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LIGHTING MEANS FOR LANDING FIELDS AT AIRPORTS

Filed Oct. 22, 1928

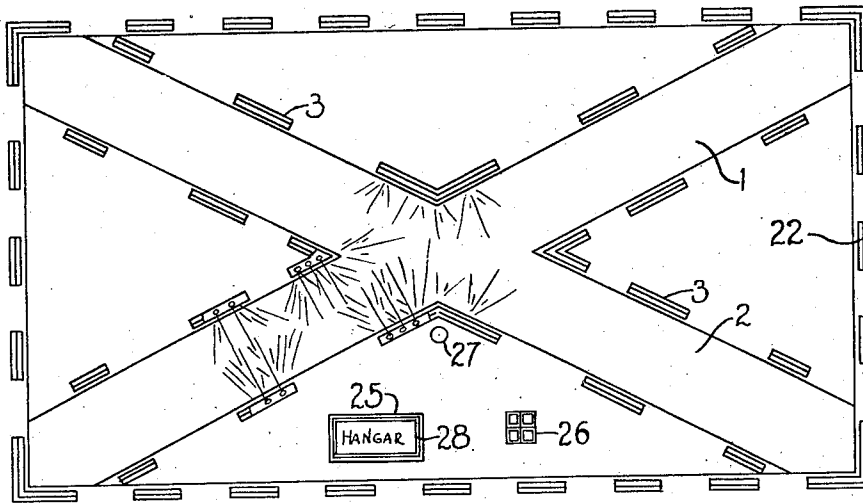


Fig. 1

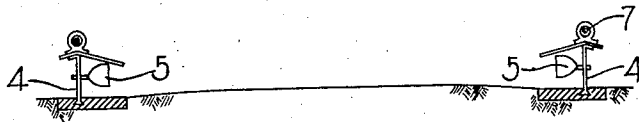


Fig. 2

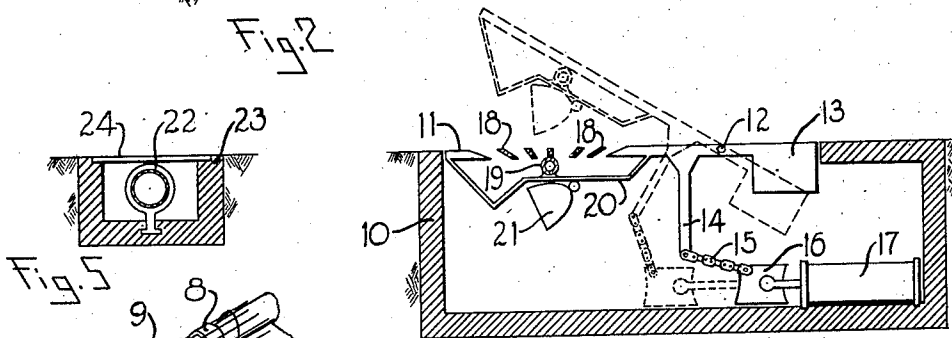


Fig. 3

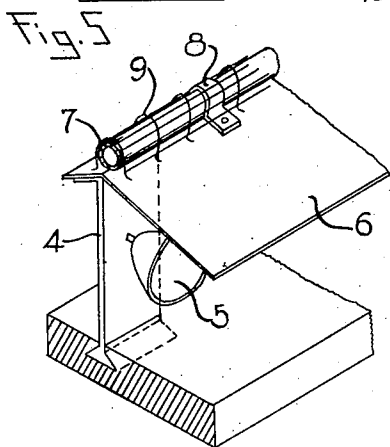


Fig. 4

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LIGHTING MEANS FOR LANDING FIELDS AT AIRPORTS

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This invention has for its principal object the provision of means for ensuring the safety of pilots of airplanes making landings at night and it accomplishes this and other objects by the use of a plurality of well lighted runways having distinctive means for indicating their position under conditions of low visibility together with means for selective illumination of the runways, selective illumination of the position indicating lights, and means for shielding the lights that might tend to blind the pilot when landing.

Another object of the invention is to provide a distinctive source of long wave-length light which may be seen even under conditions of fog or mist to indicate the positions of obstructions along a runway or upon a field.

In the drawings forming a part hereof, there has been shown diagrammatically a typical landing field having some preferred forms of illuminating units, together with certain illustrative details and modifications, but it will of course be understood that the invention may be embodied in many other forms all within the scope thereof, so long as such other forms come within the scope of the concluding claims wherein the distinguishing features of my invention are particularly pointed out and defined.

Figure 1 is a plan view of a landing field having diagonally disposed runways; Fig. 2 is a fragmentary view in elevation across one of the runways with parts in section; Fig. 3 is a vertical section with parts in elevation of a preferred form of illuminating unit; Fig. 4 is an elevation of a portion of a modified form of illuminating unit with parts in section and parts broken away; and Fig. 5 is a vertical section of a form of unit adapted for outlining a field.

The field is shown as having broad runways 1 and 2 which intersect near the middle of the field, though any other suitable arrangement of the runways may be made, and there may be any desired number. Along the runways are arranged a series of illuminating units 3, substantially parallel with the runways and separated to permit an airplane to leave the runway at once after landing. Two differ-

ent forms of illuminating units are illustrated in Figs. 3 and 4, respectively, of which that shown in Fig. 4 is the simpler and less expensive to construct. The standards 4 form a portion of the supports for any suitable flood-lighting lamps 5 mounted beneath a shield or hood 6 carried by the standards and serving to prevent direct rays of light passing from the lamps to the eyes of a pilot flying above the runway. The lamps will be of any type which will give strong illumination to the surface of the runways. The hood will preferably be inclined to shed water and upon its upper surface are arranged neon tubes 7. Such tubes, as is well known in the art, emit light of a distinctive orange red color with most of the visible radiation in the long wave-lengths which are most suitable for penetrating fog and mist. These tubes are held in place by clips 8 and are protected from injury by any desired form of wire guard 9. While it is evident that such a support for the flood lighting lamps will be an obstruction, the neon tubes will indicate their position exactly even when the fog or mist may obscure the light poured upon the runway by the flood lighting means. The runways will be broad and smooth, well lighted without confusing glare, and kept free from anything that would interfere with proper manipulation of the airplane.

To avoid a structure elevated above the ground, the modified form of unit shown in Fig. 3 may be used. Within a box or channel 10, a cover 11, which may be of metal, is pivoted at 12 and provided with a weight 13 which will preferably overbalance the cover to hold it normally in the position shown in broken lines. An arm 14 rigidly secured to the cover has attached to its lower end a chain 15 of which the other end is secured to a sliding crosshead 16 operated by a compressed air cylinder 17. The cover has cross bars 18 radiating from a neon tube 19 mounted below the bars on an opaque shield 20. On the under side of the shield is a flood-lighting lamp 21. When it is desired to illuminate the runway, the cylinders 17 of any selected group of units are actuated to allow the covers to swing upward into the broken line po-

sition in which the lamps 21 will light up the surface of the runway, and all the other illuminating units may remain out of the way with their covers flush with the surface of the field. The flexible chains will permit the arms 14 to swing down even when the cross-heads 16 are advanced, and thus any pressure on the cover will cause it to move out of the way into the channel or box 10. An airplane landing on the field in the rear of such a lighting unit could roll across it, forcing the cover to swing on its pivot.

Around the outer margin of the field, neon tubes 22 will be set in cement channels or boxes 23 having slatted covers 24. A hangar 25 may be set near one side of the field and a code signal box 26 will be mounted in any suitable location for operation by an attendant. A beacon 27 may be placed near the intersection of the runways to aid in the general illumination of the field.

A pilot approaching the field will be guided by the beacon to a point at which the outlines of the field may be seen as lines of orange red light from the tubes 22. If the runways are clear, the field attendant may close the circuits to light up all the runways, and the pilot even in a fog will see the outlines of the spaces prepared for his landing and may choose one best suited to his course. As he gets low enough, the flood lighting of the runways will also become visible as concentrated illumination of the best places. If any runway is obstructed, as by another plane, the lights along that runway will be shut off, leaving only the safe landing places indicated by the neon tubes and lighted by the flood lamps. The signal box 26 may be used by the attendant to give any information to the pilot and if landing conditions are very unfavorable, the attendant will be ready to operate any of the illuminating units to lower them out of the way to avoid injury to the plane. Four of the units are shown in Fig. 1 with the covers broken away to indicate the arrangement of the flood lighting lamps in a series.

If desired, the hangar may be outlined with neon tubes or with tubes of some other distinctive color, as for example, argon-mercury vapor tubes 28.

I claim:

1. In a lighting unit for landing fields, a box, a lamp support comprising a recessed cavity having slots cut in the upper surface thereof and a shield formed upon the lower surface thereof and pivoted relative to the box so as to form a top surface therefor when in lowered position; a light of high illuminating efficiency mounted upon the under surface and a rare gas discharge tube mounted in the recessed cavity; a counterweight means to normally hold the support in a raised position.

2. In a lighting unit for landing fields, the

combination of a box, a lamp support comprising a recessed cavity with slots cut in its upper surface and a shield formed upon its lower surface, a light of high illuminating efficiency mounted on the under surface adjacent the shield, and a rare gas discharge tube mounted in the cavity, said lamp support being pivoted relative to the box so that in its lowered position it will form a top surface therefor and provided with counterweight means to hold the support normally raised and lowering means comprising a fluid motor connected to the support.

3. In a lighting unit for landing fields, the combination of a box, a lamp carrying support pivoted thereon, an illuminating lamp and a rare gas discharge tube mounted on the support, counterweight means to hold the support normally open and means to lower said support comprising a fluid motor connected to the support by a flexible tension member.

In testimony of which I affix my signature.
MELVIN G. MORRIS.

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