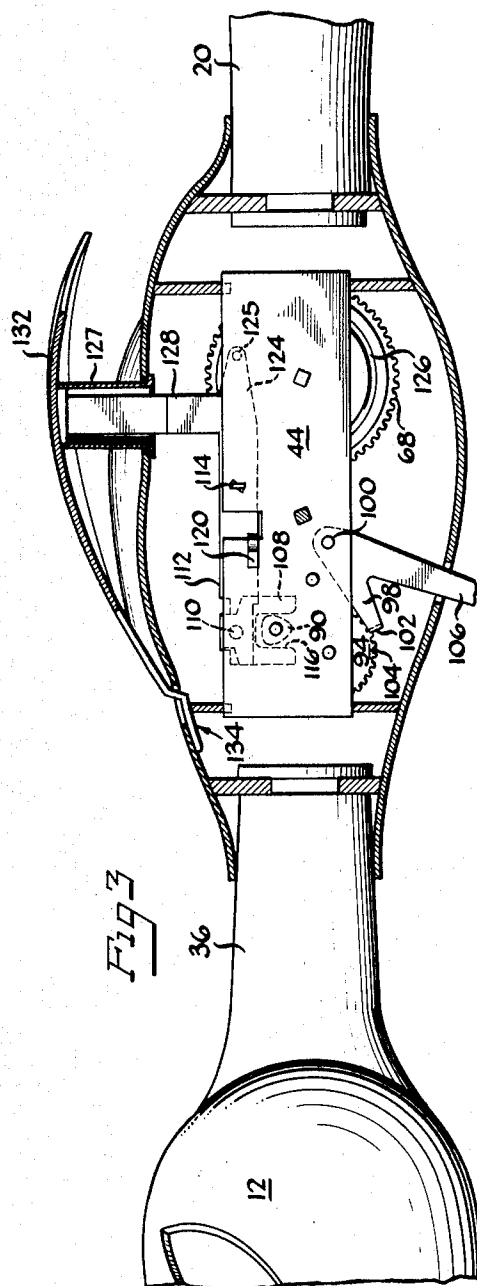
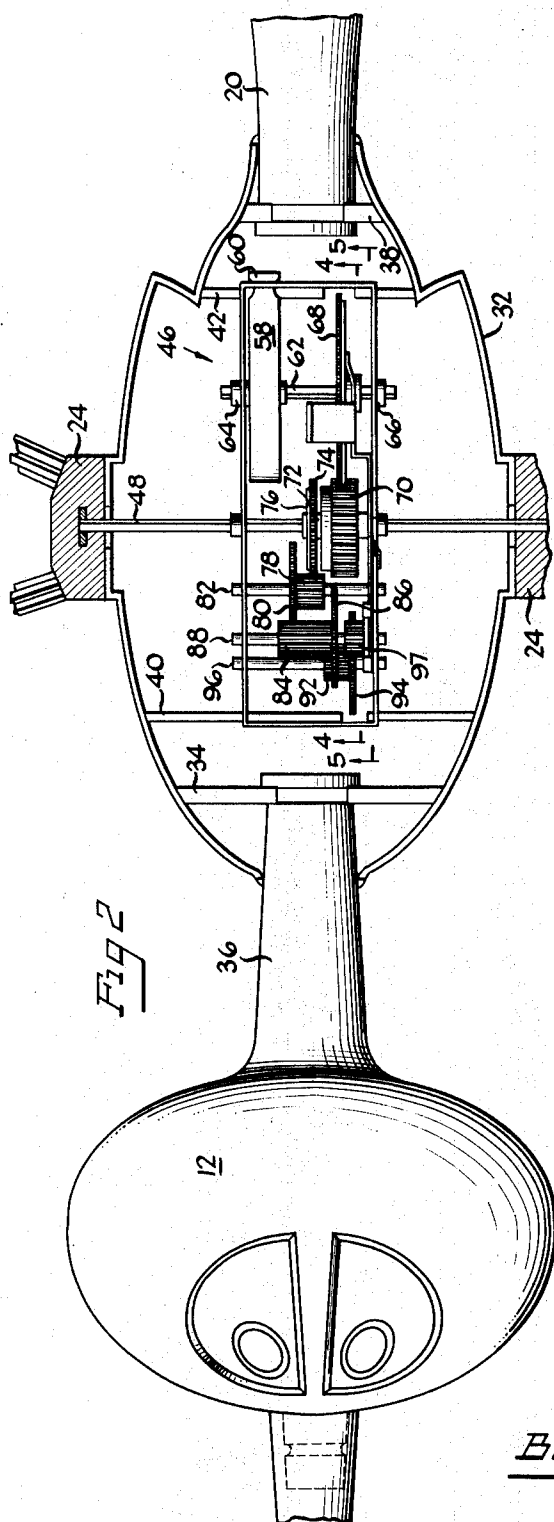
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MOTOR DRIVEN TOY BUG

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4 Claims. (Cl. 46-150)

The present invention relates to animated toys, and particularly to those designed to simulate insects, and an object is to provide such a toy which has amusing characteristics not heretofore known.

Such toys in the past have tended to either employ an excessive number of parts so as to be of doubtful reliability and durability, or to be over-simplified, so as to be unlikelike and uninteresting. Furthermore, there has often been present a winding key or handle, which is either promptly lost or which if not removable tends to destroy the illusion that the toy is a real live creature. There has also been a lack of variety in the motions of the toy. Accordingly, the principal object of the invention is to furnish an animated toy, simulating a large insect, which will have a comical walking movement; in which there is no projecting winding key or other incongruous control, visible when the toy is in motion; which is composed of a minimum number of relatively rugged parts, and which, if struck, will change its rate of movement, and appear to attempt to run away.

The manner in which this object is accomplished is fully described in the following specification and illustrated in the accompanying drawings in which:

FIGURE 1 is a perspective view of the toy;

FIGURE 2 is an enlarged plan view of the toy with parts removed and others in section;

FIGURE 3 is an enlarged left side elevation with the casing broken away to expose the interior mechanism;

FIGURE 4 is an enlarged vertical sectional view on the line 4-4 of FIGURE 2 with parts broken away;

FIGURE 5 is an enlarged sectional view on the line 5-5 of FIGURE 2; and

FIGURE 6 is a view of elements of the drive mechanism.

Similar reference characters have been applied to the same parts throughout the drawings and specification.

The toy selected to embody the present invention is in the form of a caricature of a bug or insect and comprises basically a hollow body portion 10, as seen in FIGURE 1, having a head 12 providing a nose 14 and eyes 16; and antennae 18 may be included, all calculated to give the toy a rather grotesque and yet comical appearance. A tail 20 is substantially rigid with body portion 10, and normally rests on the floor or supporting surface. At either side of body 10 is a propelling leg unit 22 which comprises a hub 24 supported for rotation relatively to body portion 10, and having rigidly fixed therewith a plurality of legs 26 which project away from body 10 and in relation to the axis of hub 24 in the positions of the elements of a cone. The outward or oblique angle of legs 26 relative to the axis of hub 24 is such that at least one leg 26 on each side always projects in an outward direction but sufficiently downwardly to be in supporting relation to the floor or supporting surface to support the body 10. When the leg units 22 are slowly rotated, the toy will partake of a peculiar wobbling kind of walking movement, not unlike that of a June-bug, or similar large insect. The torque imparted to body 10 by any mechanism for rotating leg units 22 is resisted, and body 10 is prevented from overturning, by contact of tail 20 with the floor or supporting surface over which it slides when the bug is in motion.

2

It is contemplated that legs 26 may be flexible or "springy" if desired to give more character to the movement.

As hereinbefore stated, the bug is driven by a spring motor concealed in body 10, and one of the advantages of the construction is the fact that the spring motor is wound by the simple reverse rotation of the leg units. It is, therefore, unnecessary to have any type of winding key or control in evidence on the outside of body 10.

Body 10 consists of a thin outer shell 32 (FIGURES 2 and 3) which may be made most conveniently of one of the easily moldable plastics of which many are well-known. Shell 32 has a rib or bulkhead 34, which engages a neck portion 36 of head 12, thereby helping to secure the head to the body. In similar manner a rib or bulkhead 38 cooperates to secure tail 20. Other ribs or bulkheads 40 and 42 fit and cooperate with a frame 44 of a spring motor generally designated as 46. Motor 46 drives a one piece shaft or axle 48 which extends outwardly from opposite sides of the frame 44 into fixed engagement with the hubs 24 carrying the two sets of legs 26.

Within motor frame 44 a spiral spring 58 has an end 60 anchored on frame 44, its other or inner end being anchored on a spring arbor 62 in any suitable or well-known manner. Arbor 62 is journaled in bearings 64 and 66 mounted in frame 44, and has fixed therewith a first gear 68, which meshes with a second gear 70 fixed on axle shaft 48. Axle shaft 48 and spring arbor 62 are, therefore, connected together in such manner that rotation of one must rotate the other.

Gear 70 includes a projecting circular hub portion 72 mounting a freely rotatable gear 74 (see also FIGURE 6) having circularly arranged openings 75 through its face for coaction with a spring ratchet element 76 which is keyed or otherwise fixed to shaft 48 in facing engagement with gear 74. Ratchet element 76 includes a pair of angularly bent ears 77 disposed in the path of openings 75 and bent so that rotation of element 76 in one direction (clockwise in FIGURE 4) permits the ears 77 to slide over the face of gear 74, whereas counterclockwise rotation of element 76 results in the ears 77 entering a pair of the openings 75 to provide a positive driving relation between ratchet 76 and gear 74. Consequently, rotation of legs 22 in a clockwise direction will serve to wind spring 58 without disturbing gear 74, whereas release of the tensioned spring 58 will drive shaft 48, through gears 68 and 70, in a counterclockwise direction and thereby establish a positive driving relation between ratchet element 76 and gear 74.

The mechanism so far described would tend to actuate leg units 22 too fast for a natural crawling appearance, so a governing device is provided as follows.

Third gear 74 meshes with and drives a first pinion 78 which is fixed in relation to a fourth gear 80 supported for rotation on a shaft 82 carried in frame 44. Gear 80 meshes with and drives a second pinion 84 fixed in relation to a fifth gear 86 fixed on a shaft 88 carried in frame 44 for rotation.

Fifth gear 86 meshes with and drives a third pinion 92 fixed in relation to a gear 94 on a shaft 96 rotatably carried in frame 44. Gear 94 in turn meshes with a fourth pinion 97 rotatably carried on shaft 88. A detent or pawl 98 (FIGURE 3), providing a stop level for the drive mechanism, is pivotally supported on a rivet or the like 100 on frame 44 and includes an ear portion 102 engageable with the teeth 104 of sixth gear 94 by swinging of detent 98. Detent 98 has an arm or lever 106 which projects preferably through the undersurface of body 10 so as not to be noticeable during the movement of the bug. It will now be apparent that the speed reduction

gears will be locked whenever detent 98 is engaged with gear 94.

In order to provide further speed control means, pinion 97 has integrally formed therewith a governor cam 99 which is generally triangular in configuration, as best seen in FIGURES 3 and 5, and a yoke 108 is pivotally supported in position for engagement with the cam by means of a pin or the like 110 on a carrying lever 112 which is fulcrumed on a tongue 114 turned out from the side of frame 44. Yoke 108 provides a notch or interior space 116 which loosely fits about governor cam 99 so that rotation of the cam will swing yoke 108 rapidly back and forth about pin 110. The rapid motion introduces a substantial degree of friction between the cam and yoke and, of course, controls the speed of rotation of pinion 97 and the gear train associated therewith, so that the speed of drive shaft 48 and the legs 22 fixed thereto is kept approximately within a predetermined range. However, it is intended that the governor shall be disabled from time to time, which action will now be described.

Carrying lever 112 may be swung upwardly about fulcrum 114 as shown in dotted lines in FIGURE 5 to a position wherein yoke 108 is removed from cam 99, in which case cam 99 and pinion 97 will be released for freer rotation and the motor will speed up to a much faster rate than with the governor in operation. This is to give the bug the capability of "running away" when struck by the hand or any suitable object. When lever 112 is raised so yoke 108 is out of engagement with cam 99, the yoke is prevented from swinging too far out of line by tongues 118 bent in from the upper edge of lever 112 to engage the upper edge of the yoke if it swings excessively, but to allow complete freedom to follow cam 99 at other times. Lever 112 has a tongue 120 extending outside of frame 44 through a notch 122 to slidably engage the edge of the notch to guide lever 112 against sideward displacement. It is to be noted that the rapid movement of yoke 108 will make a distinct rattling noise which will add to the grotesque effect of the toy.

Carrying lever 112 has an arm 124 extending from fulcrum 114 in the opposite direction from yoke 108, arm 124 being resilient and having a detent button, dimple or the like 125 pressed by the resiliency of arm 124 into following engagement with a cam groove 126 formed in first gear 68, which in the present instance is concentric with spring arbor 62. Lever 112 is thus held stationary so long as detent 125 is in engagement with groove 126. However, in view of the resiliency of arm 124, detent 125 is rather easily dislodged from cam groove 126. A strut or upright 128 extends generally upwardly from arm 124 through a suitable opening in the top of body portion 10 and is guidedly held in position by a tube or sleeve 127 fixed to and extending upwardly from the body. The upper end of upright 128 engages a simulated wing 132 which it maintains in a raised position above body 10. Wing 132 has a combined sliding and pivotal connection 134 with body 10 so that the wing may pivot downwardly if sufficient force is exerted thereon to dislodge detent 125 from groove 126. Wing 132 constitutes a control or an impact receiving element. Thus, if someone swats the bug and hits wing 132, arm 128 is depressed and governor yoke 108 will be removed from cam 99 and the governor will be disabled. Thus the bug will speed up and appear to run away from its tormenter.

The shifting of lever 112 will be limited by contact of arm 124 with spring arbor 62, and detent 125 will come to rest in a position to be engaged with a snail-cam groove 136 which starts near arbor 62 and winds outwardly until it intersects hereinbefore mentioned cam groove 126. After detent 125 is dislodged as above described, some portion of groove 136 will engage it quite promptly, particularly in view of the increased speed of the parts, and detent 125 will be gradually shifted back into cam groove 126, restoring yoke 108 to engagement with cam 99, and restoring the action of the governor. The bug will then

go back to its slow pace until such time as it is again struck.

The operation of the device is thought to be clear from the above, sufficient to say the spring is wound by the simple expedient of turning one of the leg units backward while the stop control is engaged. If the bug is struck so as to contact the upstanding wing, it will run away temporarily. The leg-wheels are effective to give the bug a comical waddling motion, and a convenient start and stop control has been provided on the underside of the body where it does not detract from the desired appearance.

While this invention has been described with reference to certain features, structure and material in a particular environment, it will be apparent that various modifications might be made without departing from the principles of this invention.

What is claimed is:

1. In an animated toy of the type having a hollow body, mechanism comprising a motor within said hollow body, leg simulating means on said body and means connected with said motor and with said leg simulating means for actuating the latter in response to operation of said motor, the combination of a governor on said motor arranged to limit the speed of said motor, impact receiving means on said hollow body, means connected with said governor and with said impact receiving means arranged to disable said governor by reason of an impact received by said impact receiving means, and means connected with said motor and with said governor and arranged to automatically restore the action of said governor after limited operation of said motor with said governor disabled.

2. An animated toy simulating an insect, said toy comprising a hollow body portion, a head projecting from one end of said body portion, means for propelling said body portion including a pair of spaced hubs disposed on a common axis transverse to the length of said body portion, one on each side of said body portion, a plurality of legs extending obliquely from each of said hubs in the positions of the elements of a cone, at such an angle that at least one of the legs on each hub will be in contact with a supporting surface beneath said body portion at all times, means in said body portion for rotating said hubs, a tail projecting rearwardly from said body portion into contact with said supporting surface to withstand the torque reaction imparted to said body portion by said means for rotating said hubs, governing means for said rotating means adapted to control the speed of rotation of said hubs, impact receiving means on said body portion connected with said governing means and arranged to disable said governing means by reason of such an impact, and means connected with said disabling means arranged to restore said governing means to operation after limited running of said rotating means, following disablement of said governing means.

3. Driving mechanism for an insect simulating animated toy of the type having a hollow body, leg simulating means on each side thereof, a motor in said hollow body and means connected with said motor and with said leg simulating means to actuate the same in response to operation of said motor, said motor including a frame supported in said body, an arbor, a first gear on said arbor, a driving shaft journaled in said frame and connected to said leg simulating means, in driving relation thereto, speed-up gearing connected in driven relation with said driving shaft, a governor cam connected in driven relation to said driving shaft, a yoke engaged with said governor cam and swingable by rotation thereof to introduce a governing inertial and frictional retarding force into said governor cam, a lever swingable on said frame and on which said yoke is journaled, and positioned so that swinging of said lever in one direction will remove said yoke from said governor cam for ungoverned running of said motor, an impact receiving element

5

shiftable on said body portion, means connected to said impact receiving element and to said lever to swing said lever in said direction as a result of pressure on said impact receiving element, a first cam means on said first gear, detent means on said lever remote from said yoke and engaged with said cam means to maintain said lever in position with said yoke in cooperation with said governor cam, said detent being yieldably disengageable from said cam means by reason of substantial force exerted on said impact receiving means so that said lever may disable said governing means, and a second cam means on said first gear positioned to engage said detent by reason of rotation of said first gear, and shaped to return said detent to a position in engagement with said first cam means, whereby to shift said lever and said impact receiving means into their original positions and restore the operation of said governing means.

4. Driving mechanism for an insect simulating toy of the type having a hollow body, leg simulating means on each side thereof, a spring driven motor in said hollow body, and means connected with said motor and with said leg simulating means to actuate the same in response to operation of said motor, said motor comprising a frame supported in said body, a spring arbor journaled in said frame, a spiral spring having its inner end fixed to said spring arbor and its outer end fixed to said frame, a first gear on said arbor, a driving shaft journaled in said frame and connected to one of said leg simulating means in actuating relation thereto, a second gear on said driving shaft engaged in driving and driven relation with said first gear, a ratchet element on said second gear, a second driving shaft journaled in said frame and connected to another of said leg simulating means in actuating relation thereto, a third gear on said second driving shaft, a ratchet element on said third gear engaged with the ratchet element on said second gear, speed-up gearing connected in driven relation with said second driving shaft, a governor cam connected in driven relation to said

6

second driving shaft through said speed-up gearing, a yoke engaged with said governor cam and swingable by rotation thereof to introduce a governing inertial and frictional retarding force into said governor cam, a lever swingable on said frame and on which said yoke is journaled, and positioned so that swinging of said lever in one direction will remove said yoke from said governor cam for ungoverned operation of said motor, an impact receiving element shiftable on said body portion, means connected to said impact receiving element and to said lever to swing said lever in said direction as a result of pressure on said impact receiving element, a first cam means on said first gear, detent means on said lever remote from said yoke and engaged with said cam means to maintain said lever in position with said yoke in cooperation with said governor cam, said detent being yieldably disengageable from said cam means by reason of substantial force exerted on said impact receiving means so that said lever may disable said governing means, and a second cam means on said first gear positioned to engage said detent by reason of rotation of said first gear, and shaped to return said detent to a position in engagement with said first cam means, whereby to shift said lever and said impact receiving means into their original positions and restore the operation of said governing means.

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