Nov. 24, 1931. R. L. DAVIS 1,833,156

APPARATUS FOR ACTUATING ROTARY MOVEMENTS OF LAMPS AND THE LIKE

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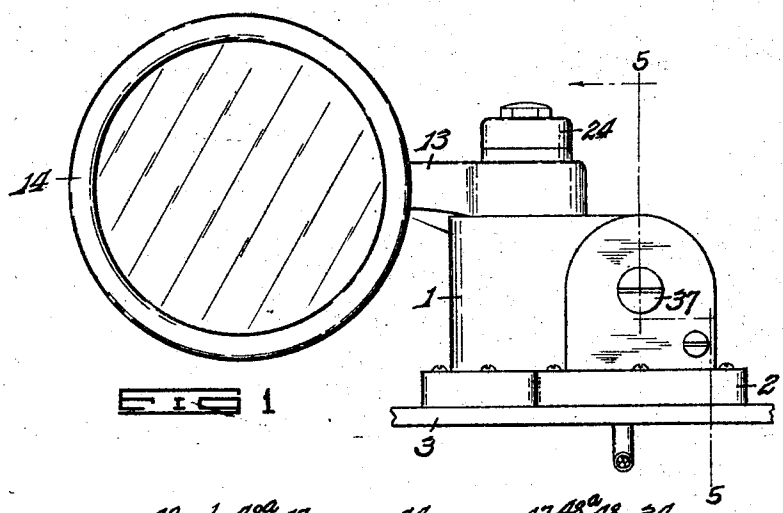


FIG 1

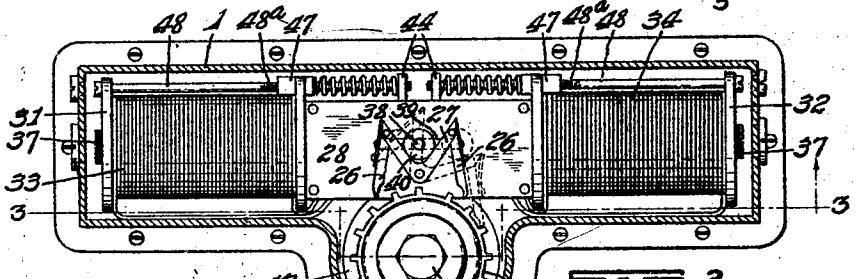


FIG 2

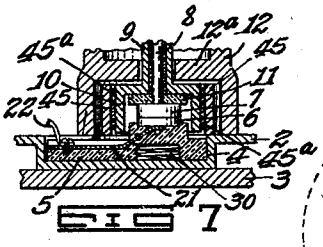
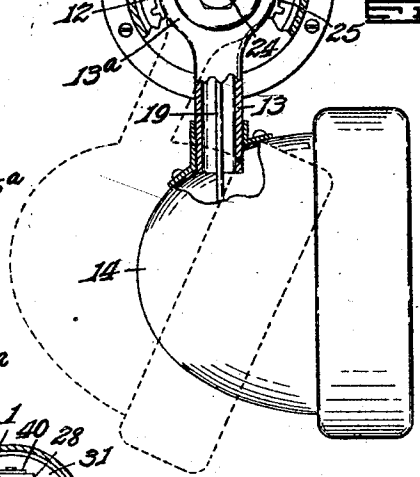


FIG 7



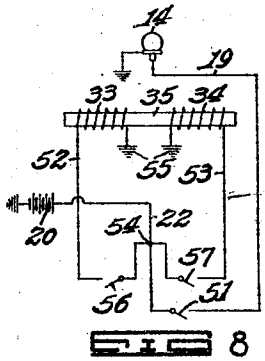


FIG 8

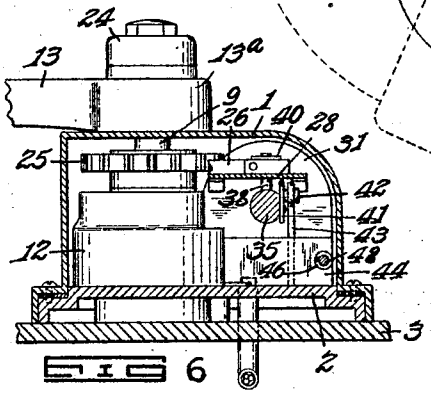


FIG 6

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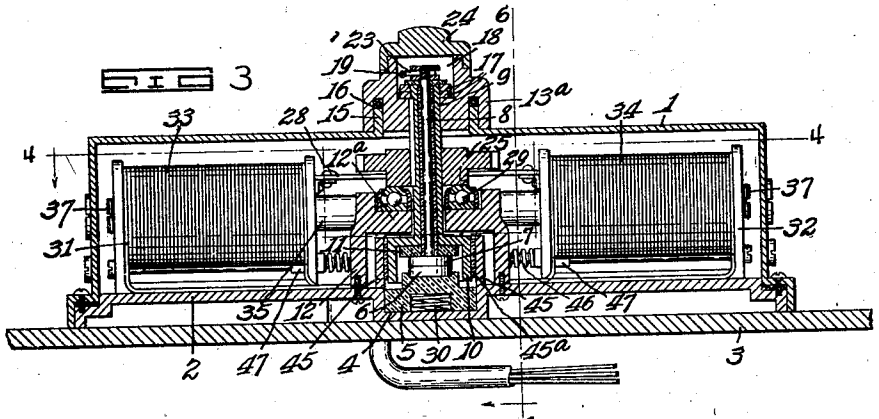
ATTORNEY

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FIG 3



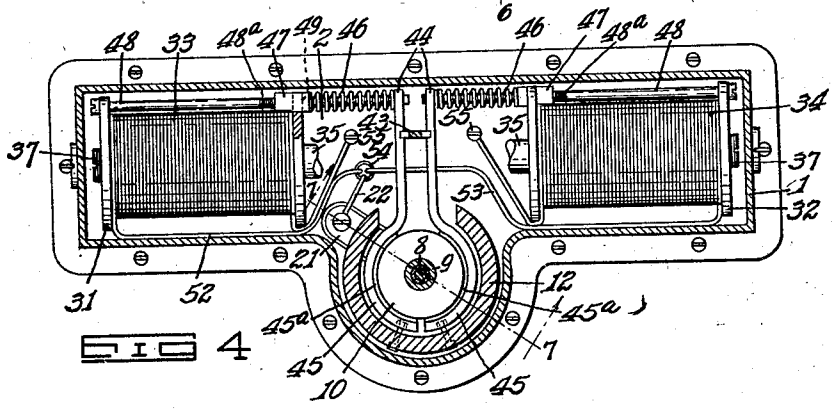


FIG 4

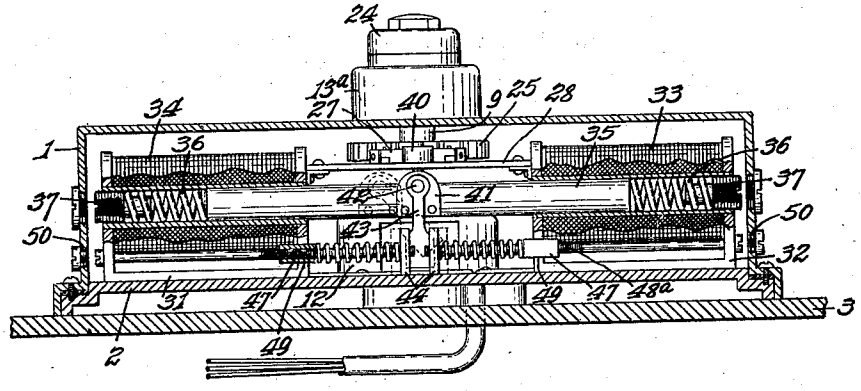


FIG 5

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Patented Nov. 24, 1931 1,833,156

UNITED STATES PATENT OFFICE

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APPARATUS FOR ACTUATING ROTARY MOVEMENTS OF LAMPS AND THE LIKE

Application filed May 9, 1930. Serial No. 450,977.

This invention relates broadly to apparatus for operating and rotating supporting arms and the like, and more particularly to an electrical device for shifting a supporting member to any desired position within the circumference of a circle.

The primary object of the invention is to provide an electrical apparatus whereby a shaft, or the supporting arm of an electric lamp or similar object may be rotated in either direction to and stopped in any desired position within the range of 360 degrees.

A further object is to provide electrical means whereby an electric lamp rotatably mounted upon an automobile, airplane, building, pole, pier, or the like, may be actuated from a point of remote control to swing or rotate such lamp to any extent required for projecting light rays in a desired direction.

With these and other objects in view, the invention resides in the features of construction, combinations of elements, and arrangement of parts which will hereinafter be fully explained, reference being had to the accompanying drawings, in which—

Figure 1 is an end elevation of the invention applied to the control of a horizontally rotatable arm-carried lamp;

Figure 2 is a top plan view of the mechanism showing the casing partially in section;

Figure 3 is a section taken substantially on line 3—3, Fig. 2;

Figure 4 is a section on line 4—4, Fig. 3;

Figure 5 is a section on line 5—5, Fig. 1;

Figure 6 is a section on line 6—6, Fig. 3;

Figure 7 is a section on line 7—7, Fig. 4; and—

Figure 8 is a diagrammatic view of the electric circuits.

Referring to said drawings, the reference character 1 designates a casing having a base 2 adapted to be mounted stationarily in any suitable position, as upon the forecastle-deck of a small boat or yacht, or upon the running board 3 of an automobile.

Disposed in a socket 4 provided therefor in the base 2 is a block 5 of fiber, or other suitable insulating material, which, in turn, has in its top portion a shallow seat on which rests a disk-like electrical contact 6, and resting upon said disk contact is a second contact 7 constituted by the head of a pin 8 which extends vertically through and is insulated from a tubular rotary shaft 9. Said shaft has formed on its lower end a brake drum 10 which encloses the contacts 6 and 7, as shown in Figs. 3 and 7, and which is insulated from the contact 7, as by an interposed fibre disk 11. Said shaft is rotatable adjacent to its lower end in the horizontal bridge or web portion 12ª of a hollow circular casting 12 which is rigidly mounted on the base 2 in spaced enclosing relation to the brake drum 10.

The upper end of the shaft 9 projects through the top of the casing 1 and has splined thereon an end of a horizontally disposed hollow bracket arm 13 which carries upon its outer end an electric lamp casing 14 of appropriate form. Said arm is supported by and rotatable upon a circular carrying flange 15 formed on said casing in concentric relation to the shaft 9, said flange being received in a circular channel or way 16 provided therefor in the under face of the overlying end 13ª of said arm. Adjusting nuts 17 carried by the upper end of said shaft are seated within a socket 18 provided in the upper face of said end 13ª of the arm.

The pin 8 constitutes a conductor for electric current supplied to the lamp located within the lamp casing 14, a current conducting wire 22 leading from a source of electrical energy, as a storage battery 20, and being connected to the contact 6, as through an intermediate metallic plate 21 mounted on the block 5. From said plate the current passes directly to and through said pin 8, and thence to the lamp through a wire 19 which leads through the interior of the arm 13 and which has a terminal 23 mounted on said pin and suitably insulated from the shaft 9 and the adjusting nuts 17. A cap 24 is removably mounted on the arm 13 in covering relation to the socket 18.

Splined on the rotary shaft 9 is a ratchet wheel 25, the teeth of which are adapted to be operatively engaged, according to the direc-

tion of rotation required, by one or the other of two pawls 26 which are pivotally mounted upon the opposite terminals of a substantially V-shaped rocker 27 which is pivoted at its apex upon a suitable support, as the bracket-carried plate 28.

Said ratchet wheel 25 has its hub resting upon ball bearings 29 which are seated upon the bridge or web portion 12[a] of the casting 12 hereinbefore referred to and which preferably sustain the weight of said ratchet wheel, shaft 9 and pin 8. A compression spring 30 preferably interposed between the insulating block 5 and the bottom of the socket 4 of the base 2 maintains said block elevated in a position in which the contact 6 is engaged with the contact 7 under yielding tension.

Mounted in longitudinally alined relation on supporting brackets 31 and 32 which occupy fixed positions upon the casing base 2 at opposite sides of and rearwardly with respect to the ratchet wheel 25 and its carrying shaft 9 are magnet coils, said rod or core being shiftable in either direction according as one or the other of said coils is energized electrically. Compression springs 36 introduced between the opposite ends of said rod 35 and plugs 37 adjustably mounted within the outer ends of said coils serve normally to maintain said rod yieldingly in a centered position wherein equal lengths of its ends are received within the embrace of said coils, as shown in Fig. 5.

Rigidly carried midway between the ends of the shiftable rod 35 is an upright arm 38 which projects through and, in shifting movements of said rod, travels in a longitudinally extending slot 39 provided therefor in the plate 28. Rotatable upon the projecting end of said arm 38 is a roller 40 which lies between the pawl-carrying members of the rocker 27 and which, in travel of said arm 38, rides upon the adjacent edge of one or the other of said rocker members, according to the direction of such travel, thereby to effect rocking movement of said rocker in the direction of the travel, as shown in dotted lines in Fig. 2 wherein said rocker is indicated as being rotated to the right. In such rocking movement of the rocker, the pawl 26 carried by that end of the rocker toward which the roller 40 travels is thrust into engagement with an adjacent tooth of the ratchet wheel 25 and actuates rotation of the latter throughout a fractional part of a revolution for effecting a corresponding rotary movement of the lamp-carrying arm 13.

As the rod 35 is shifted for actuating rotary movement of the lamp-carrying arm 13, an upright bracket 41 fixed on said rod and having a rearwardly directed wrist pin 42 is carried laterally therewith. Pivotally mounted on said wrist pin is the upper end of a therefrom-depending lever 43 which has its lower end received between substantially parallel transversely extending arms 44, each of which carries on one end thereof a substantially semi-circular brake band 45.

Said brake bands 45 are complemental one to the other, being disposed in embracing relation to the brake drum 10, each having mounted on its inner face a suitable brake lining 45[a] which, in the normal parallel positions of the arm 44, occupy close frictional braking engagement with said drum for normally maintaining the rotary shaft 9 and, consequently, the lamp-carrying arm 13 in stationary positions. However, in case the lamp casing should be forcibly engaged either on its front or rear face by a moving object, the braking means described will usually permit rotary movement against the braking force exerted, thus to prevent serious injury either to the lamp casing or its actuating mechanism which might otherwise result.

In shifting of the rod 35, the lever 43 is actuated to rock on its carrying pin 42 for effecting relative spreading of the brake arms 44, as shown in dotted lines in Fig. 5, whereby the brake bands 45 are withdrawn from binding relation to the drum 10, thus effecting release of the latter. Compression springs 46 introduced between the outer faces of the arms 44 and stationary abutments, as the adjacent ends of blocks 47, function to normally maintain said arms in their relatively indrawn positions wherein the brake lining 45[a] carried by the brake bands occupy seated binding relation to the brake drum. Thus, in shifting the lamp-carrying arm 13 in the manner hereinbefore described, when the shifting force exerted by an energized magnet coil is cut off, the rod 35 is instantly actuated by the then compressed spring 36 to return to its normal position, allowing the springs 46 instantly to actuate application of the brake for stopping the rotation.

The springs 46, as also the blocks 47, are carried by rods 48 which have their outer ends mounted in the outer ends of the coil-carrying brackets 31 and 32 and their inner ends loosely received in eyes provided therefor in the brake arms 44. The blocks 47 hereinbefore referred to are carried by threaded portions 48[a] of said rods 48 so that they may be adjusted with respect to the springs 46 for regulating the tension of the latter. Said blocks, which are preferably of rectangular form in cross section, as shown, are received in recesses 49 provided therefor in the inner end portions of said brackets 31 and 32, and are adjusted by rotation of said rods 48, effected by means of a screw-driver or other suitable instrument applied to the headed outer ends of said rods. To permit of introduction of such instrument in adjusting relation to said headed

ends of said rods without removal of the casing 1, plug-closed openings 50 are provided in said casing at appropriate points.

The lighting circuit to the lamp comprises the battery 20 which is suitably grounded on its negative side and which has its positive terminal connected to the lamp through the intermediacy of the conductor wire 22, plate 21, contacts 6 and 7, pin 8 and wire 19. A suitable switch 51 for opening and closing the lamp circuit may be introduced in the latter at any convenient point.

The magnet coils 33 and 34 are located in separate energizing circuits which include said battery 20 and the conductor wire 22. Branch conductors 52 and 53 connected, as at 54, to said conductor 22 lead to the outer ends of the magnet coils 33 and 34, respectively, which, in turn, are suitably grounded, as at 55, Figs. 4 and 8, upon the casing base 2. Switches of any appropriate type, as 56 and 57, are provided in said magnet energizing circuits.

In practice, to effect shifting of the lamp over any considerable distance, as throughout an arc of 90 degrees, requires that the lamp-supporting arm 13 be actuated successively a number of times, according to the distance traversed in each actuation. For instance, when the ratchet wheel 25 is actuated in each movement to rotate throughout one-sixteenth of a revolution, it is manifest that four successive movements are required to rotate the arm 13 throughout 90 degrees. These movements are produced through the closing and opening of the appropriate switch 56 or 57 the required number of times, each act of opening the switch permitting the movable parts of the ratchet mechanism to resume normal position prior to the next succeeding actuation induced through reclosing of the switch.

What is claimed is—

1. In apparatus for imparting forward and reverse rotary movements to a shaft, gear mechanism associated with said shaft, alined solenoid magnet coils located at opposite sides of said gear mechanism, a longitudinally shiftable member operatively associated with said gear mechanism whereby shifting movements of the former actuate the latter to impart rotary movements to said shaft, said member having its opposite ends forming cores for said magnet coils, resilient means normally maintaining said member in equi-spaced relation to said coils, means for selectively energizing said coils for effecting shifting of said member in either direction, brake mechanism normally having frictional engagement with said shaft which holds the latter stationary, and means actuated by movement of said member for effecting release of said brake mechanism.

2. In apparatus for imparting forward and reverse rotary movements to a shaft, a ratchet wheel fixed on said shaft, a pivoted rocker, pawls carried by said rocker and selectively engageable with said wheel for rotating the latter in the desired direction, alined solenoid magnet coils located at opposite sides of said shaft, a longitudinally shiftable member having its opposite ends received by and forming cores for said coils, resilient means normally holding said member in equi-spaced relation to said coils, means intermediate said member and said rocker whereby shifting of the former actuates movement of the latter for causing one of said pawls to actuate rotation of said ratchet wheel, and means for selectively energizing said coils for effecting shifting of said member in the desired direction.

3. In apparatus for imparting forward and reverse rotary movements of a shaft, a ratchet wheel fixed on said shaft, a pivoted rocker, pawls carried by said rocker and selectively engageable with said wheel for rotating the latter in the desired direction, alined solenoid magnet coils located at opposite sides of said shaft, a longitudinally shiftable member having its opposite ends received by and forming cores for said coils, resilient means normally holding said member in equi-spaced relation to said coils, means intermediate said member and said rocker whereby shifting of the former actuates movement of the latter for causing one of said pawls to actuate rotation of said ratchet wheel, means for selectively energizing said coils for effecting shifting of said member in the desired direction, brake mechanism normally holding said shaft stationary, and means actuated by shifting movement of said member for effecting release of said brake mechanism.

4. The combination with a rotary supporting arm and a lamp carried thereby, of apparatus for shifting the position of said arm, said apparatus comprising a shaft upon which said arm is rigidly carried, gear mechanism associated with said shaft and including a ratchet wheel, magnets located at opposite sides of said gear mechanism, a member operatively associated with both of said magnets and shiftable relative thereto in either direction according as one or the other thereof is energized, means for selectively energizing said magnets, resilient means normally holding said member in neutral position, and means actuated by shifting movements of said member from said position whereby said gear mechanism is driven for rotating said shaft, the last mentioned means including pawls engageable with the ratchet wheel of said mechanism.

5. The combination with a rotary supporting arm and a lamp carried thereby, of apparatus for shifting the position of said arm, said apparatus comprising a shaft upon which said arm is rigidly carried, a ratchet wheel fixed on said shaft, a pivoted element,

pawls carried by said element and selectively shiftable by rocking movement of the latter into engagement with said wheel for rotating said wheel in either direction, electro-magnets disposed in opposed relation, a member interposed between and shiftable relative to said magnets in either direction according as one or the other of said magnets is energized, means for selectively energizing said magnets, resilient means normally holding said member in neutral position, and means intermediate said member and said pivoted element whereby shifting movement of the former actuates rocking movement of the latter.

6. The combination with a rotary supporting arm and a lamp carried thereby, of apparatus for shifting the position of said arm, said apparatus comprising a shaft upon which said arm is rigidly carried, a ratchet wheel fixed on said shaft, a pivoted element, pawls carried by said element and selectively shiftable by rocking movement of the latter into engagement with said wheel for rotating said wheel in either direction, solenoid magnets disposed in alined relation at opposite sides of said pivoted element, a member interposed between and shiftable in either direction relative to said magnets according as one or the other thereof is energized, means for selectively energizing said magnets, resilient means normally holding said member in neutral position, and means actuated by shifting of said member whereby said pivoted element is rocked for carrying a selected pawl into driving relation to said ratchet wheel.

7. The combination with a rotary supporting arm and a lamp carried thereby, of apparatus for shifting the position of said arm, said apparatus comprising a shaft upon which said arm is rigidly carried, a ratchet wheel fixed on said shaft, a pivoted element, pawls carried by said element and selectively shiftable by rocking movement of the latter into engagement with said wheel for rotating said wheel in either direction, solenoid magnets disposed in alined relation at opposite sides of said pivoted element, a member interposed between and shiftable in either direction relative to said magnets according as one or the other thereof is energized, means for selectively energizing said magnets, resilient means normally holding said member in neutral position, means actuated by shifting of said member whereby said pivoted element is rocked for carrying a selected pawl into driving relation to said ratchet wheel, brake mechanism normally maintaining said shaft stationary, and means actuated by shifting movement of said member for releasing said brake mechanism.

8. The combination with a rotary supporting arm and a lamp carried thereby, of apparatus for shifting the position of said arm, said apparatus comprising a tubular shaft upon said arm is rigidly carried, gear mechanism whereby said shaft may be rotated and including a ratchet wheel, electromagnets disposed in opposed relation, a member interposed between and shiftable in either direction relative to said magnets according as one or the other thereof is energized, means for selectively energizing said magnets, resilient means tending normally to hold said member in neutral position, pawls intermediate said member and said gear mechanism whereby shifting movement of the former actuates the latter to rotate said shaft, and a lighting circuit to said lamp, said circuit including a pin extending through the interior of and insulated from said shaft.

In testimony whereof, I affix my signature.

RAY L. DAVIS.