A. C. GILBERT.

TOY ELECTRIC MOTOR.

APPLICATION FILED APR. 18, 1916.

1,323,045.

Patented Nov. 25, 1919.

2 SHEETS—SHEET 1.

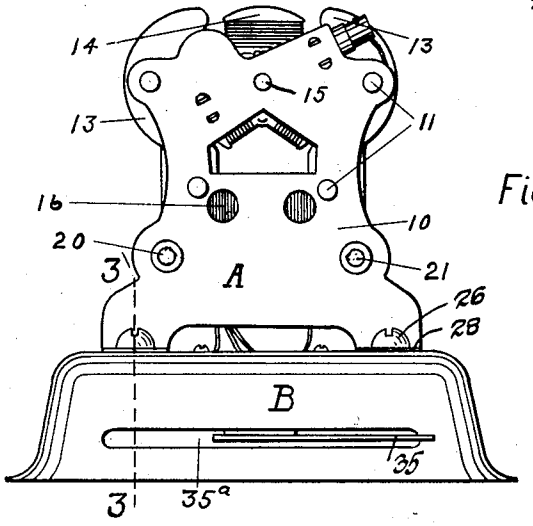


Fig 1

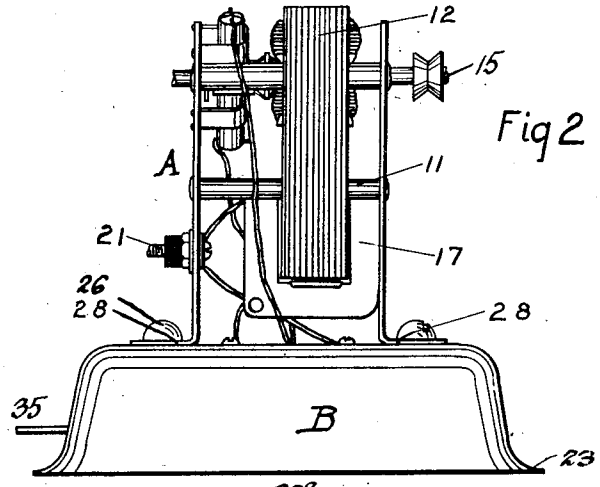


Fig 2

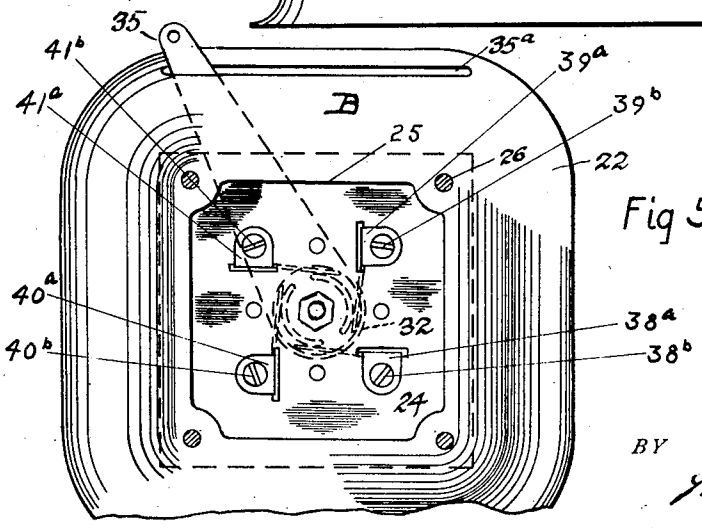


Fig 5

INVENTOR.
Alfred C. Gilbert
BY
ATTORNEY

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2 SHEETS—SHEET 2.

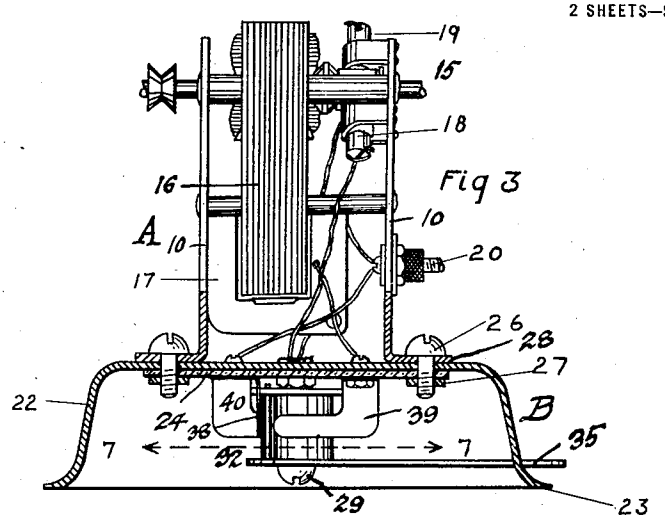


Fig 3

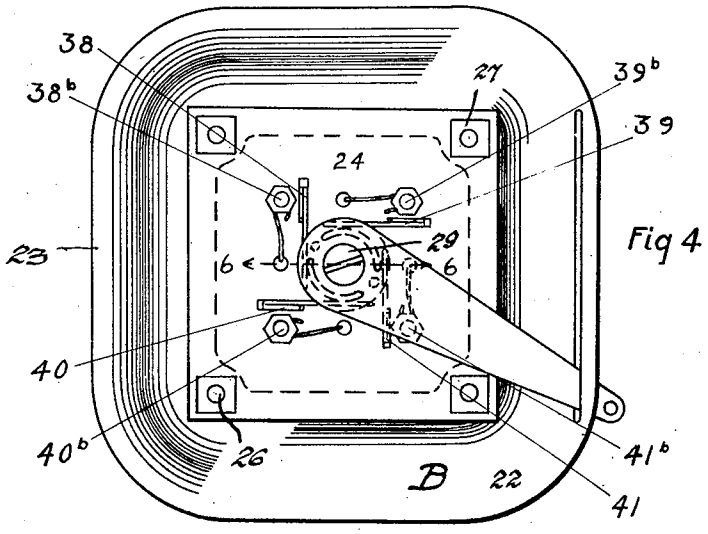


Fig 4

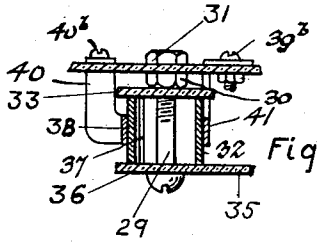


Fig 6

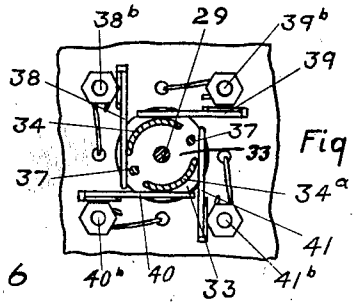


Fig 7

INVENTOR.

BY Alfred C. Gilbert

ATTORNEY

UNITED STATES PATENT OFFICE.

ALFRED C. GILBERT, OF NEW HAVEN, CONNECTICUT, ASSIGNOR TO THE A. C. GILBERT COMPANY, OF NEW HAVEN, CONNECTICUT, A CORPORATION OF CONNECTICUT.

TOY ELECTRIC MOTOR.

1,323,045. Specification of Letters Patent. Patented Nov. 25, 1919.

Application filed April 18, 1916. Serial No. 91,976.

To all whom it may concern:

Be it known that I, ALFRED C. GILBERT, a citizen of the United States, residing in the city and county of New Haven and State of Connecticut, have invented certain new and useful Improvements in Toy Electric Motors, of which the following is a full, clear, and exact description.

This invention relates to toy electric motors, and more particularly to a toy motor having a pole changing switch, by means of which it may be reversed, although in some aspects of the invention this is not an essential feature.

One of the primary objects of the invention is to provide a toy motor having an improved form of base, which is detachable from the motor so that in using the motor for operating various toy models, such as elevators, bridges and the like, the motor proper may be used with or independently of the base as desired. In the case where a reversing motor is required, the motor proper is provided with a base having a reversing switch. Where a control of the speed of the motor is desired, the base may be equipped with a rheostat in place of the reversing switch.

My improved motor is therefore adapted to fulfil many different conditions when used as a toy, and furthermore the construction of the several parts is very simple so that they can be readily assembled and taken apart.

To these and other ends, the invention consists in the novel features and combinations of parts to be hereinafter described and claimed.

In the accompanying drawings,

Figure 1 is a side elevation of a toy motor embodying my improvements;

Fig. 2 is an end elevation thereof;

Fig. 3 is an end elevation, partly in section, on line 3—3 of Fig. 1;

Fig. 4 is a bottom view of the base or foundation plate;

Fig. 5 is a top view of the base, the screws securing the motor proper to the base being shown in section;

Fig. 6 is a detail section on line 6—6 of Fig. 4; and

Fig. 7 is a detail of the reversing switch, partly in section on line 7—7 of Fig. 3.

The toy motor installation shown in the drawings comprises an electric motor proper A, and a detachable base or foundation plate B for said motor. The main parts of the motor A are for the most part of usual construction. The motor has side plates or frames 10 tied together by rods 11, and supporting a laminated field magnet core 12 of horseshoe type. Between the poles 13 of the field magnet, an armature 14 is rotatably mounted in the usual manner, said armature being fixed to a shaft 15, journaled in the side plates or frames 10. The field magnet 12 is energized by a coil 16 wound around the lower intermediate portion thereof between insulating plates 17. In the form shown, the armature has three poles, each wound in the usual manner, the winding of each pole being connected to a corresponding segment of a suitable commutator (not shown), coacting with the usual brushes 18, 19. Binding posts 20, 21 mounted on one of the side plates 10 are adapted to be connected with a battery or other source of current in the usual manner.

The base B is preferably constructed as follows: The main part is stamped up from a single sheet metal blank so as to present a cup-shaped plate 22 having a lateral supporting flange 23 at the lower edge thereof. The base is entirely open at the bottom but closed at the top by means of a plate or insert 24 of fiber or other insulating material. The base plate has an aperture at the top, as shown at 25, and the insulating plate 24 is set over the aperture from beneath and clamped against the margins thereof by screws 26 having nicked heads and nuts 27. These screws are also instrumental in securing the motor A to the base, for which purpose integral lugs 28 bent outward from the side plates 10 at the corners of the motor are provided with perforations which are adapted to register with the openings in the base plate 22 and insulating plate 24 through which the screws 26 pass. Fig. 3 shows how the parts are assembled, and how each screw passes through an outstanding lug of the motor, a portion of the base plate 22, and a corner portion of the insulating plate 24. When the motor proper is detached from the base, the screws 26 may still serve as a means for securing the insulating plate to the main base plate. Preferably, the screw openings are all lo-

cated at the corners of a square, so that the parts may be conveniently secured together in various angular adjustments.

In the particular form shown, the insulating plate 24 serves as a mounting for a pole changing switch for the motor, although it may also serve as a mounting for a rheostat or the like. In the example illustrated, the construction of the pole changing switch is as follows: In the center of the insulating plate, a depending post 29 is mounted by means of nuts 30, 31, so as to extend downward within the hollow base, and on this post a switch member or distributer 32 is swiveled. This switch member may comprise an upper disk 33 of fiber or other insulating material, two spaced arc-shaped segments 34, 34^a placed oppositely to each other, and concentrically with respect to the post 29, and an operating lever 35 for the swinging switch member, comprising a plate portion 36, between which and the disk 33 the segments 34, 34^a are secured in place. The disk 33 and its coöperating clamping portion 36 (also of insulating material) are likewise connected by pins 37 located in the spaces between the segments. At four points around the switch member or segmental drum 32, contact plates 38, 39, 40 and 41 are arranged. Referring, for example, to the contact plate 38, this is formed of an L-shaped sheet metal plate having its upper end 38^a passing through a slot in the insulating plate 24, said upper end being bent laterally and clamped to said plate by means of a screw 38^b. The contact plates 39, 40 and 41 are provided with similar upper bent ends 39^a, 40^a and 41^a secured in place by screws 39^b, 40^b and 41^b, which are also adapted to act as binding posts. Near each screw a suitable perforation is provided for leading a wire through the plate to the corresponding binding post.

The arrangement is such that when the lever 35 is swung into the position shown in Fig. 4, connection will be established between the binding post 38^b and the binding post 40^b by way of the contact plate 38, segment 34^a and contact plate 40, both of which contact plates may contact with this segment in this adjustment. In a similar manner, connection is simultaneously established between the binding posts 39^b and 41^b. When, however, the operating lever 35 is swung to the other limit of its movement, the parts assume the positions shown in Fig. 7, and it will be observed that the binding post 38^b is connected with binding post 39^b, whereas binding post 40^b is connected with binding post 41^b. The operating lever 35 is limited in its movement by passing outward through a slot 35 in the base which permits said operating lever to have the requisite travel and arrests it in the required positions. When the lever occupies a central position in its slot, the current is cut off by virtue of the provision of the pins 37, which in this adjustment engage the plates 38, 41 and hold them out of contact with both segments. In this manner, short circuiting is prevented because the pins 37 are so located as to prevent two adjacent contact plates from making contact with two of the switch segments at the same time. It will be understood of course that the pins 37 are insulated by the insulating material of the disk 33 and lever 35.

I have not considered it necessary to describe in detail the particular wiring by which reversal of the motor may be obtained by operation of the switch. The motor shown is a series motor, and reversal is obtained by changing the direction of the current flow through the armature. If the binding post 20 is considered the positive pole of the motor, in the switch adjustment shown in Fig. 7, the current will pass from this pole to the binding post 38^b, thence to the binding post 39^b, thence to brush 18, through the armature to the brush 19, thence to binding post 40^b of the reversing switch, thence to binding post 41^b, thence through the field winding 16, and out through the binding post 21. On the other hand, when the reversing switch occupies the position shown in Fig. 4, the current passes from binding post 20 to binding post 38^b, thence to binding post 40^b, thence to brush 19, through the armature to brush 18, thence to binding post 39^b, thence to binding post 41^b, and thence outward through the field winding.

Various changes in the details of the construction may be adopted without departing from the scope of the invention as defined in the claims.

I do not claim herein the electric switch *per se*, as the same is claimed in my divisional application, Serial No. 203,976, filed Nov. 26, 1917.

What I claim is:

1. The combination with a toy electric motor, of a hollow base supporting said motor and having an opening in the upper part thereof, a plate covering said opening, means for detachably securing said plate to the base, and a switch for the motor mounted on said plate, said opening provided to permit convenient access to said plate and to the terminals of the switch mounted thereupon; substantially as described.

2. The combination of a toy electric motor having outstanding perforated lugs at the lower corners thereof, a hollow base having perforations in the upper part thereof registering with those in said lugs, said base having a central cut-away portion, a plate within said cut-away portion contacting at its edges with the surface of the base around said cut-away portion, and fastening screws

passing through said lug perforations, said base perforations, and through perforations in said plate; substantially as described.

3. The combination of an electric motor, a separate base supporting said motor and having an opening beneath the motor, a member of insulating material closing said opening, and a controlling device for the motor mounted on said insulating member and projecting downward therefrom into the base, said opening provided to permit convenient access to said insulating member and the controlling device mounted thereupon.

4. The combination with an electric motor, of a separate hollow base therefor having an opening in the upper part thereof beneath the motor, a plate of insulating material adapted to cover said opening, a switch for the motor mounted on said plate and bodily carried thereby, and means for detachably securing the motor, base and insulating plate together.

5. The combination of an electric motor, a hollow base member therefor, an insulating plate having a switch mounted thereon, said motor, base member and insulating plate all having registering openings, and detachable fastenings extending through said registering openings for securing all said parts detachably together.

6. The combination of an electric motor, a base member on which said motor is superimposed, said base member being hollow and open at the top, an insulating plate closing the open top portion of said base member and having a motor controlling device mounted thereon, and means for detachably securing the motor, base member and insulating plate together, each of said parts being readily separable from the others when said fastening means is removed.

7. The combination of an electric motor, a base member on which said motor is superimposed, said base member being hollow and open at the top, an insulating plate inclosing the open top portion of said base member and having a motor controlling device mounted thereon, and fastening screws for detachably securing the motor, base member and insulating plate together, each of said parts being readily separable from the others when said fastening screws are removed.

In witness whereof I have hereunto set my hand on the 13th day of April, 1916.

ALFRED C. GILBERT.