J. F. HUTCHINSON.

AERO LIGHTHOUSE.

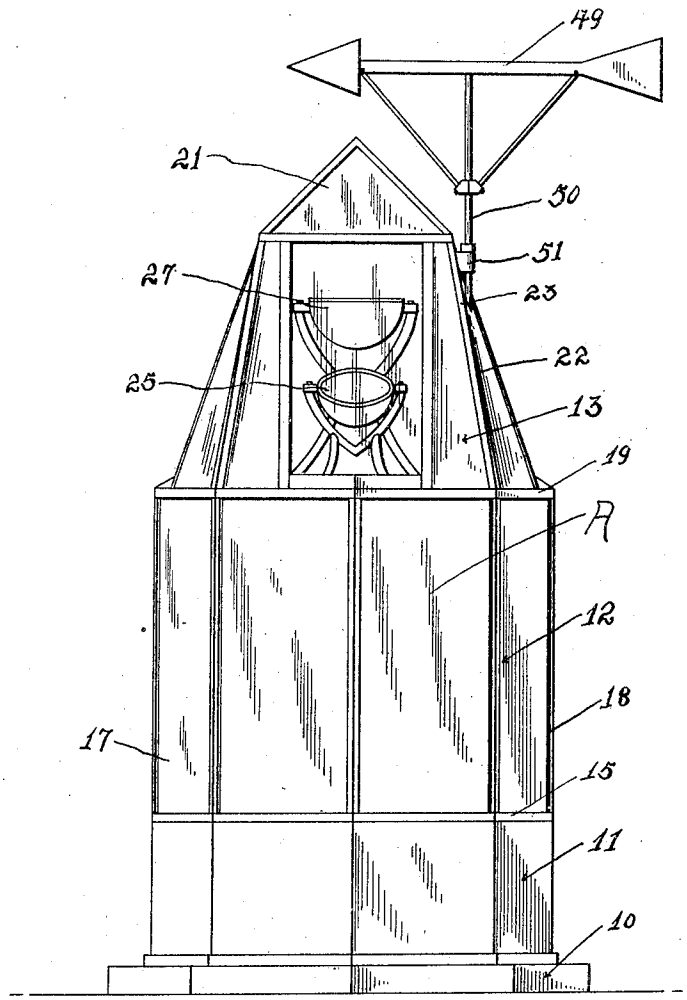
APPLICATION FILED JUNE 14, 1920.

1,404,962.

Patented Jan. 31, 1922.

5 SHEETS—SHEET 1.

Fig. 1.



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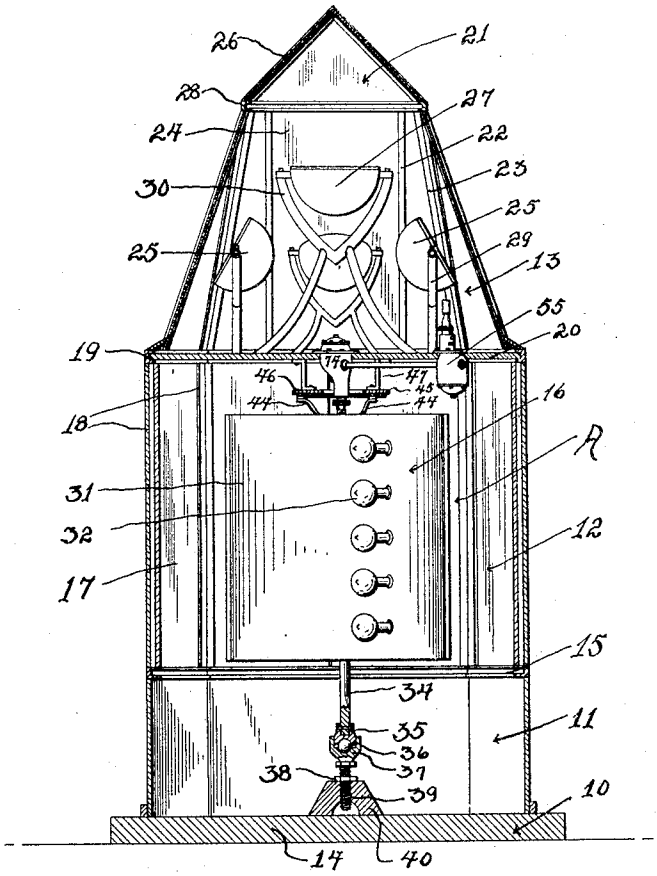
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5 SHEETS—SHEET 2.

Fig. 2.



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5 SHEETS—SHEET 3.

Fig. 3.

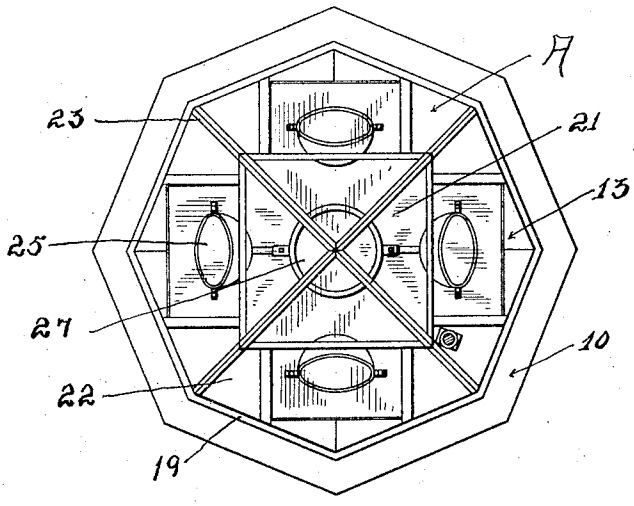
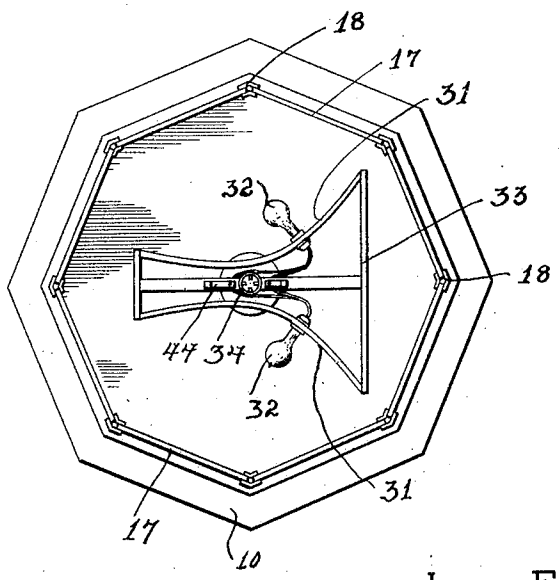


Fig. 4.



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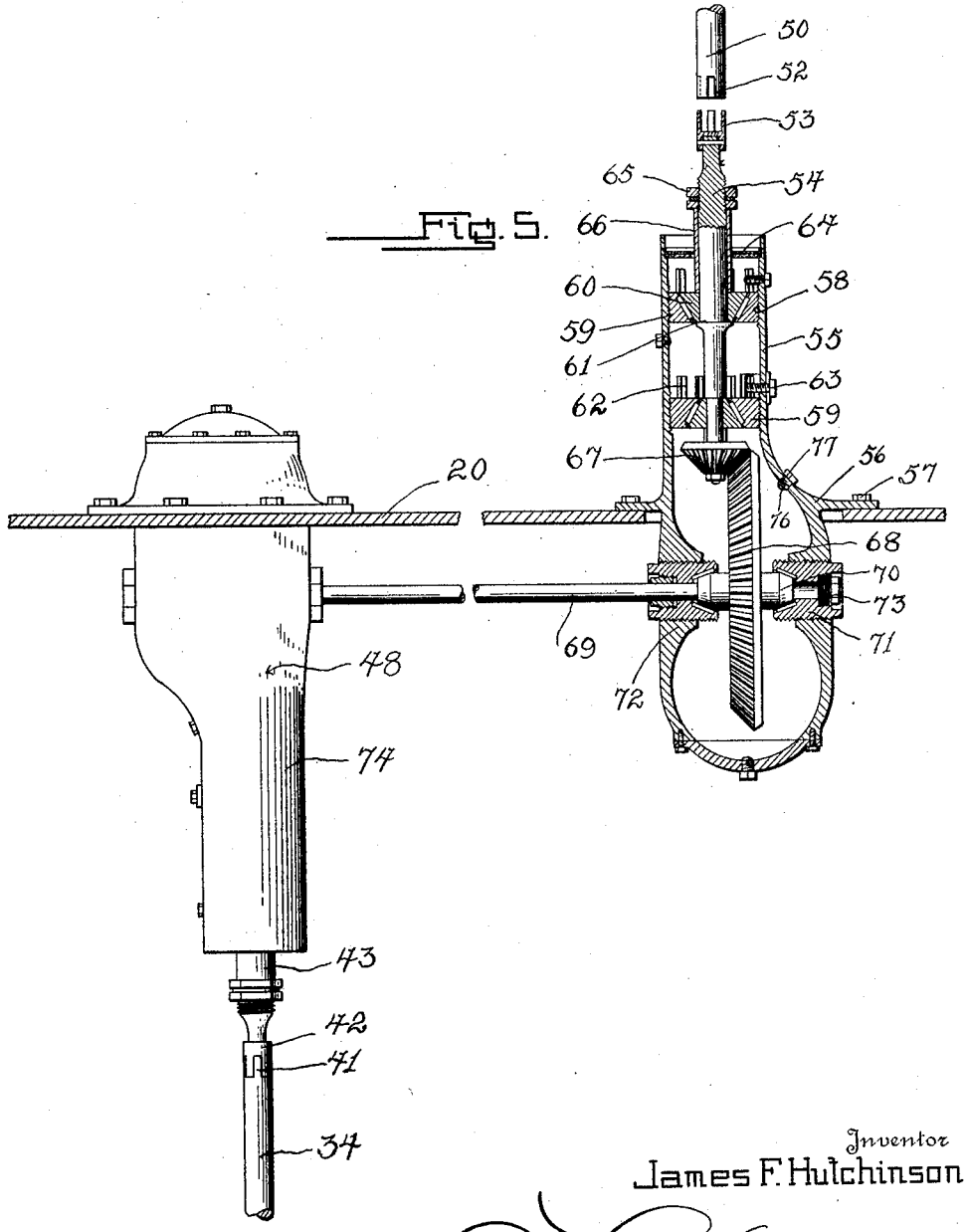
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5 SHEETS—SHEET 4.

Fig. 5.



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5 SHEETS—SHEET 5.

Fig. 6.

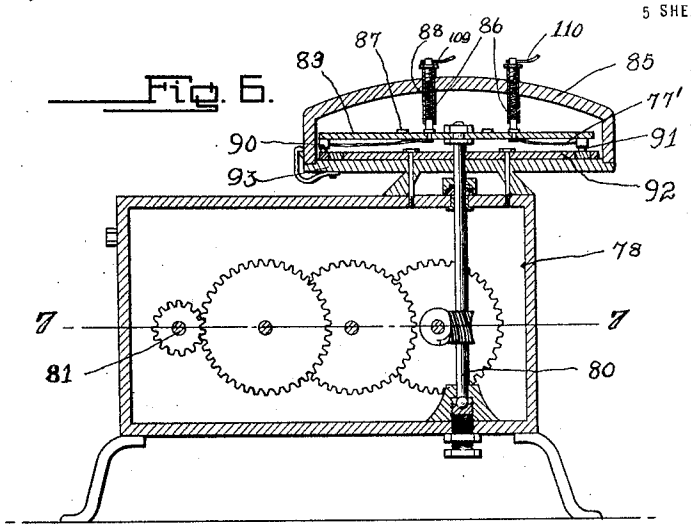


Fig. 7.

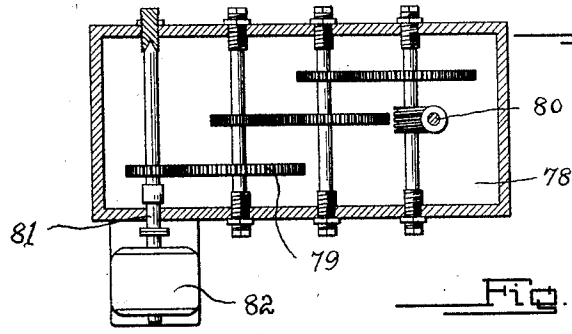


Fig. 9.

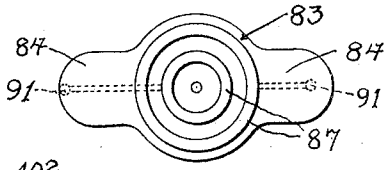


Fig. 8.

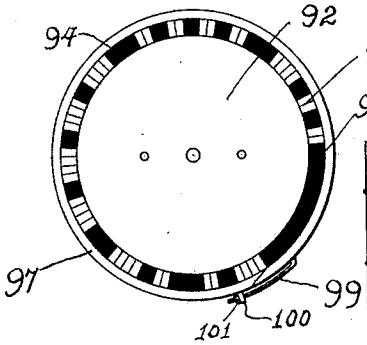


Fig. 11.

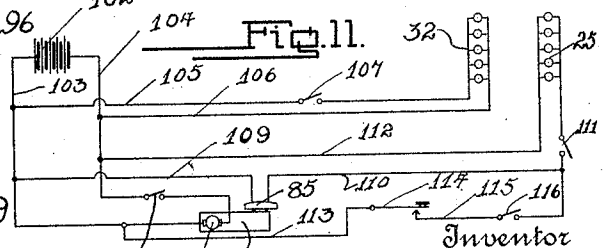
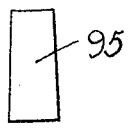


Fig. 10.



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UNITED STATES PATENT OFFICE.

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AERO LIGHTHOUSE.

1,404,962. Specification of Letters Patent. Patented Jan. 31, 1922.

Application filed June 14, 1920. Serial No. 388,947.

To all whom it may concern:

Be it known that I, JAMES F. HUTCHINSON, a citizen of the United States, residing at Cozad, in the county of Dawson and State of Nebraska, have invented certain new and useful Improvements in Aero Lighthouses, of which the following is a specification.

This invention relates to light houses, and the primary object of the invention is to provide an improved device for facilitating the landing and arising of air craft at night time from aviation fields, and thereby eliminate the inconveniences generally associated therewith.

Another object of the invention is to provide an improved light house for aviation fields for effectively illuminating the fields so as to permit of night flying, the light house also being in the nature of a signal light, whereby aviators can readily locate the flying fields.

A further object of the invention is the provision of an improved signal tower or light house for aviators, which will signal out at predetermined times through the medium of telegraphic code light flashes, the name of the aviation field, thereby permitting aviators to readily determine their location during night flying, means also being provided for permitting messages to be sent to aviators in the air through the medium of the light flashes and a telegraphic key.

A further object of the invention is to provide an improved means for automatically maintaining the projection of illuminating light rays cross wise to the wind, thereby permitting the easy landing of aircraft without the projecting of light into the aviator's eyes.

With these and other objects in view, the invention consists in the novel construction, arrangement and formation of parts as will be hereinafter more specifically described, claimed and illustrated in the accompanying drawings, in which drawings:

Figure 1 is an elevation of the improved signal tower or light house.

Figure 2 is a vertical section through the same.

Figure 3 is a top plan view of the improved light house.

Figure 4 is a top plan view of the signal tower or light house showing the upper portion thereof removed.

Figure 5 is an enlarged fragmentary vertical section through a portion of the signal tower or light house, illustrating the means for connecting the wind vane with the illuminating reflector, for maintaining said reflector at a position transversely to the direction of the wind.

Figure 6 is an enlarged vertical section through the signal box located in the tower, which is employed for regulating the making and breaking of the circuit to the beacon light so that messages can be flashed out therefrom.

Figure 7 is a horizontal section taken on the line 7—7 of Figure 6.

Figure 8 is a plan view of the contact carrying plate utilized for regulating the character of the message to be flashed out.

Figure 9 is a plan view of the rotary plate carried by the rotary timing shaft, which is adapted to engage the contacts carried by the plate illustrated in Figure 8.

Figure 10 is a detail view of one of the contact members carried by the plate illustrated in Figure 8, and

Figure 11 is a diagrammatic view of the wiring circuit for the illuminating lights and the beacon lights.

Referring to the drawings in detail, wherein similar reference characters designate corresponding parts throughout the several views, the letter A generally indicates the improved signal tower or aero light house which includes the foundation 10, the body 11, the field illuminating section 12 and the beacon light section 13.

The foundation 10 includes a flat base plate 14 upon which the body 11 of the tower is adapted to be anchored. The body 11 is preferably formed octagonal shaped in cross section and is built up of any preferred material. The upper edge thereof is braced by a suitable rim 15 which can be formed of angle or channel iron if so desired.

The field illuminating section 12 is also formed octagonal shaped in cross section so that the field can be illuminated during all of the positions of the illuminating means 16, which will be hereinafter more fully described. The walls of the field illuminating section 12 are preferably formed of transparent plates such as glass and the same are designated by the numeral 17. The glass plates are positioned on the upper surface of the rim 15 and are held in place by corner posts 18 which are preferably formed with their opposite faces provided with

flanges for the reception of the plates. The upper surface of the field illuminating sections are further braced by a rim 19 which can be made, if so desired, of angle or channel iron. The provision of the rims 15 and 19 and the corner post 18 form a rigid construction which absolutely precludes movement or displacement of the transparent walls 17. By this construction, it can be seen that an intermediate section is provided which is wholly constructed of transparent material, whereby the field illuminating means 16 can be seen at all angles. The upper channel rim 19 supports a plate 20 which forms the flooring for the beacon light section 13. The beacon light section 13 includes the top pyramidal shaped section 21 and the lower frusto octagonal shaped section 22. The sides of the section 22 are provided with bracing posts or strips 23 and the opposite side of the section is provided with transparencies 24, through which the side beacon lights 25 are adapted to shine. The walls of the upper pyramidal sections are also formed of transparent plates 26 and the central beacon light 27 is adapted to shine through the same. The upper end of the corner posts or strips 23 supports the rim 28 which serves to brace and strengthen the structure. The side beacon lights 25 are four in number and the reflectors thereof can be any shape but preferably of the usual parabolic configuration. These side beacon lights 25 are carried by brackets 29 which are anchored or otherwise secured to the plate 20. The beacon side lights 25 are tilted at an angle to the horizontal so that the beams thereof will be projected outwardly and upwardly. The central beacon light 27 can also be of any preferred shape and construction and is supported in position by means of a central bracket 30 or in any preferred manner to the floor or plate 20. This light is so positioned that the beams therefrom will be projected directly upwardly and thus it can be seen that the beacon lights can be seen by an aeroplane or other aircraft approaching from any direction.

The field illuminating means 16 consists of a pair of vertically disposed substantially parabolic reflectors 31, and these reflectors 31 are positioned back to back so that the rays from the electric lamps 32 will be projected in opposite directions. These oppositely disposed reflectors 31 are secured in any preferred manner to a frame 33 which is carried by a central rotatable shaft 34. The lower end of the shaft 34 has keyed or otherwise secured thereto a depending bearing cap 35 which is adapted to engage bearings 36 carried by the cup 37. The bearing cup 37 is held in any preferred adjusted position by means of a nut 38 which is threaded on the shank 39 of the cup 37. The shank 39 is slidably mounted in a bracket 40 carried by the base plate 14. The nut 38 rests on the upper surface of the bracket 40 and it can be seen that by adjusting the nut the cup can be raised or lowered. The upper end of the shaft 34 is provided with a clutch face 41 which is adapted to engage the clutch head 42 carried by the shaft 43, which is driven by means which will be hereinafter more fully described. The frame 33 which supports the reflectors 31 for movement with the shaft 34 carries a pair of spaced brushes 44 which are adapted to frictionally engage the lower surface of a pair of spaced concentrically arranged annular electrical conducting strips 45. These strips 45 are carried by the lower surface of an insulating plate 46, which is held in position in axial relation to the shaft 34 by means of depending brackets 47.

A plurality of electric lamps 32 are carried by each of the reflectors 31 so that a relatively strong brilliant light will be obtained for effectively illuminating the field. The electric lamps 32 are connected in series and the brushes 44, are in circuit therewith and it can be seen that as the shaft 34 rotates the brushes 44 will engage the contact strips 45 which are connected to a suitable source of electrical energy, as will be hereinafter more fully described. Thus it can be seen that the lamps 32 are illuminated at all times during the rotation of the shaft 34.

The reflectors 31 are mounted for rotation in the field illuminating housing section 12 so that the beams from the reflectors 31 will be projected at right angles to the direction in which the wind is blowing. This provision is made so that the light will not be projected into the eyes of an aviator during the landing or arising of a machine, as in the flying, machines alight or rise with the wind.

An automatic means 48 is provided, for normally positioning the reflectors so that the light beams projected therefrom will be at right angles to the direction of the wind and this means includes a wind vane 49 which as shown is in the shape of an arrow and is secured in any preferred manner to a vertically disposed shaft 50. This shaft 50 is mounted in suitable bearings 51 carried by the corner posts 23 of the beacon light section 13. The lower end of the shaft 50 projects into the beacon light section 13 and the lower end of this shaft 50 is provided with a clutch head 52 which is adapted to engage the clutch head 53 formed on a shaft 54. This shaft 54 projects into a housing 55, the side faces of which carry lugs 56 which are bolted or otherwise secured as at 57 to the plate or floor 20. The housing 55 is provided with interior threads 58 which adjustably support the bearing cones 59, which are disposed in opposite relation to

each other. These bearing cones 59 support suitable rollers or the like and are adapted to engage the conical collars 60 secured to the shaft 54. The shaft 54 adjacent to the cones 60 is provided with annular flanges 61 which limit the movement of the conical collars thereon. The provision of these conical collars 60 and the conical bearings 59 form an effective means for supporting the shaft 54 and these conical bearings 59 can be adjusted for adjusting the shaft 54 in the casing. The upper end of the conical bearings 59 are provided with lugs 62 which form means for adjusting the bearings and after the same have been adjusted to their preferred positions, suitable set screws 63 are threaded into the casing between the lugs so as to prevent turning movement of the same.

To prevent the entrance of dirt or the like into the casing, flexible gaskets 64 are carried by the upper end of the casing 65 and frictionally engage the shaft 54. The shaft 54 is also provided with adjusting nuts 65 which have a lock washer interposed between the same so as to prevent accidental turning thereof. These lock nuts are adapted to engage a sleeve 66 which bears against the upper surface of the upper conical collar 60. This also forms means for adjusting the position of the collar on the shaft 54 and holds the same against the flange 61. The lower end of the shaft 54 has keyed or otherwise secured thereto a relatively small gear wheel 67 which meshes with a relatively large gear wheel 68 which is keyed or otherwise secured to a transversely extending shaft 69. The opposite sides of the bevelled gear 68 is provided with outwardly extending substantially conical hubs 70, which rest upon suitable roller bearings carried by the conical bearing caps 71, which are adjustably mounted in boxes 72 carried by the side walls of the casing 55. These bearings 70 carry closing plugs 73. The shaft 69 projects into a casing 74, which is bolted or otherwise secured to the flooring or plate 20 and this casing is constructed identically the same as the casing 65 and projects downwardly from the flooring as shown. The shaft 69 is operatively connected to the shaft 43 which projects into the casing 74 in the same manner as the shaft 54 with the shaft 69.

From the foregoing it can be seen that when the wind vane 49 is turned by the wind, the shaft 34 will be turned therewith, thereby carrying the reflectors 31 to their correct positions in regards to the direction in which the wind is blowing. The bearings for the shafts 43, 69 and 64 are suitably lubricated, by oil or grease introduced through the holes 76, which are closed by the removable plugs 77.

The beacon lights 25 and 27 are also connected in series and are adapted to be intermittently lit so that signals can be sent through the intermittent flashing thereof. An automatic circuit maker and breaker 77′ is provided and this device is arranged at any convenient point in the tower. As shown the improved circuit maker and breaker includes a casing 78 in which a speed reducing mechanism 79 is mounted for driving the driven shaft 80 at a comparatively low rate of speed over the driving shaft 81 of the electric motor 82 which is provided for operating the same. The shaft 80 carries a plate 83 which is provided at diametrically opposite points with outwardly extending ears 84. This plate 83 is positioned in a protecting housing 85, the cover of which carries a pair of depending brushes 86, which frictionally engage the upper surface of a pair of spaced concentrically arranged electric conducting rings 87. The brushes 86 are normally held in engagement with the rings by suitable expansion springs 88. The conducting rings 87 are held in position by means of the insulating plate 83 which also carries depending brushes 90 and 91. These brushes 90 and 91 are adapted to engage the upper surface of the plate 92 which forms means by which the flashing of the beacon light may be controlled. This plate 92 is preferably formed of insulating material and is mounted in any preferred manner to the upper surface of the bottom wall 93 of the casing 85. The outer periphery of the plate 92 is adapted to have secured thereto in any preferred manner the insulating plugs 94 and the electric conducting plugs 95. These plugs are freely removable from the plate 92 and form the means whereby the length of the flashes from the beacon lights may be controlled. By making the conducting plugs 95 shorter or longer the dot and dash flash can be made. By arranging the dot and dash plug according to any preferred code, any name or signal can be flashed and the plugs are preferably arranged so as to spell out the name of the aviation field so that the aviators can readily determine their location at night. The shaft 80 is rotated at a relatively low rate of speed so that the signals are flashed comparatively slow so that an aviator will have plenty of time to read the same. A relatively long plug of nonconducting material 96 is provided, between the beginning and end of the word being flashed, so that the aviators can tell when to begin to read the signal. As shown in the detailed view in Figure 10, the conducting plugs 95 are slightly tapered so as to conform to the configuration of the plate 92. The plugs 94 and 95 are held in position on the periphery of the plate 92 by means of a split conducting ring 97 which forms the other terminal adapted to be engaged by the brush 90. The split conduct-

ing ring 97 has one end of the same provided with a threaded shank 99 which is adapted to protrude through an eye 100 carried by the opposite end of the ring and a nut 101 is threaded on the shank and is adapted to engage the eye so as to bring the terminals of the split ring together. As shown the brush 91 is adapted to ride over the upper surfaces of the plugs 94 and 95 while the brush 90 is adapted to engage the conducting ring 97.

By referring to Figure 11, the method of wiring the apparatus can be readily seen. The source of power is designated by the numeral 102 and this can be a generator, a storage battery, dry cells, or the like. The terminals of the source of electrical supply is provided with a pair of lead wires 103 and 104. These wires have connected thereto respectively the lead wires 105 and 106, which lead to the lamps 32 of the field illuminating means. A suitable switch 107 is interposed in the wire 105, whereby a circuit to the lamps 32 may be manually closed or opened. The wire 104 is extended to one terminal of the motor 82, while the wire 103 is extended to the other terminal and the wire 104 has interposed therein a manually operated switch 108, thereby the circuit to the motor may be controlled. The wire 103 has electrically connected thereto a branch wire 109 which extends to one of the brushes 86. The other brush 86 has connected thereto a wire 110, which leads to the beacon lights 25 and 27 respectively. A suitable hand operated switch 111 is interposed therein whereby the circuit may be manually opened and closed. The wire 104 has also connected thereto a branch wire 112, which leads to the other contact of the lamps 25 and 27. A branch wire 113 is also connected to the wire 103 and this wire leads to one terminal of a telegraph key 114. The opposite terminal of the telegraph key has connected thereto a wire 115 which leads to the branch wire 110. An electric switch 116 is interposed in the wire 115 whereby the circuit through the telegraph key 114 may be manually opened and closed. When it is desired to flash a signal message by the beacon light, the switch 108 is opened so as to open the circuit of the motor 82. This will stop the operation of the plate 83 and by pressing the key 114 the desired message can be readily flashed.

From the foregoing description it can be seen that an improved tower has been provided which is especially adapted for an aeronautical field, and which will considerably facilitate night flying of all kinds of air craft.

Changes in details may be made without departing from the spirit or scope of this invention; but,

I claim:

1. In an aero light house, a tower having transparent walls, a pair of oppositely disposed reflectors arranged back to back in said tower, lamps carried by the reflectors, a wind vane, and means operatively connecting the wind vane with the reflectors, so that upon movement of said wind vane the reflectors will be turned therewith in said tower.

2. In an aero light house, a shaft, a pair of reflectors carried by the shaft arranged back to back, lamps carried by the reflectors, a rotatable wind vane, and means connecting the rotatable wind vane with the rotatable shaft.

3. In an aero light house, a tower, including a lower illuminating light section, and an upper beacon light section, a shaft rotatably mounted in the illuminating light section, a pair of reflectors carried by the opposite sides of the shafts, lamps carried by the reflectors, a weather vane rotatably carried by the tower, means operatively connecting the weather vane and the rotatable shaft, and means for flashing relatively long and relatively short flashes from the beacon lights.

4. In an aero light house, a circuit making and breaking device including an insulating plate, a plurality of insulating plugs and conducting plugs detachably carried by the periphery of the insulating plate, and a conducting ring arranged to surround said plugs to contact and to hold the same against accidental displacement.

5. In an aero light house, a circuit making and breaking device including a stationary plate, a plurality of radially extending detachable conducting and non-conducting plugs, a split electrical conducting ring arranged to surround said plugs and hold the same in position against accidental displacement, means for adjustably connecting the ends of the adjusting strip together, a rotatable plate, means for rotating said plate, a pair of brushes arranged to engage the conducting strip and the upper surface of the plugs, a pair of spaced contact rings carried by the upper surface of the last named plate, and stationary brushes arranged to engage the upper surface of said rings.

JAMES F. HUTCHINSON.