United States Patent

[11] 3,533,489

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[21] Appl. No. **841,707**
[22] Filed **July 15, 1969**
Continuation-in-part of Ser. No. 659,161, Aug. 8, 1967, now Patent No. 3,456,762, July 22, 1969.
[45] Patented **Oct. 13, 1970**

[54] **HOUSING FOR AN ELECTRICALLY POWERED MOBILE**
14 Claims, 6 Drawing Figs.

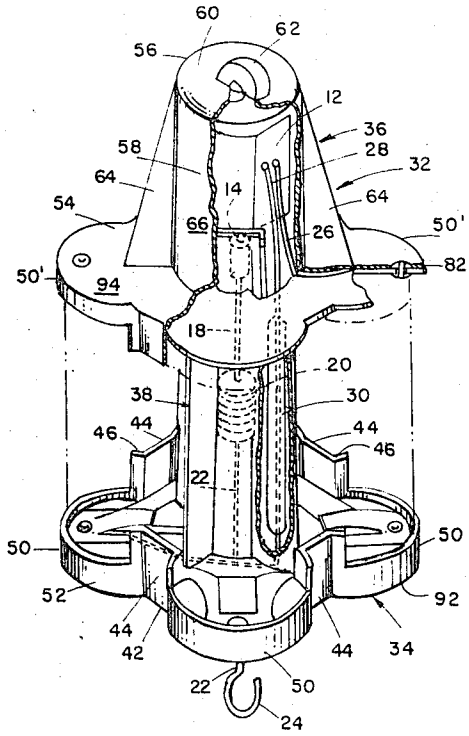
[52] **U.S. Cl.** **185/40,** 40/53, 60/7
[51] **Int. Cl.** **F03g 1/08,** G09f 11/10
[50] **Field of Search** ..... 185/33, 40, 40(B), 41, 45; 40/53; 60/6, 7, 8, 7(A)

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ABSTRACT: Improved housing for a display apparatus including an electric motor, a power supply, an electric circuit connecting the power supply to the motor and a switch assembly connected to the electric circuit in series with the power supply and motor for starting and stopping the operation of the motor, comprising a base member for holding the power supply, a top member for holding the motor and a frame member intermediate the base and top members for holding the switch assembly.



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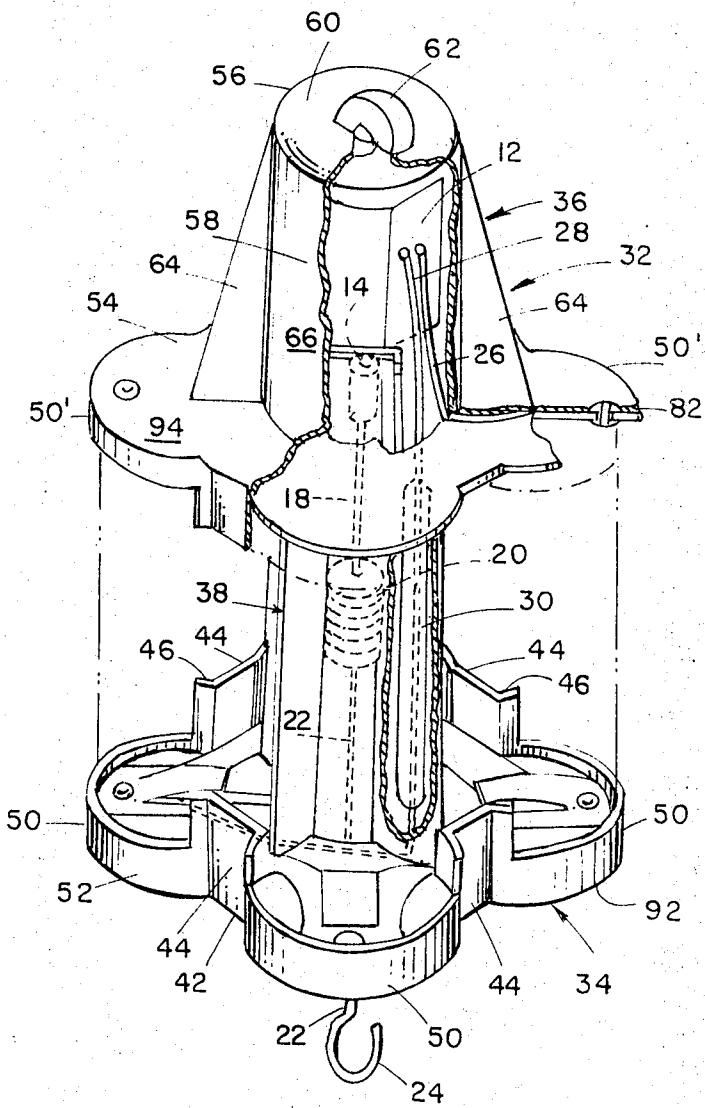


FIG. 1.

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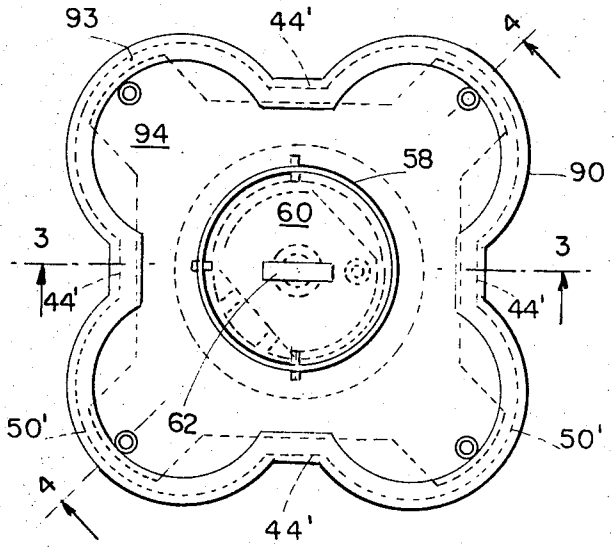


FIG. 2.

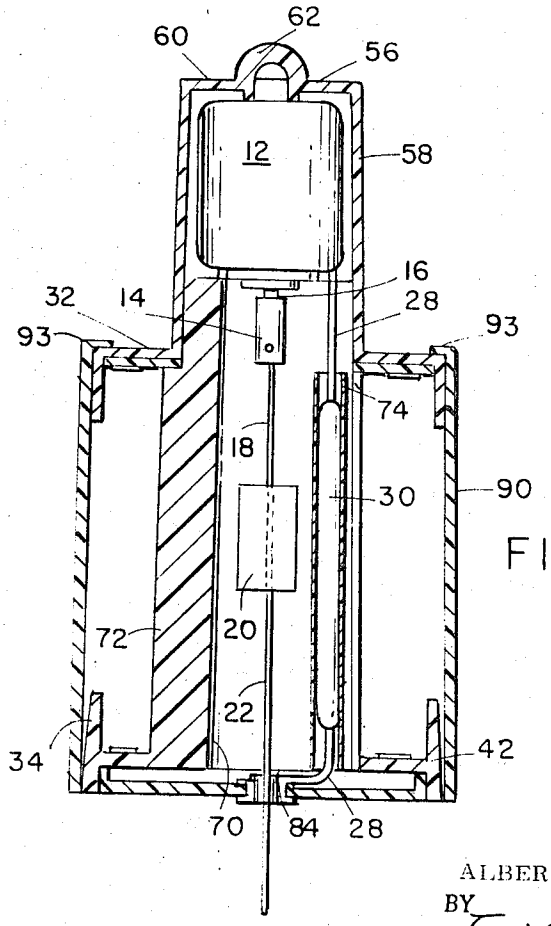


FIG. 3.

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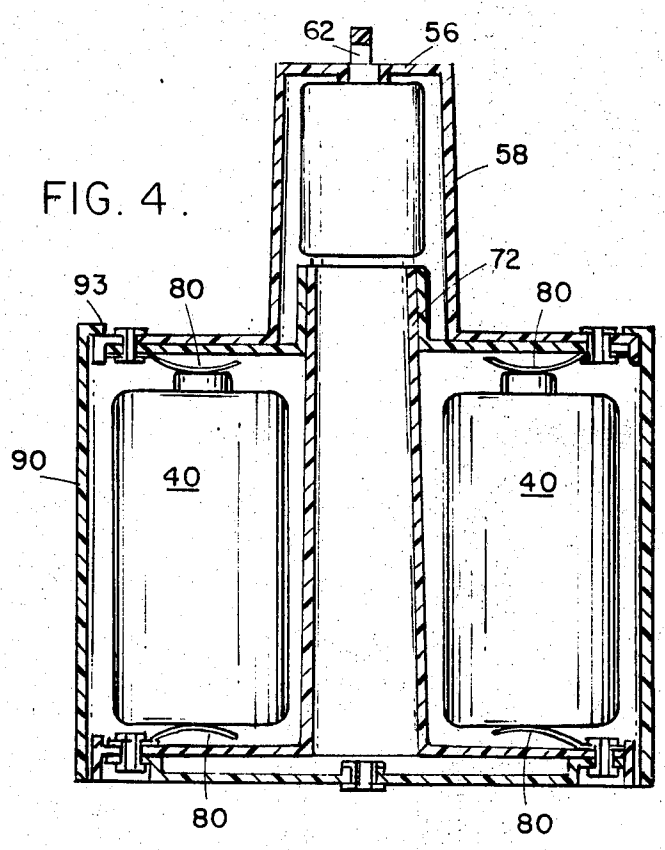


FIG. 4.

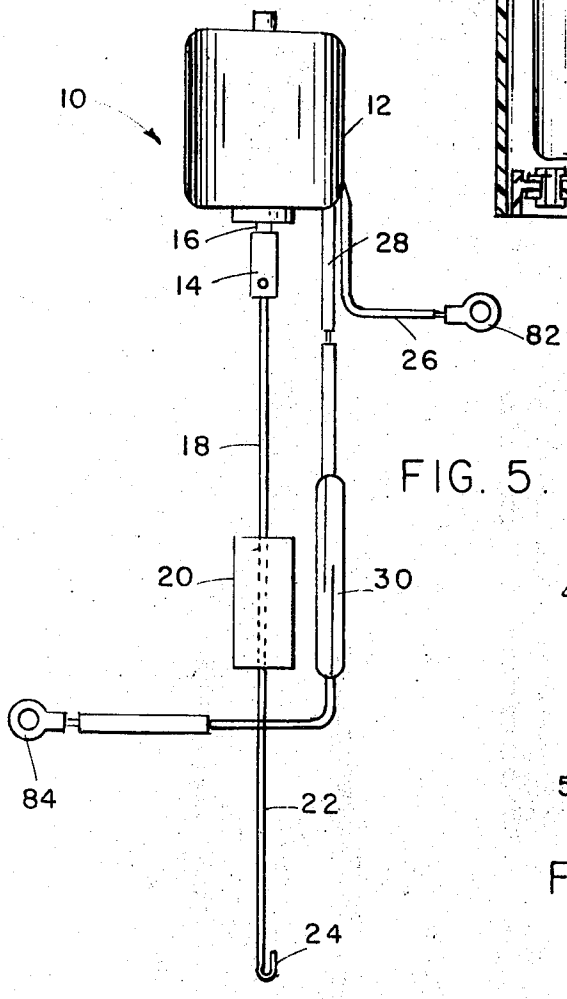


FIG. 5.

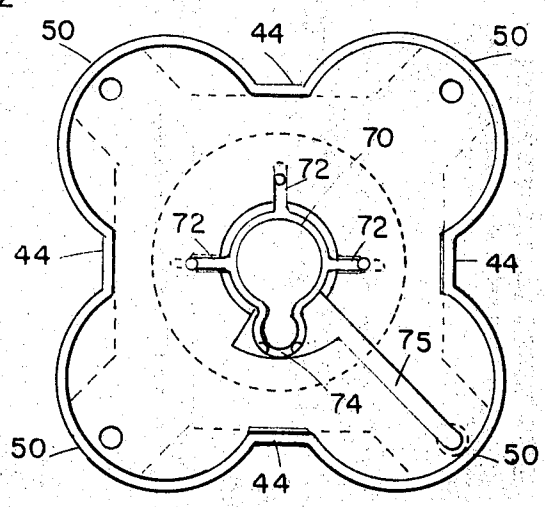


FIG. 6.

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HOUSING FOR AN ELECTRICALLY POWERED MOBILE

REFERENCE TO RELATED APPLICATION

This application is a continuation-in-part of copending U.S. application Ser. No. 659,161 filed Aug. 8, 1967 now U.S. Pat. No. 3,456,762, granted July 22, 1969.

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to an improved housing for a display apparatus comprising an electrically powered mobile.

2. Description of the Prior Art

My copending application discloses a display apparatus in which a display sign or artistic mobile can be caused to rotate for many months powered by a single flashlight battery. The system disclosed therein stores the energy of some rapidly rotating motor shaft or other moving element; the energy is stored by twisting a length or lengths of cord, string, twine, monofilament, chain, or similar thin and flexible material which is attached to the shaft or other moving element; the system senses when a significant level of energy has been stored, and responds by turning off the motor; the energy stored in the twisted string is released in the form of slow rotation of a suspended object or objects with the speed of rotation being variable by varying the air resistance of the objects; the system senses when the stored energy in the twisted string is significantly depleted and causes the motor to start and to operate until the energy store is significantly replenished; the cycle repeats until the power supply of the electric motor is exhausted.

SUMMARY OF THE INVENTION

It is among one of the principal objects of the invention to provide an improved housing for such a display apparatus which housing is extremely efficacious in holding the display apparatus in a balanced relation therewith, and moreover, is adaptable to be rendered decorative in nature so that it may be aesthetically pleasing to the viewer.

In accordance with the present invention, there is provided an improved housing, for a display apparatus including an electric motor; a power supply; an electric circuit connecting said power supply to said motor; switch means connected to said electric circuit in series with said power supply and said motor for starting and stopping the operation of said motor; rotating energy storing means associated with said motor for storing rotating energy; actuating means for opening and closing said switch means; control means operatively associated with said motor and said actuating means and constructed and energized to control the opening and closing of said switch means upon the storing of a predetermined amount of rotating energy in said rotating energy storing means, comprising a base member for holding said power supply, a top member for holding said motor and a frame member intermediate said base and top members for holding said switch, rotating energy, actuating, and control means.

BRIEF DESCRIPTION OF THE DRAWING

The invention will be hereinafter more fully described with reference to the accompanying drawing in which:

FIG. 1 is a view in perspective showing an improved housing constructed in a manner according to the invention in one embodiment thereof.

FIG. 2 is a top plan view of the housing shown in FIG. 1 except that the housing is provided with a removable cover member connecting the top and base members according to another embodiment.

FIG. 3 is a sectional view taken along line 3–3 of FIG. 2.

FIG. 4 is a sectional view taken along line 4–4 of FIG. 2.

FIG. 5 is an elevated view showing the motor and switch assembly for rotating a mobile display.

FIG. 6 is a top plan view of the housing shown in FIG. 1 except as shown with the top member removed.

DESCRIPTION OF THE SPECIFIC EMBODIMENTS

Referring now to the FIGS. in detail, and for ease of the flow of description, initially to FIG. 5, there is shown the motor and switch assembly **10** of an electrically powered mobile comprising a small electric motor **12**, a rotatable coupling **14** connected to the rotating drive shaft **16** of the motor, a length of twistable material **18**, such as a string or cord, monofilament, chain, or similar thin and flexible material, a magnet **20** attached to the end of the twistable material, and a length of wire **22** terminating in a hook **24** being in turn attached to the magnet. The motor is connectable to a power supply by wire leads **26** and **28**, with normally open switch means, such as a proximity switch **30**, connected intermediate the two ends of the wire lead **28** and locatable in a position adjacent to the magnet **20**.

The electrically powered mobile **10** is mountable in a housing **32** constructed in the manner according to the invention. Housing **32** comprises a base member **34**, a top member **36** and a frame member **38** intermediate the base and top members.

Base member **34** is adapted to hold the power supply for the motor and switch assembly earlier described, the power supply consisting of four conventional 1.5 volt dry cell batteries **40**, base member **34** further comprising a recessed body **42** having two pairs of parallel opposing side walls **44**. The respective ends **46** of each side wall terminate and merge into rounded corners **50**, each adaptable to hold a battery **40**. As shown, the corner walls **52** are lower than the side walls **44** so that the batteries may be more easily placed therein when the housing **32** is fully assembled.

The top member **36** comprises a lower portion **54** and an upper portion **56**. The lower portion **54** is constructed in a manner identical to the base portion **34**, and its component parts are similarly numbered except that the numerals are primed, thereby providing a balanced construction to the housing, because when the housing **32** is fully assembled, lower portion **54** and base member **34** will be in directly opposed spaced relation. The upper portion **56** of the top member consists of a hollow generally cylindrically shaped body **58** adapted to receive the motor housing **12**. The cylindrical body **58** is closed by a cover **60** to which is joined a semiannular shaped body **62** through which may be attached a supporting string or wire. A pair of opposingly disposed right triangular shaped wings **64** extending in the direction of two opposing corners **50'** are provided along the vertical exterior wall **66** of the cylindrical body **58**. These wings provide added balance for the top member as well as the housing and also effect a more decorative look to the top member.

Intermediate the base member **34** and top member **36**, and in generally central relation therewith, is provided the frame member **38**. The frame member **38** is adapted to hold the switch assembly of the electrically powered mobile which was earlier described. The frame member **38** comprises a hollow generally cylindrical body **70** provided with three outwardly radially extending webs **72** which will serve to define compartments for, and to provide additional support for, the batteries **40** containable in corners **50**. Additionally, in opposition to one of the webs **72**, there is provided another supplementary hollow cylindrical body **74** which is in opening relation with the cylindrical body **70**. Thus, looking, for example, at FIG. **6** specifically, a web **72** will extend in the direction of, and in bisecting spaced relation to, each of the three walls **44**, while supplementary cylindrical body **74** will similarly extend in the direction of the one remaining wall **44**.

Thus in a housing, as just described, the motor **12** will be locatable in cylindrical hollow body **58**, the proximity switch **30** will be locatable in supplementary cylindrical body **74** and the rotatable coupling **14**, twistable material **18**, magnet **20** and wire **22** will be containable in hollow cylindrical body **70**. The twistable material **18** is of such a length that the magnet **20** is adjacent to the magnetic reed (or proximity) switch **30** so that the switch responds to the proximity of the magnet by closing. This will become readily apparent by referring specifi-

cally to FIGS. 1 and 3. Suitable spring-leaf battery contacts 80 are provided in complementary positions in each of the upper and lower corner members 50 and 50'. With the motor and switch assembly and the batteries installed in the housing 32, wire lead 26 will be connectable to a terminal of one of the batteries, by means of its solderless terminal 82, and wire lead 28 will be connectable to the proximity switch 30 and in turn to one of the opposing batteries 40, via a channel 75 leading thereto, by its solderless terminal 84. There is also attached to the housing by means of the hook 24 on wire 22 a desired sign, signs object or objects which one is desirous of rotating for viewing purposes.

Now, with the electrical circuit established, the switch closure, above described, activates the motor by means of the wire leads 26 and 28. The rotation of the motor twists the twistable material 18 by causing it to twist about its own vertical axis. Only the twistable material will be twisted by the rotation of the motor shaft, since the weight of the housing will inhibit it from being turned by the motor action. This twisting of the twistable material 18 shortens it and causes the magnet 20 to be upwardly drawn inside the cylindrical body 70. The proximity switch then responds to the increased distance of the magnet by opening and the motor then stops. The energy stored in the twisted string produces a torque in the motor shaft. The friction between motor shaft and motor case transmits this torque to the wire 22 and to any displays or objects attached thereto. The rate of rotation will be determined in great part, and can be varied, by the air resistance generated by these objects. Thus, the larger the area of the object, the larger the air resistance.

When the string unwinds, the motor will again twist it and the cycle will repeat until the battery is depleted.

In an alternate embodiment, a cover 90 may be provided connecting the base and top members 34 and 36 thereby resulting in a completely enclosed housing containing the aforementioned motor and switch assembly. The cover 90 is associatingly shaped to be slidably fittable over the base and top members and is provided with an inwardly directed horizontally extending flange 93 which marginally overlies the periphery of the face 94 of the top member.

The cover 90 is particularly desirable when the housing is in a position exposable to the viewer, since in this condition the batteries and working components of the display apparatus will be completed covered.

The housing may be formed of a suitable rigid material such as a plastic, *e.g.* polystyrene and the like, and it may be colored to heighten its decorative effect.

In accord with the invention, just described, thus there is provided a housing for holding an electrically powered mobile in a balanced as well as decorative setting.

I claim:

1. An improved housing, for a display apparatus including an electric motor; a power supply; an electric circuit connecting said power supply to said motor; switch means connected to said electric circuit in series with said power supply and said motor for starting and stopping the operation of said motor; rotating energy storing means associated with said motor for storing rotating energy; actuating means for opening and closing said switch means; control means operatively associated with said motor and said actuating means and constructed and energized to control the opening and closing of said switch means upon the storing of a predetermined amount of rotating energy in said rotating energy storing means, comprising a base member for holding said power supply, a top member for holding said motor and a frame member intermediate said base and top members for holding said switch, rotating energy, actuating, and control means.

2. A housing according to claim 1 wherein said power supply comprises at least one dry cell battery, said base member comprises a recessed body adapted to hold said battery, said top member comprises a lower portion and an upper portion, said lower portion further comprising a recessed body associatingly constructed to conform to the structure of said base member, to cover said battery, said base member and said lower portion of said top member being in directly opposed spaced relation, said upper portion of said top member comprising a hollow body adapted to receive said motor, said hollow body being closed at one end by covering means to which are joined connecting means to which a support means for said housing are attachable, said frame member being in a generally central relation with said base and top members, said frame member comprising a first hollow body adapted to externally define at least one compartment for said battery with said base and top members, said first hollow body being adapted to contain said rotating energy, actuating, and control means, and a second hollow body in opening relation with said first hollow body for holding said switch means.

3. A housing according to claim 2 wherein said recessed body of said base member is adapted to hold a plurality of dry cell batteries and further comprises two pairs of parallel opposing side walls each having a respective end, the respective ends of each side wall terminating and merging into rounded corners, each adaptable to hold one of said batteries, said lower portion of said top member is adapted to cover a plurality of said batteries and comprises a like recessed body having two pairs of parallel opposing side walls, each having a respective end, the respective ends of each side wall terminating and merging into rounded corners, each adaptable to cover one of said batteries, said upper portion of said top member further comprising a generally cylindrically shaped body closed at one end by a circular cover to which is joined a semiannular shaped body through whose opening may be attached a supporting string or wire, said first hollow body of said frame member further comprising a generally cylindrically shaped body externally provided with three outwardly radially extending webs serving to define compartments for said batteries with the recessed bodies of said base and top members, said second hollow body being integral with said first hollow body and being generally cylindrically shaped and in opposition to one of said webs.

4. A housing according to claim 3 wherein battery contact means are provided in complementary positions in each of the opposed corners of said lower portion of said top member and said base member.

5. A housing according to claim 3 wherein said hollow cylindrical body of said top member is provided with external balancing means.

6. A housing according to claim 5 wherein said external balancing means comprise a pair of opposingly disposed wing members extending in the direction of two opposing corners of said recessed body forming the lower portion of said top member.

7. A housing according to claim 3 wherein the height of the walls of said rounded corners is lower than the height of said ends walls.

8. A housing according to claim 1 having covering means connecting said top and base members.

9. A housing according to claim 8 wherein said covering means further comprise a cover member associatingly shaped to conform to the configuration of said base and top members so as to be slidably engageable thereover.

10. A housing according to claim 9 wherein the lower portion of said top member includes a face portion and said cover member is provided with an inwardly directed horizontally extending flange which is adapted to marginally overlie the periphery of said face portion when said cover member is in the slidably engaged position.

11. A housing according to claim 5 wherein said wing members are each generally right triangular in configuration.

12. A housing according to claim 3 wherein four dry cell batteries are provided, one in each corner position.

13. A housing according to claim 4 wherein four dry cell batteries are provided, one in each corner position.

14. An improved housing, for a display apparatus including an electric motor, a power supply, an electric circuit connecting the power supply to the motor, and a switch assembly con-

nected to the electric circuit in series with the power supply and motor for starting and stopping the operation of the motor, comprising a base member for holding said power supply.

a top member for holding said motor, and a frame member intermediate said base and top members for holding said switch assembly.