Aug. 16, 1966 W. FELSHER 3,266,187

MAGNETICALLY ACTIVATED CONTROLS FOR TOYS

Filed Dec. 26, 1962

Fig. 1.



Fig. 2.

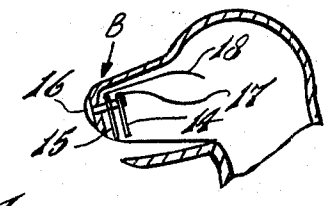


Fig. 3.

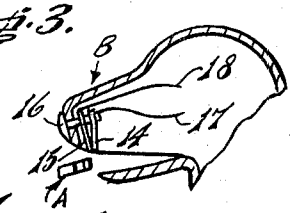
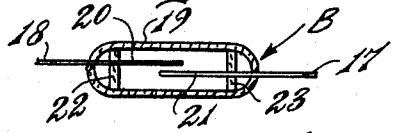


Fig. 4.



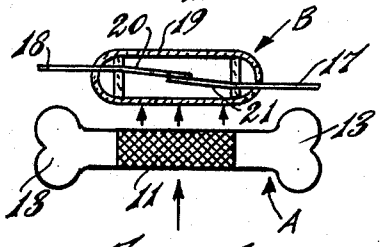


Fig. 5.

Fig. 6.

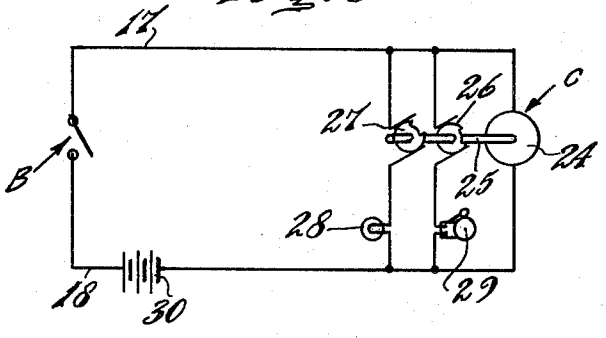


Fig. 7.

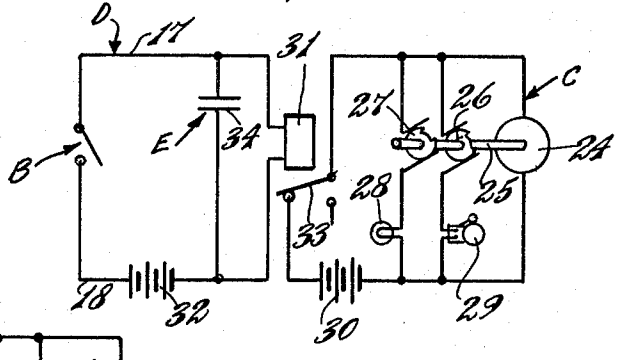
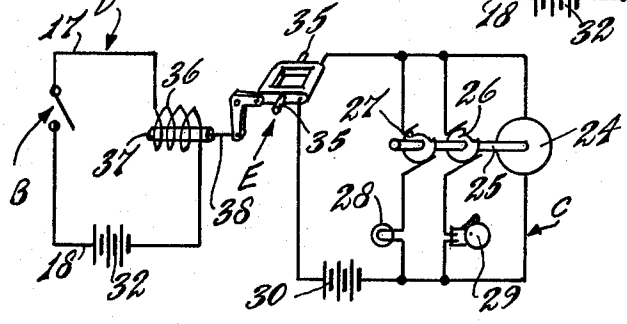


Fig. 8.



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3,266,187

MAGNETICALLY ACTIVATED CONTROLS FOR TOYS

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2 Claims. (Cl. 46—239)

This invention pertains to action toys of the type where a toy operating circuit, including a self-contained source of electromotive force, provides animation, self-propulsion, and/or operates various signals such as noise makers and lights. More particularly, it pertains to magnetically activated controls for causing initiation of such action and for determining the length of time for which such action will continue.

Battery operated toys are becoming increasingly popular with advances in technology and increased sophistication of toymakers. Yet despite the fact that such toys are provided with a wide variety of means for animation, propulsion, and signaling the controls have remained relatively primitive. Often such controls are nothing more than a manually operated on-off switch on the toy or incorporated in a container for batteries which is connected by a wire to the animated toy.

Accordingly it is an object of this invention to provide magnetically activated controls for toys.

Another object of the invention is to provide magnetically activated switches for use in toys which are rugged, cheap to manufacture, and simple in operation.

It is also an object of the invention to provide electronic time delay means for use in connection with magnetically activated controls so that action of the toy continues for a predetermined time.

An additional object of the invention is to provide electromechanical time delay means for use in connection with magnetically activated controls for toys which will permit continued operation of the toy for a predetermined time.

Other objects of the invention are to provide magnetically activated controls for toys of the character described which are easily and economically produced, sturdy in construction, and highly efficient in operation.

These and other related objects of the invention will be apparent to those skilled in the art from a consideration of following detailed description, when read in conjunction with the accompanying drawing, in which:

FIGURE 1 is a perspective view of a magnetically activated toy dog embodying the invention and its related action-initiator.

FIGURE 2 represents a fragmentary detail, in section, showing a magnetically responsive switch of the invention, as used in the toy of FIGURE 1, in open position.

FIGURE 3 is a fragmentary detail similar to FIGURE 2 showing the same switch in closed position under the influence of an action-initiator, which is also shown.

FIGURE 4 is a section through a switch useful in the controls of the invention, shown in open position.

FIGURE 5 is a section showing the switch of FIGURE 4 in closed position under the influence of an action-initiator, which is also shown, partially cut-away.

FIGURE 6 is a circuit diagram, partially diagrammatic, showing one embodiment of the invention.

FIGURE 7 is a circuit diagram, partially diagrammatic, showing another embodiment of the invention adapted to produce an electronic time delay.

FIGURE 8 is a circuit diagram, partially diagrammatic, showing still another embodiment of the invention adapted to produce an electro-mechanical time delay.

Referring now to the drawings, wherein like numerals designate like parts, it will be observed that the magnetically activated controls of the invention comprise a magnetic initiator or activator, generally designated A;

normally-open magnetically-responsive switches generally designated B; toy operating circuits generall designated C; trigger circuits generally designated D and time delay means generally designated E.

Considering now FIGURE 1 we observe an action toy, generally designated **10**, in proximity to a magnetic action-initiator A. In the figure the toy **10** is a dog. In keeping with the spirit of the invention, the action-initiator A, which includes a permanent magnet **11**, insulated and concealed by wrapping **12** and provided with distal ends **13** is made to resemble a bone. Were the toy figure a rabbit, the action-initiator could be disguised as a carrot; were it an antique automobile the action-initiator could be disguised as a manual crank; were the toy an elephant the initiator could be a gaff of the type used by a mahout.

In any event, the nature of the action-initiator should preferably bear a definite and natural relationship to the nature of the action toy.

The switch B, which is responsive to fields of magnetic force emanating from the initiator, is concealed in an appropriate portion of the toy. As shown in FIGURE 1, the switch is in this case, concealed within the dog's muzzle.

Suitable normally-open magnetically responsive switches B are shown in FIGURES 2 to 5 inclusive and are respresented diagrammatically in FIGURES 6 to 8 inclusive. The switch in FIGURES 2 and 3 comprises a first spring blade **14**, preferably made of paramagnetic material and a second blade **15**, preferably made of electrically conductive non-magnetic material such as copper. These blades are held in place in the toy by a stud **16** made of non-magnetic non-conductive material and the same stud, if desired may serve to keep them in spaced-apart electrically-insulated relationship as shown in FIGURE 2. Alternative spacer, mounting and insulating means may be used. In this figure the switch is open and the blades **14** and **15** are not in contact with each other.

In FIGURE 3, however, due to the proximity of action-initiator A from which a field of magnetic force emanates, the paramagnetic blade **14** has been drawn into electrical and physical contact with blade **15**. Lead or wire **17** is connected to blade **14** and a similar lead or wire **18** is connected to blade **15**.

FIGURES 4 and 5 show another normally-open magnetically responsive switch suitable for use in the controls of the invention. This switch is encapsulated in a glass envelope **19** which permits ease of mounting within the toy figure and also protects the blades from mechanical damage and corrosion. Resilient conductive blades **20** and **21** are provided which are kept in insulated, normally spaced-apart relationship by internal plugs **22** and **23** which may be made, for instance, of a ceramic material. One or both of these blades may be made of paramagnetic material just as in the case of the switch described in connection with FIGURES 2 and 3. Further, both blades may be made of magnetic material and oppositely polarized. Such polarization tends to keep the blades in spaced-apart relationship and yet, the field emanating from action-initiator A, when it is in proximity to the switch as shown in FIGURE 5, overcomes the fields of the blades and allows them to come into contact with each other.

In FIGURE 4 the switch is shown in open position and in FIGURE 5, under the influence of the action-initiator A, the blades are in contact and a circuit exists between wires **17** and **18**. Other suitable normally-open magnetically responsive switches for use in the invention are described in the "1961–62 E.E.M. Catalogue" published by Tech Publishers Inc. of Hempstead, N.Y. on page 1462 thereof. Thus, the switches that have been de-

scribed and which are shown in the figures are merely exemplary.

FIGURE 6 shows a typical toy operating circuit of the invention which may be activated by an action-initiator including a permanent magnet. The circuit includes a motor **24** which when in operation, produces motion, animation and the like. The motor shaft **25**, or mechanical extensions thereof, may also be used to activate cam switches **26** and **27**. These switches which are closed electrically for only a portion of a motor revolution are used to activate signal devices such as light **28** and noise-makers, for instance, bell **29**. As is well known in the art, movement produced by the motor **24** may be sequenced with noise controlled by cam switch **26** and lights controlled by cam switch **27** to give very realistic effects. As shown in FIGURE 6 the operating circuit also includes a self-contained source of electromotive force **30**. Still referring to FIGURE 6, when an action-initiator including a permanent magnet is brought proximate switch B, the switch closes in response to the magnetic field of force emanating from the initiator. It stays closed and the action circuit is operative only so long as the initiator is proximate the switch.

In FIGURES 7 and 8 the operating circuit C includes a separate normally-open switch and separate means are provided for closing the switch in response to a field of force emanating from the action-initiator. Considering first FIGURE 7 it will be observed that a trigger circuit D is provided. This is essentially a series circuit including a normally-open magnetically responsive switch B, a relay coil **31** and a self-contained source of electromotive force **32**. The operating circuit C is provided, in effect, with a normally-open switch in the form of contacts **33** which are operatively associated with relay coil **31**. As shown, these contacts are closed and the operating circuit C is therefore energized. Such a condition will obtain when switch B in the trigger circuit is closed. However, this circuit also embodies electronic time delay means, in the form of a capacitor **34**, which is wired in parallel to relay coil **31**. Closure of switch B, therefore, will not only energize coil **31** to activate circuit C but will also charge capacitor **34** from voltage source **32**. When switch B is opened (i.e. upon removal of the action-initiator from its vicinity) the current stored in capacitor **34** will discharge through relay coil **31** keeping it energized, and its associated contacts **33** closed, for a predetermined length of time, which is a function of the capacitance of the trigger circuit D.

Other suitable time delay means, of electro-mechanical nature, are exemplified in FIGURE 8. In the circuit time delay means E is a time delay switch. A suitable switch is fully described in Patent No. 2,990,460 which issued on June 27, 1961. Briefly, such switches are mounted for pivotal movement about a horizontal axis which may conveniently be defined by mounting trunnions **35**. The switch includes a network of tubes partially filled with conductive fluid. Restrictions are provided in the tubes so that time is required for the fluid to move from one position (where a connection is made) to the drained position (where connection is broken). The switch is activated by arcuate motion about the axis defined by trunnions **35** which displaces the conductive fluids. Such time delay switches are normally-open and require mechanical activation before the start of their period of conductivity. Such mechanical motion is provided, in this instance, by trigger circuit D which is a simple series circuit including a source of electromotive force **32**, a normally-open magneticaly responsive switch B and a solenoid coil **36**. Obviously, sources **32** and **30** can be one and the same sources and consequently, hereinafter, the term self-contained source of electromotive force, when used in connection with operating circuits having associated trigger circuits, is intended to mean either a separate source for each circuit or the same source. Operatively associated with solenoid coil **36** is a plunger **37**. As is customary in the solenoid art this plunger is adapted to reciprocate in the coil and is provided with travel limits and is preferably spring loaded. Plunger **37** is connected to time delay switch E by linkages **38** which are appropriately designed to impart arcuate motion to the switch about the axis defined by trunnions **35**. The switch of Patent No. 2,990,460 is merely exemplary of electro-mechanical time delay switches which may be used in connection with the invention.

Although the invention has been described in considerable detail, such description is intended to be illustrative rather than limiting, since the invention may be variously embodied and its extent, consequently, is to be determined by the appended claims.

Having described my invention, I claim:

1. Magnetically activated controls for toys comprising an action-initiator including a permanent magnet; a series trigger circuit within said toy including a normally-open switch, a source of electromotive force, and a relay coil; a capacitor electrically paralleling said relay coil; said switch comprising a first resilient blade connected to one side of said series circuit, a second resilient blade connected to the other side of said circuit, and means for keeping said blades in spaced apart and electrically insulated relationship; a toy operating circuit within said toy including a self-contained source of electromotive force and normally-open contacts, operatively associated with said relay coil, which close to activate said circuit when said coil is energized; a magnetic field of force emanating from said initiator closing said normally-open switch to energize said relay coil and cause closure of the contacts in said toy operating circuit, said relay coil remaining energized after withdrawal of said initiator until said capacitor has discharged.

2. Magnetically activated controls for toys comprising an action-initiator including a permanent magnet; a series trigger circuit within said toy including a normally-open switch, a source of electromotive force, and a solenoid coil with which is associated a plunger adapted to reciprocate as the solenoid is energized and de-energized, said switch closing to energize said coil and cause movement of said plunger in response to a field of magnetic force emanating from said initiator; a toy operating circuit said toy including a self-contained source of electromotive force and a normally-open time delay switch; a linkage connecting said plunger and said time-delay switch, movement of said plunger by energization of said trigger circuit causing said time delay switch to close and current to flow through said operating circuit, said current flow continuing for a predetermined time after current cease to flow in said trigger circuit.

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