May 5, 1936. F. R. HOUSE 2,039,647

AIRWAY BEACON

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Fig. 1.

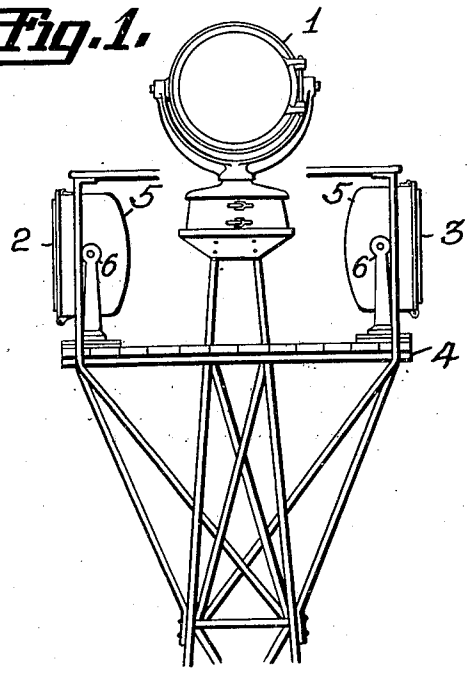


Fig. 2.

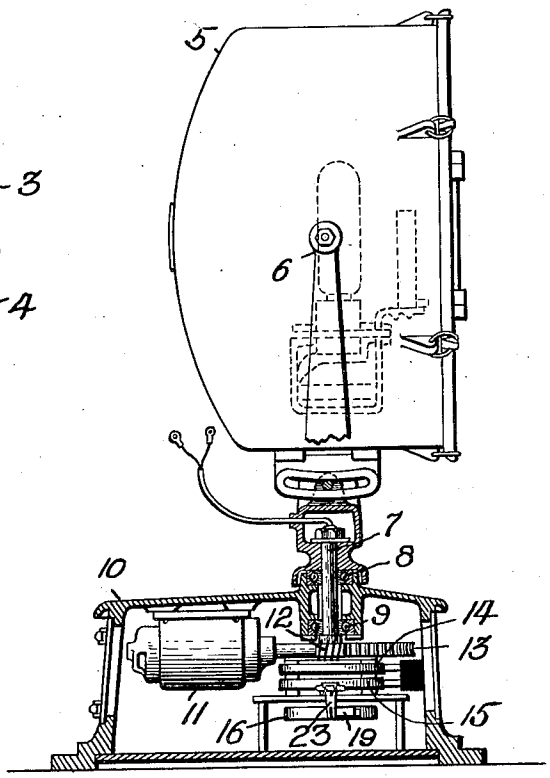


Fig. 3.

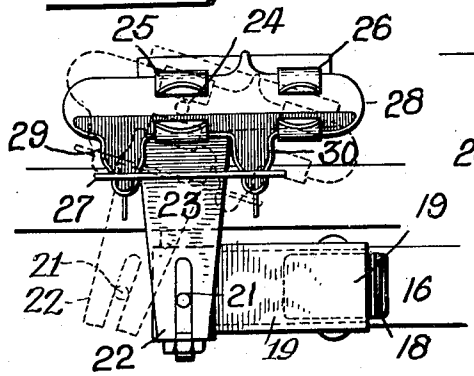


Fig. 4.

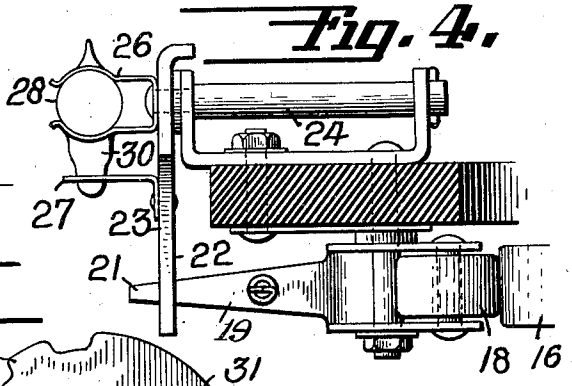
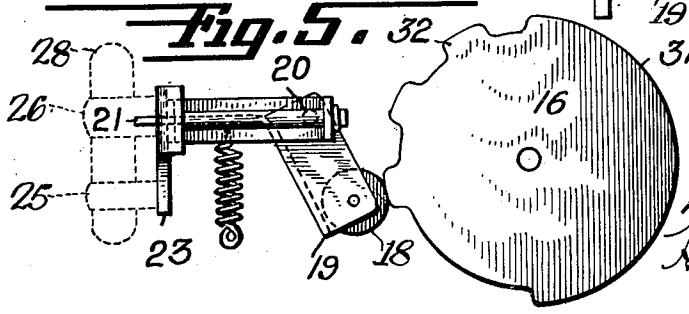


Fig. 5.



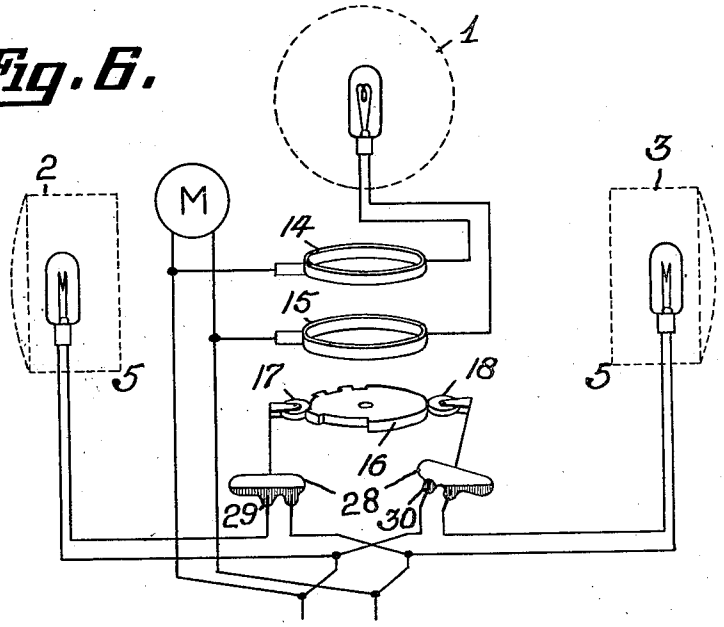
INVENTOR
Frank R. House.
BY
Herbert R. Thornton
his ATTORNEY.

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AIRWAY BEACON

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Fig. 6.



INVENTOR
Frank R. House.
BY
Herbert H. Thompson
his ATTORNEY.

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UNITED STATES PATENT OFFICE

2,039,647

AIRWAY BEACON

Frank R. House, Baldwin Harbor, N. Y., assignor to Sperry Gyroscope Company, Inc., Brooklyn, N. Y., a corporation of New York

Application March 7, 1929, Serial No. 345,189

10 Claims. (Cl. 177—352)

This invention relates to airway beacons or signalling searchlights and has particular reference to the means for switching on and off the lamps in predetermined sequence. It has been found that airway beacons require both directional beacons which preferably point along the airway route to the next beacon and also a revolving beacon to attract the aviator's attention. It is also desirable to provide means for flashing preferably the directional beacons in a predetermined sequence so that the aviator may know the route number. According to my invention I mount both directional and revolving beacons on the same support and preferably operate the cam for flashing the directional beacons from the rotating beacon and also arrange the cam so that the stationary beacons are extinguished at the time the flashing beacon passes over the stationary beam. Also, prior to my invention it has been usual to employ a master cam-operated switch or switches on the light, which in turn control a relay or relays for handling the comparatively heavy current of the lamps. According to my invention I eliminate the necessity for such a complication and in addition provide a very simple, cheap, and reliable mechanism for performing this function which can operate for months at a time without any attention whatever on an isolated airway.

Referring to the drawings in which my preferred form of the invention is shown,

Fig. 1 is a front elevation of a beacon tower showing a plurality of beacons mounted thereon.

Fig. 2 is a side elevation on a larger scale of the revolving beacon, the base being shown in section.

Fig. 3 is a detailed view in elevation of one of the tumbler switches for operating one of the flashing beacons.

Fig. 4 is an end view of the same.

Fig. 5 is a plan view showing the cam for operating the switch.

Fig. 6 is a wiring diagram showing the control of both flashing beacons from the same cam.

According to my invention, I employ a continuously revolving beacon 1 such as is usually employed for enabling an aviator to locate from a distance the airport and one or more stationary directional beacons 2 and 3, which send out beams in a predetermined direction usually along the boundaries of the airport. The group of beacons is shown as mounted on a suitable elevated framework or tower 4. All of the beacons are shown as comprising drums 5 pivotally mounted on trunnion arms 6 for oscillation about a horizontal axis. The base of the revolving beacon is revolubly mounted as by being secured to shaft 7 journaled in vertical bearings 8—9 in the fixed base 10. Said shaft is shown as revolved by a suitable motor 11 through worm 12 on the shaft thereof and wormwheel 13 on shaft 7. On said shaft is also located suitable slip rings 14 and 15 for leading current into the lamp and a cam 16 which controls the lighting of the stationary or flashing beacons. Preferably both of said beacons are controlled from the same cam as by positioning the rollers 17 and 18 for the switches of each beacon on opposite sides of the cam so that the two beams operate at 180° phase relationship. The cam is shown as provided with a semi-circular raised portion 31 which operates to extinguish the stationary light having its cam-roller bearing thereon. The other semi-circular portion of the cam is struck on a smaller radius so that when the roller of one of the stationary lights bears thereon it is lighted. The cam is so synchronized with the rotating beacon that as the beam of the rotating beacon approaches within 90° of the beam of a stationary beacon the latter is extinguished and is lighted again as the beam of the rotating beacon leaves at the opposite 90° angle. At the same time the opposite stationary beam is lighted and extinguished as will be readily understood. The cam is also provided with raised portions 32 within the depressed semi-circular portion so that the stationary beams are flashed on and off during the period they are lighted in a predetermined sequence so as to furnish the aviator with a signal informing him of the location of the beacon and/or the course to follow in approaching and leaving the beacon.

Each roller is shown as mounted on the bell crank lever 19 pivoted at 20. At its opposite end said lever is provided with a pin 21 which takes in the fork 22 of a supporting clamp 23 pivoted at 24. Said clamp is provided with suitable spring clips 25, 26 and base 27 for holding a mercury tumbler switch 28. Said switch comprises a sealed tube placed in a normally horizontal position and partially filled with mercury or other suitable conducting fluid. Said tube is provided with depressions 29, 30 into each of which a wire projects. When the switch is horizontal the mercury closes the gap between the two wires but when the switch is tilted, as shown in dotted lines in Fig. 3 or as shown at the right hand switch in Fig. 6, the mercury flows down into the larger end of the tube and breaks the circuit.

It should be noted that in this type of switch,

contact is made and broken entirely within sealed tube 28 so that there are no exposed contact surfaces to become corroded or fouled. The switch, therefore, can easily handle the entire lamp current without deteriorating so that no relays are necessary and the mechanism is greatly simplified and its reliability increased.

In accordance with the provisions of the patent statutes, I have herein described the principle and operation of my invention, together with the apparatus which I now consider to represent the best embodiment thereof, but I desire to have it understood that the apparatus shown is only illustrative and that the invention can be carried out by other means. Also, while it is designed to use the various features and elements in the combination and relations described, some of these may be altered and others omitted without interfering with the more general results outlined, and the invention extends to such use.

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

1. In an airway beacon, the combination with a revolving and a stationary directional beacon, both adapted to project beams in substantially horizontal planes, a cam revolving with said first named beacon, a tumbler mercury switch operated thereby and in circuit with said second named beacon to extinguish it as the beam of the first beacon sweeps through a predetermined arc.

2. In an airway beacon, the combination with a revolving and a pair of stationary directional beacons adapted to direct beams in different directions, a cam revolving with said first-named beacon, a pair of tumbler mercury switches oppositely operated thereby and in circuit with said second named beacons to extinguish one or the other of said stationary beacons as the beam of the revolving beacon sweeps past the beams of the stationary beacons.

3. In an airway beacon, the combination with a revolving and a stationary beacon, a cam revolving with said first named beacon, a tumbler mercury switch operated thereby and in circuit with said second named beacon to extinguish it as the beam of the first beacon sweeps through a predetermined arc, said cam also being provided with additional projections to cause oscillation of said switch and flashing of said second beacon within its normal period of illumination.

4. In an airway beacon, the combination with a revolving and a pair of stationary beacons adapted to direct beams in different directions, a cam revolving with said first-named beacon, a pair of tumbler mercury switches oppositely operated thereby and in circuit with said second named beacons to extinguish one or the other of said stationary beacons as the beam of the revolving beacon sweeps past the beams of the stationary beacons, said cam also being provided with additional projections to cause oscillation in turn of each switch and flashing of said stationary beacons wit in their normal periods of illumination.

5. In an electric airway beacon system, a revolving beacon, a stationary directional beacon for projecting a beam substantially horizontally in a predetermined direction and mounted adjacent said revolving beacon, and means actuated by the revolution of said first beacon for periodically closing and opening the circuit through said stationary beacon.

6. In an airway beacon system, a revolving beacon, a plurality of stationary directional beacons mounted adjacent said revolving beacon and adapted to project their beams in different substantially horizontal directions, and means actuated by the revolution of said first beacon for periodically and successively energizing said stationary beacons.

7. In an electric airway beacon system, a revolving beacon, a stationary beacon mounted adjacent said revolving beacon, a cam carried by said revolving beacon, and switch contacts controlling the energization of said stationary beacon, said contacts being operated by said cam whereby they are periodically closed and opened by the revolution of said revolving beacon as said revolving beacon revolves.

8. In an electric airway beacon system, a revolving beacon, a plurality of stationary beacons mounted adjacent thereto and adapted to project substantially horizontal beams in different directions, a cam carried by said revolving beacon, a plurality of sets of switch contacts controlling the energization of said stationary beacons, said contacts being operated by said cam to be periodically and successively closed thereby as said revolving beacon revolves.

9. An airway beacon unit comprising a pair of stationary searchlights faced in different directions to project substantially horizontal beams, a third searchlight rotatably mounted between said stationary searchlights, means for revolving said last-named light at a uniform rate, and means operated by the rotation of said last-named light for extinguishing each stationary light in turn as the rotating beam approaches the same and relighting the same as said rotating beam recedes from the same.

10. An airway beacon unit comprising a pair of stationary searchlights faced in different directions to project substantially horizontal beams, a third searchlight rotatably mounted between said stationary searchlights, means for revolving said last-named light at a uniform rate, means operated by the rotation of said last-named light for extinguishing each stationary light in turn as the rotating beam approaches the same, and means for flashing said stationary lights in predetermined sequences during their normal period of illumination also operated by said rotary searchlight.

FRANK R. HOUSE.