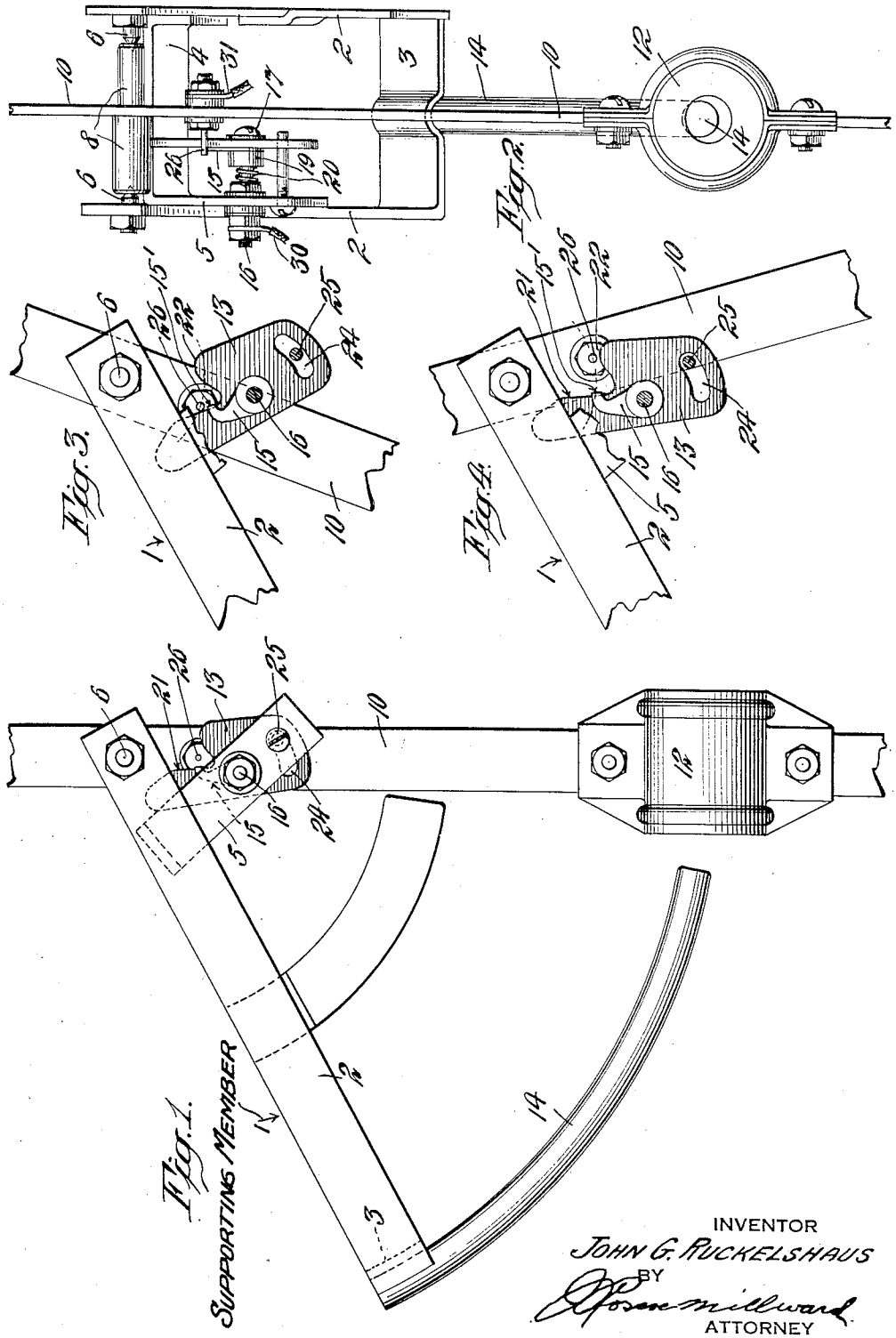
March 3, 1936. J. G. RUCKELSHAUS 2,032,889

MAGNETIC MOTOR

Filed July 12, 1935



INVENTOR
JOHN G. RUCKELSHAUS
BY
ATTORNEY

Patented Mar. 3, 1936 2,032,889

UNITED STATES PATENT OFFICE

2,032,889

MAGNETIC MOTOR

John G. Ruckelshaus, East Orange, N. J.

Application July 12, 1935, Serial No. 30,952

3 Claims. (Cl. 172—126)

The present improvements relate to the construction of magnetic motors of the oscillatory type and an object thereof is to produce a simplified power device which will be durable and dependable in its operation. A further particular object thereof is to be operable with a minimum requirement of electrical energy thus to be adapted for operation by battery current over extended periods as a result of economical current consumption.

Important features of the present improved structure which contribute to the economical operation consist in the employment, as the actuator or impeller member, of a pivotally supported arm carrying at its lower end a magnet coil operative as a pendulum weight and cooperating with a fixed armature rod curved to conform to the path of movement of the coil and combined therewith a simple, efficient and durable type of circuit closing contact member adapted to be engaged by a co-acting terminal contact element carried by the swinging actuator arm for interval closing of the energizing circuit in one direction of the arm movement. The improved contact arrangement provides for the closing of the circuit for but a short interval in the movement of the actuator arm and in timed relation to impart a driving impulse at the interval or position of greatest effectiveness of the magnetic pull whereby maximum ratio of power for current consumption is obtained.

The described and other important features and advantages of the present improvements will be more fully understood by reference to the accompanying drawing wherein like reference characters are applied to the corresponding parts in the several views.

In the drawing:

Fig. 1 is a view in front elevation showing my improved motor construction.

Fig. 2 is a view thereof in side elevation and

Fig. 3 is a detail view in elevation of the terminal contact member.

Fig. 4 is a similar view showing another position.

In the approved embodiment of the features of the present invention as here shown, the improved oscillatory motor is designed to be adapted as the prime mover for operating animated advertising displays particularly with battery energizing circuits. It comprises the supporting member or bracket 1 adapted to be rigidly secured to a panel or other member of an advertising display having movable parts to be operated by the motor. The bracket 1, as shown, is formed of flat bar metal bent in U form providing a supporting yoke having oppositely positioned, parallel side bars 2—2 connected by the integral end cross-bar 3 and near the opposite end by a cross-bar and terminal supporting member 4 having an angularly and downwardly extended arm 5. The extended free ends of the bracket side bars 2 have threaded therein the oppositely positioned and aligned bearing pins 6—6 having tapered inner bearing ends providing journal bearings for the bearing hub 8 secured to the swinging actuator or impeller arm 10 centered with relation to the bracket arms 2—2. The actuator arm 10 at the lower end of its portion depending from the fulcrum has affixed thereon an electro-magnetic coil 12 of the solenoid type having a central longitudinal opening therethrough for the reception of a co-operating armature member. The coil 12 is accordingly supported upon the pivoted actuator arm to act as a pendulum weight thereon and the arm, as shown, is suitably extended above the fulcrum point 6—6 to provide a lever to which connection is made for transmitting the motion to a movable part of the display.

The armature for co-acting with the coil is shown at 13 rigidly mounted upon the bracket cross bar 3 and formed of a curvature concentric with the fulcrum point 6—6 thereby to conform to the path of movement of the coil with which it is centrally aligned whereby the coil will move thereover in its movement with the armature received freely within the coil longitudinal opening. The armature for electrical efficiency is of soft iron rod welded within the recess of the bracket and is of a length and positioned by the bracket, as shown, whereby its free end is in close proximity to the coil when the actuator arm is in normal hanging or vertical position.

In its operation the coil is energized from a suitable electric circuit intermittently to impart a power impulse to the actuator arm. This occurs during each movement of the arm in one direction, towards the left as shown in Fig. 1. In accordance with the present invention the improved switch or terminal contact arrangement comprises a shiftable, pivotally supported terminal contact member supported upon the arm 5 of the supporting bracket and a terminal member to co-act therewith carried by the actuator arm in position to effect circuit closing engagement with the shiftable terminal during a short interval of its movement in one direction and to have a resetting engagement with the shiftable terminal support upon its return move-

ment thereby to reposition the shiftable terminal for the succeeding circuit closing engagement. As shown, the shiftable contact member consists of a supporting member 13 of insulating material to which is affixed a metallic contact element 15 to be shiftable therewith. The member is pivotally supported upon a bearing stud 16 secured on bracket arm 5 and is confined between an inner head 17 on the pivot stud and a collar 19 slidable on the stud and acted on by a coil spring 20 to impose a slight frictional resistance to shifting movement of the member 13. The shiftable member 13 is formed with an upper finger extension providing an inner elongated contact face 21 and a rounded shoulder extension 22 and is further formed with a curved slot 24 within which there is received a projecting pin 25 carried by the arm 5.

Cooperating with the shiftable terminal 13—15 there is a contact terminal pin 26 mounted on the actuator arm 10 and positioned relative to the shiftable terminal member whereby in its movement with the arm toward the left as shown it will first engage a turned over contact portion or lip 15' of the contact member 15 to close the energizing circuit. In its movement, as best shown in Figs. 3 and 4, the pin 26 will ride off the contact 15' as it shifts the member 13—15 toward the left in its movement thereby having a short interval of circuit closing contact only. The shifting of the member 13—15 toward the position of Fig. 3 elevates the shoulder 22 into the path of movement of the pin 26 whereby the latter in the return swing of the actuator arm engages the shoulder 26 and rides thereover to reshift the member 13—15 to an initial position. The frictional resistance of the collar 19 will prevent excess shifting of the shiftable contact member. As will be noted, in the return or resetting movement the pin 26 does not engage the contact 15' so that the circuit is closed at an interval in one direction of the movement of the actuator arm only. The relative positioning of the parts is such as to effect energizing of the coil for a short interval or moment occurring when the armature enters the coil opening and with opening of the circuit approximately at the point when the armature end is fully received within the coil at which point the impulse has been found to be most effective.

The circuit arrangement includes a lead 30 from a battery or other source of current to the pivot stud 16 which is insulated in its mounting upon the bracket arm 5. The current passes therethrough to the contact member 15 having electrical contact with the stud; thence by engagement with the pin 26, insulated from the actuator arm in its mounting, to connection 31 from the pin 26 to the coil at one end, the opposite end of the coil being connected to the actuator arm which grounds through the bearings to the bracket 1 which at a suitable point is connected to a grounding or negative circuit.

While I have shown and described an approved embodiment of the features of my invention, it will be understood that varied modifications may be made therein without departing from the scope of the invention as defined in the appended claims.

Having described my invention, I claim:

1. An oscillatory motor of the character described comprising a supporting member, a pendulum acting actuator arm pivotally supported thereon, a magnet coil supported on the arm at its lower end, a fixed armature to co-operate therewith having a curvature to conform to the path of movement of the coil and circuit controlling means for energizing the coil comprising a terminal contact element supported on the actuator arm to swing therewith and a co-acting terminal contact member shiftably supported on the supporting member in position to be engaged by the swinging contact element, said shiftable member having an upper finger extension having an elongated contact face and a shoulder extension spaced therefrom and positioned relative to the swinging contact element to be engaged thereby to effect resetting of the shiftable member to a normal position after each engagement of the contact members.

2. An oscillatory motor of the character described comprising a supporting member, a pendulum acting actuator arm pivotally supported thereon, a magnet coil supported on the arm at its lower end, a fixed armature to co-operate therewith and circuit controlling means for energizing the coil comprising a terminal contact element supported on the actuator arm to swing therewith and a co-acting terminal contact member shiftably supported upon the supporting member in position to be engaged by the swinging contact element, said shiftable terminal member having a terminal contact element positioned to be engaged by the swinging element in one direction of movement of the latter only and said shiftable member having a shoulder formed and positioned to be normally out of the path of the swinging element and to be moved into the path thereof in the shifting of the shiftable contact member thereby to be effective for resetting of the said member on the return movement of the actuator member and frictional means for retarding the movement of the shiftable member.

3. An oscillatory motor of the character described comprising a supporting member, a pendulum acting actuator arm pivotally supported thereon, a magnet coil supported on the arm at its lower end, a fixed armature to co-operate therewith and circuit controlling means for energizing the coil comprising a terminal contact element supported on the actuator arm to swing therewith and a co-acting terminal contact member shiftably supported upon the supporting member in position to be engaged by the swinging contact element, said shiftable terminal member having a terminal contact element positioned to be momentarily engaged upon the shifting of the member by the swinging contact element in one direction of its movement, said shiftable member having a shoulder formed and positioned to be normally out of the path of movement of the swinging element and to be moved into the path thereof in the shifting of the shiftable member thereby to be effective for resetting of the said member to a normal position, said shiftable member having an arcuate slot, a pin supported on the supporting member received within the slot for limiting the movement of the shiftable member and frictional means for retarding the movement of the shiftable member, substantially as described.

JOHN G. RUCKELSHAUS.