May 28, 1935. H. H. THOMPSON 2,003,022

BEACON

Filed Nov. 23, 1928

Fig. 1.

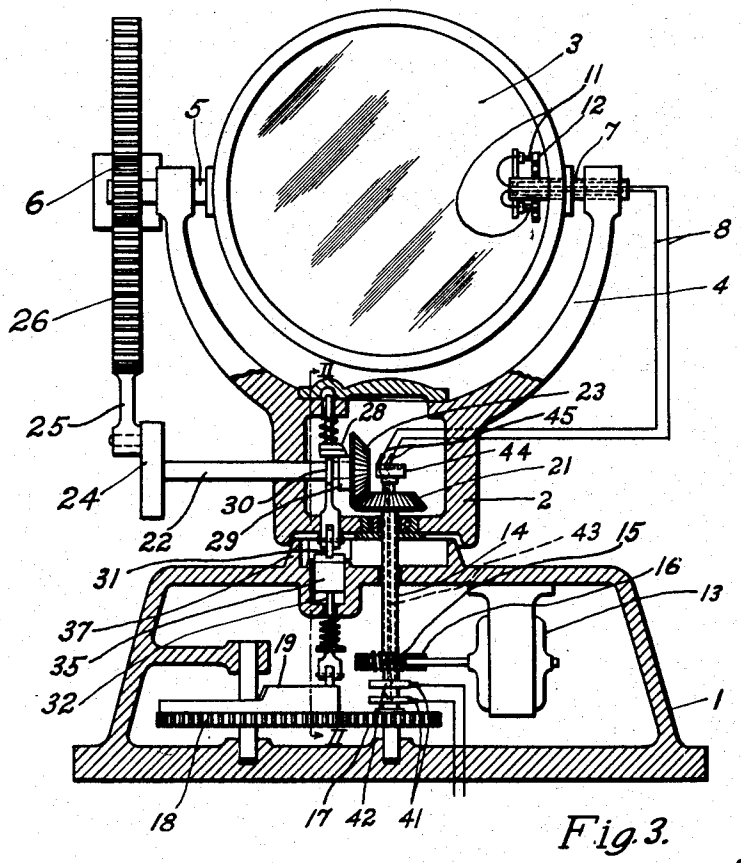


Fig. 3.

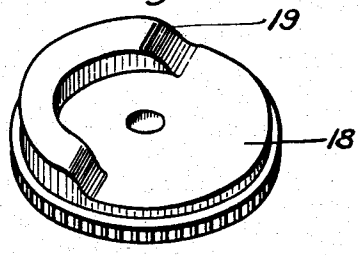


Fig. 2.

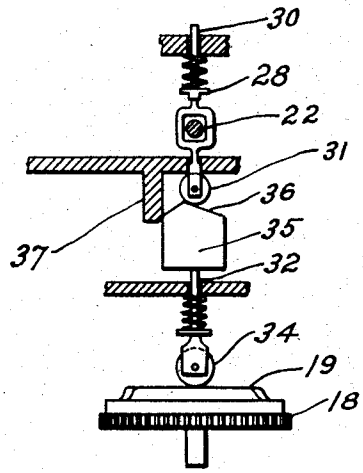
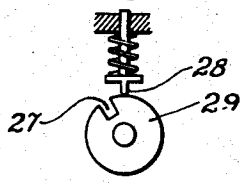


Fig. 4.



INVENTOR

Henry H. Thompson.

BY

Overley & Carr

ATTORNEY

Patented May 28, 1935 2,003,022

UNITED STATES PATENT OFFICE

2,003,022

BEACON

Henry H. Thompson, Wilkinsburg, Pa., assignor to Westinghouse Electric & Manufacturing Company, a corporation of Pennsylvania

Application November 23, 1928, Serial No. 321,411

11 Claims. (Cl. 177—352)

My invention relates to lighting devices and has particular relation to a beacon suitable for use in connection with air navigation.

An object of my invention is to provide a device which shall indicate the presence of a landing field, an airway, an obstacle or the like, or which may be utilized as an advertising device.

Another object of my invention is to provide a device of the above mentioned character having means for identifying a particular beacon.

Another object of my invention is to provide a beacon which shall indicate the direction of an airway or of any desired point of the compass.

A still further object of my invention is to provide a device of the above mentioned character which shall be strong, dependable, simple and relatively inexpensive.

Referring to the drawing, in which like figures indicate like parts;

Figure 1 is a front view, partially in section and partially in elevation, of a device constructed according to my invention,

Fig. 2 is a side view, in section, taken along the line II—II of Fig. 1,

Fig. 3 is a view, in perspective, of an idler gear of my device, and

Fig. 4 is a view, in elevation, of a locking mechanism utilized in my device.

In practicing my invention, I utilize a rotatably-mounted projector adapted to be mounted also for oscillation about a horizontal axis. The projector is adapted to be intermittently rotated by geared driving means about a vertical axis and is provided with additional geared driving means for oscillating the projector about its horizontal axis during the period in which the projector is not being rotated.

The device comprises a hollow base 1 upon which a frame 2 is so mounted that it may be rotatively moved about a vertical axis. A projector 3 is mounted on the frame 2 by means of a yoke 4. A shaft 5, engaging one side of the projector, is rotatably mounted in the yoke 4 and has a pinion 6 on its outer end. The other support 7 for the projector is stationary with reference to the yoke and is tubular in order to provide a conduit for the conductors 8 which furnish power to the lighting unit therein (not shown).

The wires 8 extend through the tube 7 to the stationary brushes 11 which make electrical contact with suitable slip rings 12 which are, in turn, electrically connected to the lighting unit. The projector, therefore, is mounted for movement of rotation about a horizontal axis provided by shaft 5 and the tube 7.

The device is operated by a motor 13 which drives a vertical shaft 14 by means of worm 15 and worm wheel 16. The lower end of the shaft 14 is provided with a gear wheel 17 which meshes with an idler gear wheel 18. The idler gear wheel 18 is provided with a cam surface 19, the purpose of which will be later explained.

The upper end of the shaft 14 is provided with a bevel gear wheel 21 to mesh with a bevel gear wheel 23 with which a horizontal shaft 22 is provided. The outer end of the horizontal shaft 22 is provided with a crank arm 24 which actuates a link 25 and gear rack 26 which, in turn, engages the pinion 6 of the projector shaft 5.

Ajacent to the bevel gear 23 is a disc 29 having a recess 27 in its periphery (Fig. 4). The shaft 22 may be prevented from rotating by means of a stop piece 28 which is mounted on a push rod 30. The lower end of the push rod 30 is provided with a roller 31. Another push rod 32 projects into the base 1 and is provided with a roller 34 to engage the cam surface 19 of gear wheel 18. The upper end of the lower push rod 32 is provided with a cam 35 having a cam surface 36 of inverted V form. A projection 37 on the bottom of the frame 2 is adapted to strike the cam 35 when the cam is raised.

In operation, when the motor 13 is energized, the shaft 14 is rotated slowly, usually at the rate of about six revolutions per minute. If the stop piece 28 is in engagement with recess 27 in the disc 29, the frame and the projector will be rotatively moved by the action of the gear wheel 21 upon the stationary gear wheel 23. When the idler gear 18 has been rotated to a point where the push rod 32 is raised, the cam surface 35 will be struck by the projection 37 and the frame will thus be stopped. At the same time, the push rod 30 is raised and the lug 28 disengaged from the recess 27. In this position, the frame is prevented from rotating, and the bevel gears 21 and 23 and shaft 22 are caused to rotate.

The rotation of the shaft 22 will give an oscillatory motion to the rack 26, whereby the projector will be tilted about a horizontal axis in accordance with the throw of the crank arm 25. As soon as the rod 32 drops, the cam 35 is disengaged from the projection 37 and the lug 28 engages the recess 27 of disc 29, thus causing the frame 2 to again rotate.

The electric current is introduced into the projector by means of brushes 41, slip rings 42,

electrical connectors 43, slip rings 44 and brushes 45.

It will be readily understood that, by utilizing cam surfaces of different lengths on the idler gear 18, the frame and gears of different sizes, the projector may be caused to rotate one or more times according to the length of the travel on the cam surface, therefore, a non-coincident movement comprising a combination of one or more rotations of the projector, together with one or more oscillations or rotations of the projector about its horizontal axis may be secured. This sequence of motions, therefore, would be of considerable value in identifying the beacon as, for instance, a combination of five rotations and one oscillation would indicate a certain beacon.

The beacon may be so rotated that, when it stops rotation about a vertical axis, the projector will oscillate on an axis perpendicular to the direction of an airway or a point of the compass, therefore, the aviator or other person viewing the beacon will see a rotating beam which will stop at a certain point and then describe an arc from the horizon to the zenith and then to the horizon on the other side and return.

Although I have described a specific modification of my device, modifications may be made by those skilled in the art without departing from the spirit and scope of my invention, as set forth in the appended claims.

I claim as my invention:

1. A beacon comprising, in combination, a support frame, means for mounting the frame for rotation about a vertical axis, a projector, means for mounting the projector on the frame for movement about a horizontal axis, driving means, torque transmitting means having driving connection with the driving means and with the frame and projector, locking means operatively disposed relative to the torque transmitting means for controlling its operation to permit the application of driving torque for rotating the support frame and projector about the vertical axis or for moving the projector about the horizontal axis, and operating means actuated by the driving means disposed to control the locking means whereby the support frame and projector is rotated a predetermined number of times about the vertical axis and the projector is oscillated a predetermined number of times about the horizontal axis alternately.

2. In a beacon comprising in combination, a projector, rotatable means for supporting the projector, said projector being rotatably mounted on the supporting means, a main shaft mounted coincident with the axis of rotation of the supporting means, an auxiliary shaft journalled in the supporting means, means interposed between said auxiliary shaft and the projector to effect a predetermined movement of the projector about its support on the frame on rotation of the auxiliary shaft, gears connecting the main and auxiliary shafts, means for driving the main shaft, spring-biased means mounted on the rotatable support for locking the auxiliary shaft against rotation whereby on rotation of the main shaft the supporting means and projector are rotated, spring-biased means operable to lock the supporting means against rotation and disposed when actuated to locking position to actuate the first mentioned locking means to release the auxiliary shaft, and means driven from the main shaft for alternately actuating and releasing the locking means for the supporting frame, thereby to provide for alternately rotating the supporting means with the projector locked against movement about its rotatable mounting on the supporting means and for effecting said predetermined movement of the projector about its support on the frame with the frame locked against rotation.

3. In a beacon, a base, a projector supporting frame mounted on the base for movement about a vertical axis, a projector, means for mounting the projector on the supporting frame for movement about a horizontal axis, means comprising an auxiliary shaft journalled on the supporting frame for oscillating the projector about its horizontal axis, a main shaft mounted on the base, power transmitting means connecting the main shaft to the auxiliary shaft, said means being disposed to effect rotation of the supporting frame when the auxiliary shaft is locked against rotation means for driving the main shaft, and means actuated by the driving means for alternately rendering the auxiliary shaft rotatable and to lock the supporting frame against rotation to oscillate the projector about the horizontal axis and lock the auxiliary shaft and release the frame to rotate the frame and projector about the vertical axis during predetermined time intervals throughout a cycle of operation.

4. In a beacon, a projector supporting frame, means for mounting said frame for movement about a vertical axis, a projector, means for mounting the projector on the supporting frame for movement about a horizontal axis, means comprising an auxiliary shaft journalled on the supporting frame for oscillating the projector about the horizontal axis, a main shaft rotatably supported on the vertical axis of rotation of the frame, bevel gears interposed between the shafts, means for driving the main shaft, means for locking the auxiliary shaft against rotation thereby to cause the frame carrying the projector to rotate about its vertical axis, means operable to lock the frame against rotation and to actuate the first mentioned locking means to release the auxiliary shaft thereby to effect the oscillation of the projector about its horizontal axis, and means including a cam member actuated by the driving means for the main shaft for alternately actuating the frame locking means to locking position and releasing same over a predetermined cycle of operation.

5. A beacon comprising in combination, a projector, rotatably mounted means for supporting the projector, said projector being rotatably mounted on the supporting means, a main shaft and driving means therefor, an auxiliary shaft journalled in the projector supporting means, means disposed to be actuated by the auxiliary shaft for oscillating the projector about its axis of support on the supporting means, gear means connecting the main and auxiliary shafts, whereby when the auxiliary shaft is locked against rotation the supporting means and projector are rotated by the main shaft and when the auxiliary shaft is released and the supporting means locked against rotation the projector alone is oscillated, and means actuated by the driving means and operable to alternately lock the auxiliary shaft against rotation and unlock the supporting means and lock the supporting means and unlock the auxiliary shaft in accordance with a predetermined cycle of operation.

6. A beacon comprising in combination, a base, a supporting frame rotatably mounted on the base, a projector mounted on the frame for movement about a horizontal axis, a main shaft

journalled in the base and frame coincident with the vertical axis of rotation of the frame, means for driving the main shaft, means including an auxiliary shaft journalled in the frame for oscillating the projector about its horizontal axis, means interposed between the main shaft and the projector whereby the auxiliary shaft is oscillated about its horizontal axis when the frame is prevented from rotating and the frame is rotated when the auxiliary shaft is locked against rotation, releasable means carried by the rotatable frame for locking the auxiliary shaft against rotation, means carried by the base operable to lock the frame against rotation and disposed when operated to release the locking means for the auxiliary shaft when the frame is in a predetermined position, and means driven from the main shaft for actuating the locking means for the frame to provide for alternately rotating and oscillating the projector.

7. In a beacon comprising a projector, rotatably mounted supporting means for the projector, means for mounting the projector on the supporting means for movement about a horizontal axis, a main drive shaft mounted on the axis of rotation of the supporting means, driving means for the main shaft, an auxiliary shaft journalled on the supporting means, means actuated by the auxiliary shaft for oscillating the projector about its horizontal axis, power transmitting means, connecting said shafts whereby the supporting means is rotated by the main shaft when the auxiliary shaft is locked against rotation and the projector oscillated when the supporting means is locked against rotation, locking means carried by the supporting means normally disposed to lock the auxiliary shaft and operable to release said shaft, additional locking means mounted stationary with respect to the supporting means operable to lock said means against rotation and to release the locking means on the auxiliary shaft, and cam means operated by the driving means for actuating the stationarily mounted locking means to effect alternate rotation and oscillation of the projector in accordance with a predetermined cycle of operation.

8. A beacon comprising in combination, a base, a supporting frame, means for mounting the frame on the base for rotation about a vertical axis, a projector, means for mounting the projector on the frame for movement about a horizontal axis, a motor, means including a shaft rotatably mounted in the frame and having driving connection with the motor for effecting a predetermined movement of the projector about its horizontal axis when the said frame is locked against rotation, said means being disposed to effect rotation of the frame and projector about the vertical axis when the shaft in the frame is locked against rotation and the frame released, and means actuated by the motor disposed to alternately lock and unlock the shaft and simultaneously alternately unlock and lock the frame.

9. A beacon comprising in combination, a base, a projector supporting frame, means for mounting the frame on the base for rotation about a vertical axis, a projector, means for mounting the projector on the frame for movement about a horizontal axis, a motor mounted in the base, power transmitting means interposed between the motor and the projector having one of its elements journalled in the frame for effecting movement of the projector about its horizontal axis when the frame is locked against rotation, and disposed to effect the rotation of the frame and projector about the vertical axis when the said element is locked against rotation, means normally disposed in one position to lock the element of the gear train against rotation and to release the frame, and operable to another position to release said element and lock the frame, and cam means actuated by the motor for alternately operating the locking means to its two positions in a predetermined manner.

10. In combination, a projector, means for mounting the projector for rotation about a vertical axis and for movement about a horizontal axis, means operable to rotate and oscillate the projector comprising a main drive shaft mounted coincident with the vertical axis, an auxiliary shaft supported by the projector mounting means and geared to the main shaft and to the projector the relative positions of the said shafts being such that the projector is oscillated when the mounting means is locked against rotation, and the mounting means and projector are rotated when the auxiliary shaft is locked against rotation, a motor for driving the main shaft, and means actuated by the motor for alternately locking and releasing the auxiliary shaft and projector mounting means, in accordance with a predetermined cycle to effect alternate rotation and oscillation of the projector over predetermined periods of time during the cycle.

11. A beacon comprising a base, a supporting frame mounted on the base for rotation about a vertical axis, a projector supported by the supporting frame for movement about a horizontal axis, driving means mounted in the base, power transmitting means interposed between the projector and the driving means having one element thereof mounted on the supporting frame and adapted to effect a predetermined movement of the projector about its horizontal axis of support when the supporting frame is held stationary and to rotate the supporting frame when said element is held stationary, locking means disposed relative to the supporting frame and the said element operative to alternately lock said frame and said element against rotation, and means actuated by the driving means disposed to operate the locking means in a predetermined manner to effect the alternate rotation of the supporting means about the vertical axis and movement of the projector about the horizontal axis.

HENRY H. THOMPSON.