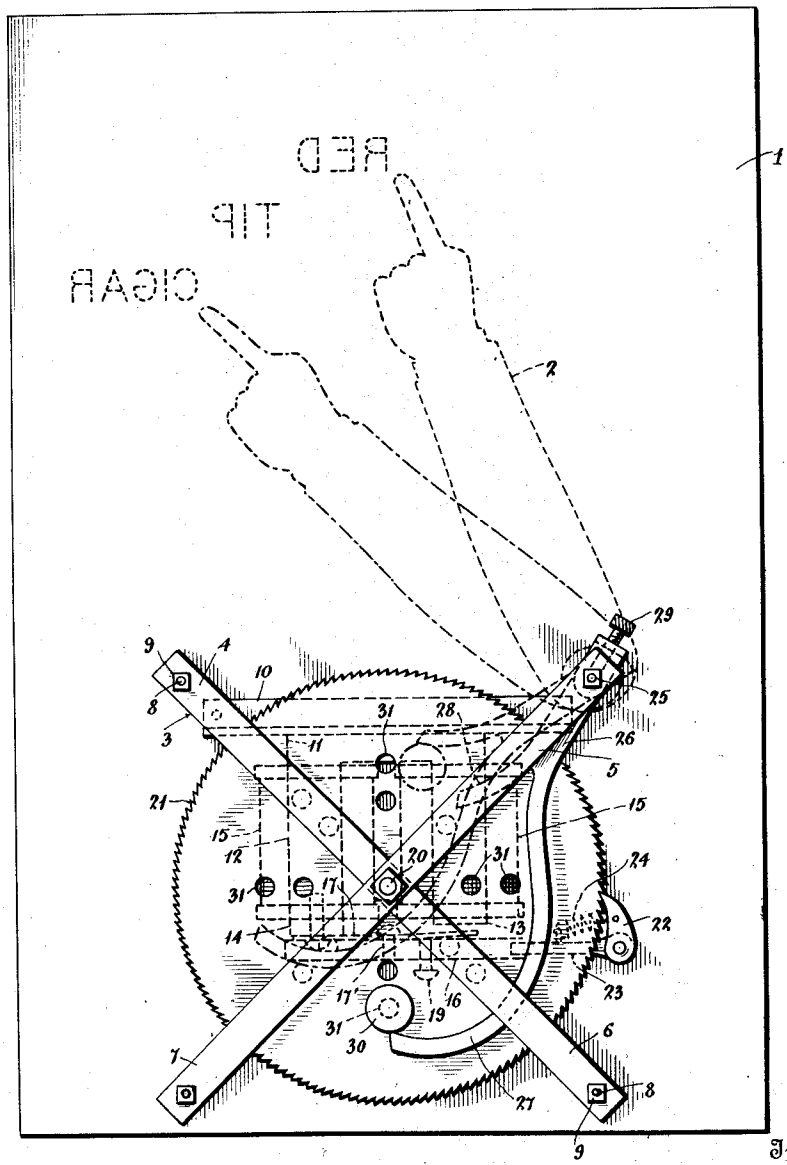
April 29, 1924. 1,492,450

E. E. GREGORY

MOTOR FOR ANIMATED ADVERTISING SIGNS

Filed Nov. 4, 1922 2 Sheets-Sheet 1

FIG. 1



Inventor

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Fig. 2

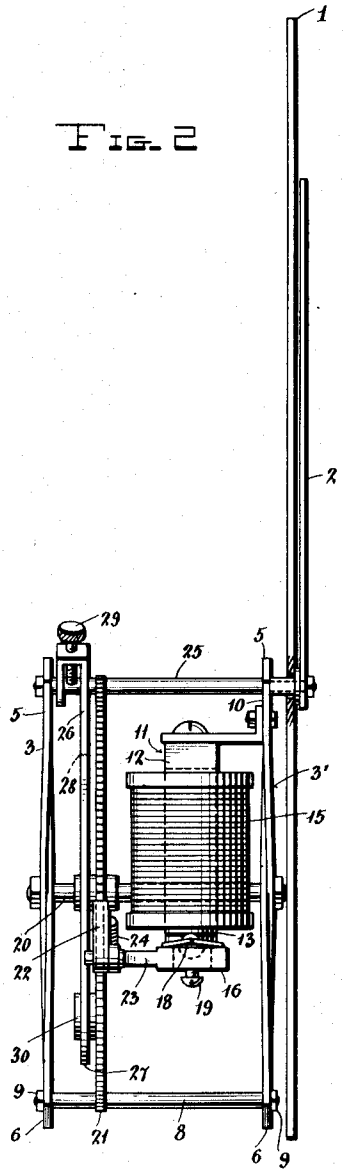


Fig. 3

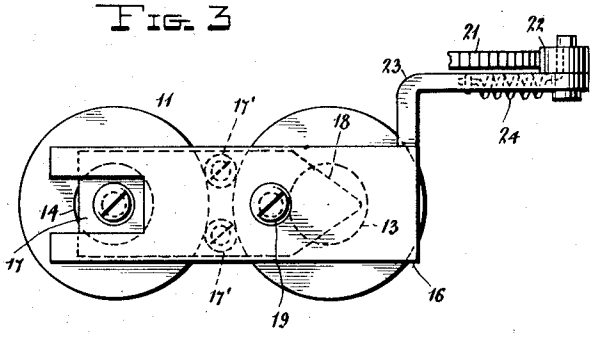


Fig. 4

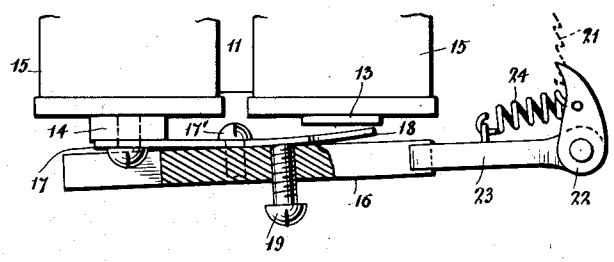
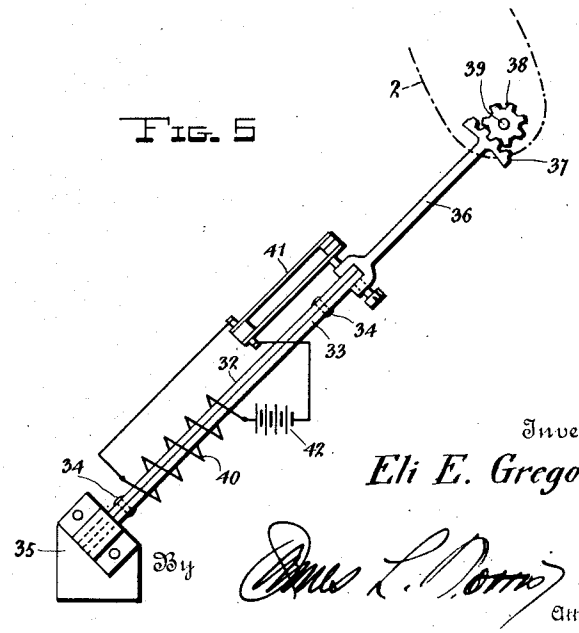


Fig. 5



Inventor

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Patented Apr. 29, 1924. 1,492,450

UNITED STATES PATENT OFFICE.

E. E. GREGORY, OF LOUISVILLE, KENTUCKY, ASSIGNOR OF ONE-HALF TO CHARLES F. BRECKEL, OF LOUISVILLE, KENTUCKY.

MOTOR FOR ANIMATED ADVERTISING SIGNS.

Application filed November 4, 1922. Serial No. 599,058.

To all whom it may concern:

Be it known that I, ELI E. GREGORY, a citizen of the United States, residing at Louisville, in the county of Jefferson and State of Kentucky, have invented certain new and useful Improvements in Motors for Animated Advertising Signs, of which the following is a specification.

This invention relates to motors for animated advertising signs and proposes the construction of an electrical device for imparting movements to a movable sign element and working upon a principle which eliminates the use of brushes or circuit breakers, depending for its operation upon the cyclic changes of flux in the alternating current.

A device of this character is long lived, being absolutely devoid of sparking, requires but few parts in its manufacture and is economical in the consumption of current.

More specifically the object of the invention is the provision of a motor comprising a magnet through which is passed an alternating current, being energized responsively to the cyclic fluctuations thereof, and a vibratory armature controlled by said magnet arranged to transmit motion to a rotary actuator, the latter carrying means for actuating a movable sign element and being selectively adjustable for the purpose of altering the character or extent of movement, or both, imparted to said sign element.

Another object of the invention is the construction of a modified form of animated sign motor having a thermally actuated armature operatively related to the movable sign element.

A further object of the invention resides in the broad idea of an advertising sign having a separable portion thereof movable in operative relation thereto, in combination with a motor for effecting the movement of said separable portion.

With the above and other objects in view, my invention consists in the improved motor for animated advertising signs illustrated in the accompanying drawings, described in the following specification, and particularly claimed, and in such variations and modifications thereof as will be obvious to those skilled in the art to which my invention relates.

In the drawings accompanying and forming a part of this specification, and wherein the preferred embodiment of my invention is illustrated:—

Figure 1 is a rear elevation of my improved motor for animated advertising signs.

Figure 2 is a side elevation of the same.

Figure 3 is a plan view of the armature.

Figure 4 is a side elevation of the armature, partly in section.

Figure 5 is a view, largely diagrammatic showing a modified form of the invention.

Referring now in detail to the several figures, the numeral 1 represents an advertising sign having the movable portion 2. Secured in any suitable manner to the rear of said advertising sign is a frame consisting of a pair of spaced spiders 3 and 3′ formed with aligned arms which in this instance are shown as four in number designated by the reference numerals 4, 5, 6 and 7. These arms are held together by means of the standards 8 having reduced upper and lower ends passing through suitable apertures in said aligned arms and secured by nuts 9. A support 10 is secured between the spaced spiders, in any suitable manner and carries the solenoid 11 which comprises the horseshoe shaped core 12 terminating in the poles 13 and 14 and surrounded by the windings 15. Said windings are so designed as to give the desired effect to the solenoid when the ordinary 60 cycle alternating house lighting current is passed therethrough.

The poles 13 and 14 preferably face in the same direction and are overlain by the armature 16 which is secured to one of said poles in a resilient manner by means of the leaf spring 17, best shown in Figure 4, one end of which is rigidly fixed to the pole 14, said spring being rigidly engaged at an intermediate portion 17′ with the armature 16. The free end 18 of said spring lies adjacent the pole 13 and is adapted to make contact therewith when the solenoid is energized. Said free end of the spring functions as a cushion, its sole purpose being to secure quietness in the operation of the device. In order to adjustably vary the tension of the free end 18 and so to control the cushioning effect thereof, the adjusting screw 19 is provided which passes through a threaded aperture in the armature 16 and engages the spring intermediate its free end and its point of attachment

to the armature. The latter is properly designed to respond to the rapid periodic energization of the solenoid brought about by the cyclic fluctuations of the alternating current passing therethrough.

Between the spiders 3 and 3' is carried, preferably centrally, a shaft 20 upon which is mounted an actuator 21 which in the present instance is exemplified in the form of a flat disk having a finely toothed edge, each tooth being provided with an abrupt sloping shoulder. Engageable with these teeth is a pawl 22 which is secured to an arm 23 made rigid with the armature 16 and partaking of the vibrations thereof which are communicated to the actuator in a succession of minute thrusts against the abrupt shoulders of the teeth on the edge thereof giving to said actuator a step by step rotary motion in one direction. In its retractile motion the pawl 22 slides from the sloping faces of the teeth, the inertia of the mass of the actuator preventing backward rotation of the latter. A spring 24 normally keeps the pawl 22 in engagement with the actuator.

The movable element 2 of the animated advertising sign is detachably connected to a spindle 25 which is here shown as taking the place of one of the standards by which the arms of the spiders are held in spaced relation. It is of course conceivable that separate apertures may be provided in any of the pairs of aligned arms of the spiders for the reception of this spindle. On the end of said spindle remote from the movable sign element is a cam 26 having preferably, an elongated curved arm 27 and a short arm 28 diverging therefrom. Said cam is adjustable angularly and longitudinally with respect to the spindle 25 by means of a set screw 29 which passes through the cam 26 and engages said spindle. The actuator 21 is provided with a contact pin 30 which in certain phases of the rotation of said actuator bears upon the curved surfaces of the arms of said cam imparting motion to the latter. The character of said motion as well as its extent is determined initially by the shape of the curved cam surfaces but may be afterward altered to suit the circumstances of use by shifting the position of the contacting pin 30, the latter being accomplished through the provision of a plurality of threaded apertures 31 on the face of the actuator into any one of which said contact pin may be located.

In the arrangement of parts just described the need for brushes or circuit makers or breakers is eliminated since the movements of the armature take place in response to the natural cyclic fluctuations of the alternating current not by interrupting the current as has been the mode of operation in former devices. This obviates entirely the destructive sparking at the points of the circuit breaker, or at the brushes, the life of the mechanism being thereby prolonged. It also makes possible a simplification in the number of parts in the manufacture of the motor and adds to the efficiency and reliability of the same by minimizing the number of the moving parts. An important advance is also made from the standpoint of economy as the consumption of current is negligible compared with the use of the brush or circuit breaker types.

In a modified form of my invention I substitute for the alternating current solenoid a thermally actuated motor which is preferably of the bi-metallic type as shown in Figure 5 consisting of the strips 32 and 33 of dis-similar metals firmly riveted together at several points as at 34, but which may be secured together in any other suitable manner, and fixed at one end to a support 35. An arm 36 is secured to the free end of the strip and carries at its outer end a segmental rack 37 meshing with a pinion 38 on the end of a shaft 39 to the other end of which the movable element of the animated advertising sign is attached. A resistance coil 40 lies in proximity to, and preferably surrounding the bi-metallic strip said coil being included in circuit with the circuit breaker 41, the latter lying within reach of the free end of the strip.

In operation, the points of the circuit breaker being normally closed, current from the source 42 passes through the coil 40, heating the latter and warping the bi-metallic strip in a well known manner. This causes an oscillation of the arm 36 and of the segmental rack 37, partially rotating the pinion 38 and the swinging of the movable sign element. But warping of the strip also causes the latter to recede from the circuit breaker, permitting the latter to open, breaking the circuit and permitting the coil 40 to cool, relieving the tension of the bi-metallic strip and causing it to straighten out, pulling the segmental rack back to its normal position and imparting a similar movement to the movable sign element.

While I have in the foregoing description associated my novel motor with mechanism that particularly adapts it for use with animated signs or bill boards it is to be understood that I do not consider the invention necessarily so restricted but to be as broad in its field of application as is permitted by the state of the prior art.

Having described my invention what I claim as new and desire to secure by Letters Patent, is:—

1. A motor comprising a solenoid having the poles thereof facing in the same direction, a spring secured at one end to one pole and having a free end normally spaced

from but in operative relation to the other pole, an armature secured to said spring intermediate its ends, the ends of said spring being normally biased away from said armature.

2. A motor comprising a solenoid having the poles thereof facing in the same direction, an armature bridging said poles, a spring secured at an intermediate point to said armature, one end of said spring being secured to one of said poles and the other end of said spring being normally spaced from the other of said poles, a movable element extraneous to said motor, an actuator for imparting movement to said movable element and means connected to said armature for transmitting motion to said actuator.

3. A motor comprising a solenoid having the poles thereof facing in the same direction, an armature, a spring secured to an intermediate portion of said armature, one end of said spring being secured to one of said poles and the other end of spring being normally spaced from the other of said poles, means for varying the tension of the free end of said spring, a movable element extraneous to said motor, and actuator for imparting movement to said movable element and means connected to said armature for transmitting motion to said actuator.

4. A motor comprising a frame formed of a pair of spaced spiders having aligned arms, a solenoid arranged between said spiders and adapted for the passage of alternating current therethrough, being energized in response to the cyclic fluctuations thereof, an armature controlled by said solenoid, an actuator, means connected to said armature for moving said actuator, a movable element extraneous to said motor, means controlled by said actuator for imparting motion to said movable element, said means being selectively positionable between any of the aligned arms of said spider and still remain under the control of said actuator.

In testimony whereof I have hereunto set my hand.

ELI E. GREGORY.