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HEARTBEAT MECHANISM  
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FIG. 1

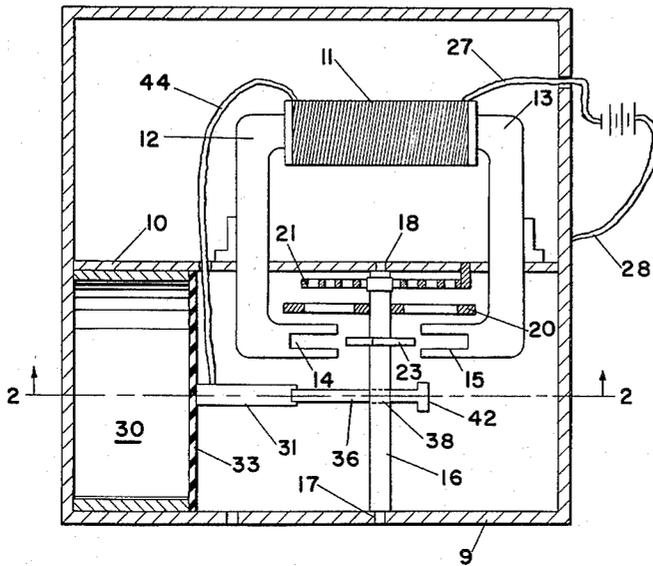


FIG. 2

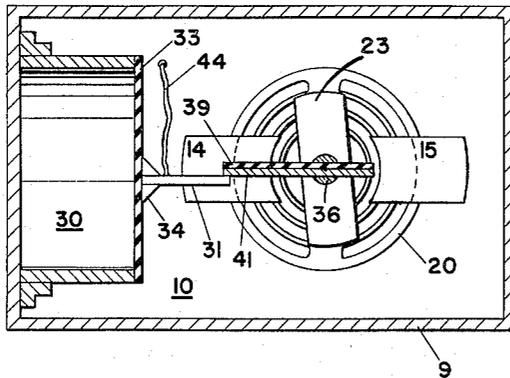
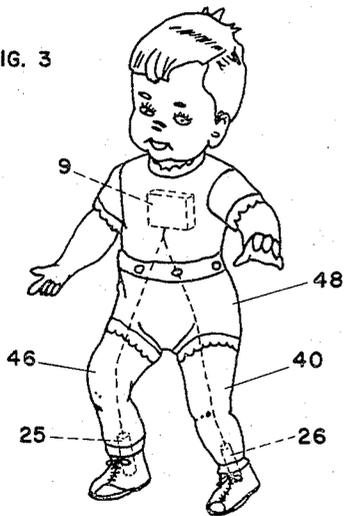


FIG. 3



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## HEARTBEAT MECHANISM

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5 Claims. (Cl. 46—232)

This invention relates to toys and to sound producing means for simulating the beat of a human heart in said toys.

Various toys have been constructed in the past in which there has been some means for simulating a particular noise within the toy, such as the firing of a gun, the beating of a heart, the ticking of a watch or the playing of certain musical themes. The mechanism in these toys was generally spring wound and adapted to run for a very short period of time. While this made the toys inexpensive to manufacture, it also rendered the pleasure received from these toys of short duration.

It is the object of the present invention to provide an electro-magnetic means for simulating the beats of a human heart and to operate such means through batteries which will last at least six months of continuous running.

It is a further object of the present invention to provide an oscillating balance wheel and staff which will operate in any position of the toy, and which during the oscillation will engage a diaphragm to vibrate said diaphragm and cause sounds which will simulate the beating of a heart.

It is still a further object of the present invention to provide batteries which may be quickly and easily replaced when exhausted and which may be so mounted within the toy that they will serve as weights to assist in maintaining the toy in a desired position such as a sitting position or an erect position.

It is a further object of the present invention to provide a unit containing a balance wheel serving as an oscillating member, a resonant chamber and a vibrating diaphragm attached to said chamber, the oscillation of the balance wheel causing the diaphragm to vibrate and simulate the beating of a human heart.

The invention is illustrated in the accompanying drawing in which:

Figure 1 is a vertical section of the mechanism used in producing the heart beats.

Figure 2 is a section on line 2—2 of Figure 1 looking in the direction of the arrows.

Figure 3 is a view of a simulated toy in the form of a doll showing the location of the heart beat producing mechanism and the batteries.

Referring particularly to the drawings, a housing 9 is formed with a central web 10 supporting an electro-magnet 11 having pole pieces 12 and 13. The pole pieces 12 and 13 are substantially U-shaped and are formed with yokes 14 and 15 at their free ends. A balance staff 16 journaled at 17 and 18 in the housing and web respectively supports a balance wheel 20 and a hairspring 21. Also attached to the balance staff is an armature 23 adapted to move between the arms of the yokes 14 and 15. The batteries 25 and 26, located at some place in the toy where it will be convenient for replacement and to establish the weight of the batteries in a proper position in the toy, are connected to the

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electro-magnet by lead 27 and grounded to the housing by lead 28.

A resonant chamber 30 is mounted in the lower section of the housing and has protruding therefrom a substantially rigid rod 31. The rod 31 is attached to a diaphragm 33 by some suitable means such as vulcanizing with rubber as shown at 34 in order to dampen the motion of the rod with respect to the diaphragm. The rod projects from the diaphragm at right angles and in the path of movement of a rectangular cross arm 36. The rectangular cross arm 36 is slidably mounted in a slot 38 in the balance staff 16 and is positioned so as to engage the end of the rod 31 with the oscillating movement of the balance staff.

The cross arm 36 is formed of two separate sections secured together, a section 39 formed of insulating material and a section 41 formed of conducting material. This cross arm is slidably mounted in the balance staff 16 and is formed with a head 42, the ends of which may be filed or ground to provide for the adjustment of the cross arm 36 so that the member will be in balance.

The end of the coil 11 is connected by lead 44 to the substantially rigid rod 31 to provide electrical contact between the rigid rod 31 and that portion 41 of the cross arm 36 which contact will energize the coil 11 and impart movement to the armature 23 thus providing with each stroke in a counter-clockwise direction an impulse to the balance wheel while movement in a clockwise direction will cause the rod 31 to be engaged by the insulated portion 39 of the cross arm 36 brushing the rod 31 to one side without making an electrical connection, thus providing impulse to the balance wheel in one direction only.

In the operation the balance wheel is periodically impulsive to provide oscillation to the balance staff 16 which in turn causes the cross arm 36 to engage the rod 31 and to produce a vibration of the diaphragm 33 which in turn produces an audible sound in the chamber 30 which closely simulates the beating of a human heart.

Batteries 25 and 26 mounted in the legs 46 of a doll 48 may be easily replaced by removing a screw cap in the bottom of the feet and inserting the battery in clips which are not shown and which are of the usual construction. The batteries are of the simple pen flashlight type and may be purchased at any store. These batteries should provide sufficient energy to operate such toy for at least a period of six months.

The housing 9 is located approximately as shown in Figure 3 and simulates the beating of a human heart in a toy for periods up to six months without replacement of the batteries, thus giving the illusion of life within the toy.

In operation the device is first energized from the initial rest position shown in Figure 2 and receives an impulse by way of armature 23 driving balance wheel 16 and cross arm 36 in a counterclockwise direction past rod 31. Balance wheel 20 rotates in a counterclockwise direction until arrested by the resiliency of hairspring 21. Hairspring 21 is constructed in the conventional manner of an electric clock to prevent rotation of the balance wheel more than 360° in either direction. Upon the return stroke of the balance wheel, cross arm 36 engages rod 31 again brushing it aside out of the path of movement of the cross arm. The resiliency of diaphragm 33 allows rod 31 to flex away and laterally from moving cross arm 36 to permit the cross arm to brush past the rod.

As a result, cross arm 36 imparts movement to rod 31 which movement has a substantial lateral component causing inward moving of diaphragm 33 and compression of the air in resonant chamber 30. Movement of

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rod 31 under the influence of cross arm 36 and hence the movement of diaphragm 33 is relatively rapid thus producing a snap action and a beat sound amplified in the resonant chamber 30.

During this clockwise movement of the balance wheel 5 the insulated portion 39 of cross arm 36 impinges upon rod 31 so no connection is made and the balance wheel continues to rotate in a clockwise direction carrying arm 36 away from rod 31 in a further clockwise direction of less than 360°.

At the end of the clockwise stroke, hairspring 20 returns the balance wheel and cross arm 36 in a counterclockwise direction to the position shown in Figure 2 where conductive portion 41 of cross arm 36 again engages rod 31 to thus establish electrical connection through coil 11 imparting a second energizing pulse to the balance wheel in a counterclockwise direction.

It is apparent that during operation the resonant chamber is energized upon both the clockwise and counterclockwise strokes whereas the balance wheel is energized only during the counterclockwise movement thereof and is returned in the clockwise direction in the conventional manner by means of hairspring 20.

The invention may be embodied in other specific forms without departing from the spirit or essential characteristics thereof. The present embodiment is therefore to be considered in all respects as illustrative and not restrictive, the scope of the invention being indicated by the appended claims rather than by the foregoing description, and all changes which come within the meaning and range of equivalency of the claims are therefore intended to be embraced therein.

What is claimed and desired to be secured by United States Letters Patent is:

1. A heartbeat simulating mechanism comprising a balance wheel and staff mounted for rotation, electromagnetic energizing means for rotating said wheel and staff, hairspring means coupled to said wheel and staff, means carried by said wheel and staff for periodically

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coupling said energizing means to said wheel and staff for producing oscillations thereof, said coupling means including rigid means projecting outwardly from said staff, a resonant chamber including a diaphragm positioned adjacent said staff, second rigid means projecting from said diaphragm in the direction of said staff in the path of movement of said first rigid means carried by said staff, said first rigid means including an electrically conductive portion for establishing electrical contact through said second means to said energizing means during rotation of said wheel and staff in only one direction.

2. A mechanism as defined in claim 1 in which said energizing means comprises an electromagnet connected to a battery.

3. A mechanism as defined in claim 2 in which said means carried by said wheel and staff comprises a longitudinally adjustable cross bar carried by said staff.

4. A mechanism as defined in claim 3 in which said cross bar is formed of two separate sections, one of insulating material and the other of electrically conductive material.

5. A mechanism as defined in claim 3 in which said cross bar comprises a laminated rod, one of said laminations serving as an electrical conductor for connecting said battery to said electromagnet, the other lamination forming an electrical insulator.

References Cited in the file of this patent

UNITED STATES PATENTS

30	312,178	Bacon	Feb. 10, 1885
	785,874	Gould	Mar. 28, 1905
	1,329,083	Jamin	Jan. 27, 1920
	2,603,035	Countzman	July 15, 1952
35	2,749,699	Laviolette	June 12, 1956
	2,757,480	Uchill	Aug. 7, 1956

FOREIGN PATENTS

1,024,764	France	Jan. 10, 1953
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