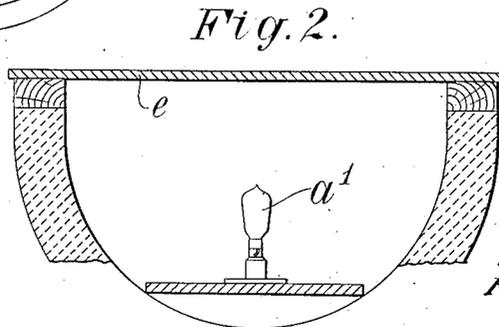
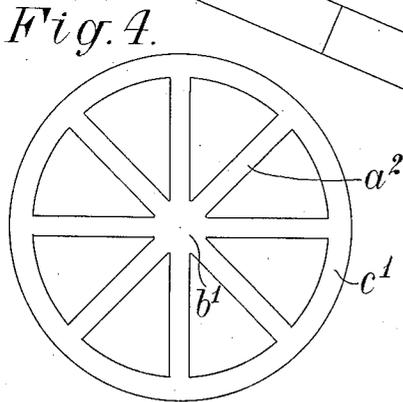
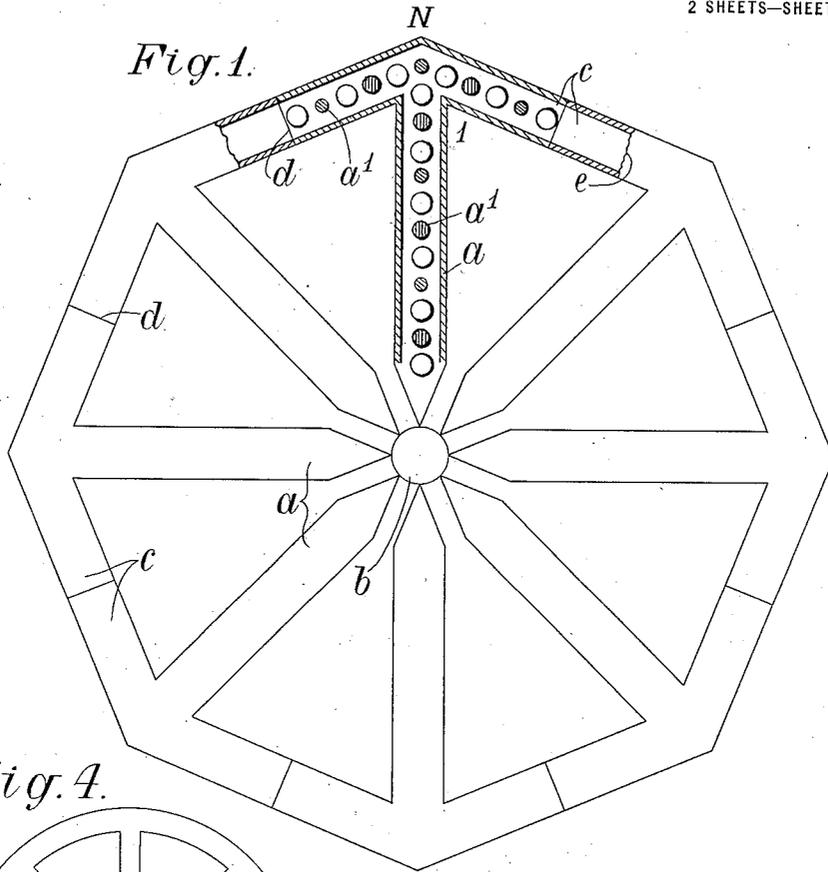


W. MORTIMER AND F. POTTEN.
 APPARATUS FOR FACILITATING THE LANDING OF AIRCRAFT.
 APPLICATION FILED MAY 13, 1919.

1,342,860.

Patented June 8, 1920.

2 SHEETS—SHEET 1.



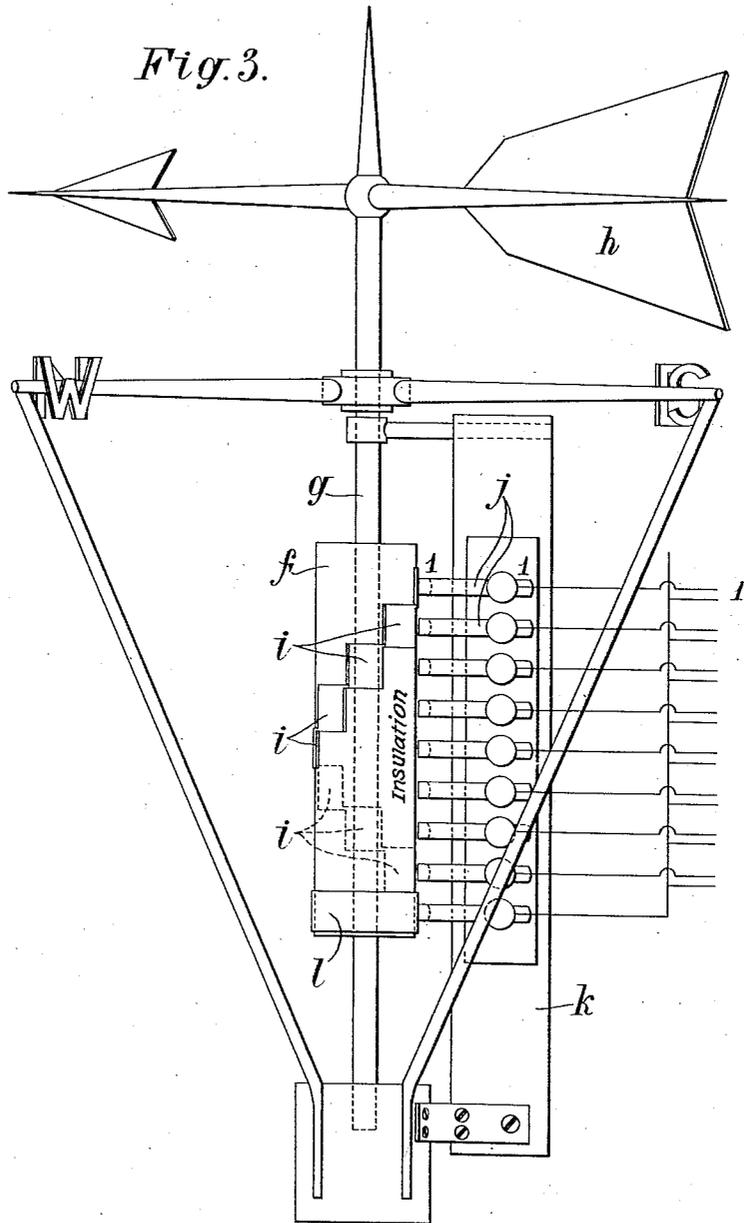
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UNITED STATES PATENT OFFICE.

WILLIAM MORTIMER AND FREDERICK POTTEN, OF DOVER, ENGLAND.

APPARATUS FOR FACILITATING THE LANDING OF AIRCRAFT.

1,342,860.

Specification of Letters Patent.

Patented June 8, 1920.

Application filed May 13, 1919. Serial No. 296,954.

To all whom it may concern:

Be it known that we, WILLIAM MORTIMER and FREDERICK POTTEN, subjects of His Majesty the King of England, both residing at Dover, in the county of Kent and Kingdom of England, have invented certain new and useful Improvements in or Connected with Apparatus for Facilitating the Landing of Aircraft, of which the following is a specification.

This invention relates to improvements in or connected with apparatus for facilitating the landing of aircraft.

The invention has for its primary object to provide apparatus of improved and efficient construction which will accurately indicate or register at a distance the direction of the wind.

Another object of the invention is to provide apparatus particularly designed for use on aviation grounds, aerodromes, or other landing places for automatically indicating at all times the direction of the wind prevailing near the ground, and for serving as a guide and greatly facilitating the landing of aeroplanes or other aerial machines or vessels in the dark, thus preventing accidents and injury to the aviators and their machines or vessels. Still another and important object of the invention is to provide apparatus whereby, by means of a system of differently colored lights, an aviator is able to ascertain approximately the distance he is from the ground at different stages of his descent.

According to the invention a weather vane or other device adapted to be actuated by the wind is operatively connected to one of a pair of mechanisms which are adapted to cooperate with one another, as the vane or other wind-operated device is actuated, to indicate or register the direction of the wind on apparatus situated at a distance from and operatively connected to said mechanisms.

The invention will now be described in connection with a suitable apparatus for use on aviation grounds, reference being made to the accompanying drawings in which:—

Figure 1 is a partly sectional plan showing a suitable form of indicator,

Fig. 2 is an enlarged cross-section of one of the trenches of the indicator shown in Fig. 1;

Fig. 3 is an elevation of suitable apparatus for controlling the lights in the indicator;

Fig. 4 is a plan of a modified form of indicator.

Referring to Figs. 1 to 3, a number of trenches *a*, preferably eight, each about 30 feet long, 1 foot in depth and 1½ feet wide, are formed in the center of the landing area of each aerodrome, aviation ground or other landing place so that they radiate from a center pit *b* and their outer ends terminate in a surrounding trench *c* preferably of octagonal plan. The surrounding trench *c* is divisioned off at *d* so that it forms in conjunction with the radial trenches *a* a series of eight connected arrows which are directed toward the cardinal and half cardinal points of the compass. The whole of the inside of the trench work is preferably whitewashed for light reflecting purposes, and is covered with slabs *e* of wire woven or other glass, or other transparent material, or gratings. The interior of each arrow *a*, *c* formed by the trenches is fitted with red, white and green electric lamps *a'* which are arranged in the order white, red, white, green, and so on beginning from the inner end of the radial trench *a*. The lamps are preferably of the same voltage so that they may burn in parallel in one circuit, the white lamps being 32 or 50 watt lamps, the red and green lamps being of such a candle power that they have a range of visibility, when compared with the white lamps, of approximately ¼ and ⅓ respectively, *i. e.*, white lamps 4,000 feet, red lamps 1,000 feet, and green lamps 500 to 600 feet.

The above described mechanism serves as the indicator of the apparatus and is electrically connected to operating or controlling mechanism, preferably comprising a cylinder or drum *f* made of glass, porcelain, ebonite, vulcanite, wood, vitrite or other insulating or non-conducting material fitted on the spindle *g* of a weather vane *h*, or other wind actuated device. The drum *f* is fitted with a number of staggered step contacts *i* of copper, German-silver, brass or other conducting metal, one or more contacts for each of the arrows *a*, *c* of the compass indicator, which arrows are adapted to be illuminated at night, when it is necessary to indicate the direction of the wind and also to mark a spot on which a safe landing may be made. The apparatus may be supplied with current from the lighting mains, and an 8 core cable may connect a series of contact fingers *j*, adapted to co-

operate with the drum contacts *i*, to a fuse and distribution box in the center pit *b* of the indicator and thus to the indicating arrows *a*, *c*. The contact fingers *j* are mounted on a support *k* adjacent to the drum *f*, and the whole controlling mechanism is preferably erected on top of a mast or other support in such a situation as to be exposed to all winds, which mast or support could be erected 500 yards or more from the indicator so as to insure sufficient air-room for maneuvering. The position of the mast may be indicated by a red lamp at night, and all the lamps, cables, etc., be disposed under the ground level of the landing area. Each core of the 8 core cable may have a current capacity of 8 to 10 amperes at 100 volts and the lamps in the trenches *a*, *c* may be approximately 2 feet apart. The feed wire from the lighting mains may carry, say 15 amperes at 100 volts, because with the wind between a cardinal and half-cardinal point of the compass, for instance N. N. E., two indicating arrows would be alight at one time. The contact fingers *j* and the drum contacts *i* are so arranged that only a main contact finger (shown in the drawings as being the lowest) connected to a main feed wire and bearing upon a contact ring *l* mounted on the drum *f* and common to all the drum contacts, and one other finger (or at most two) can be bearing on the drum at the same time. This arrangement lessens the braking effect due to the pressure of the fingers *j*, but as the pressure of the main finger is constant, the vane *h* will be more dead beat in its action than would otherwise be the case.

The operations of the apparatus above described are as follows:—

When a switch is closed in the feed wire leading from the lighting mains, the step contacts *i* on the drum *f* are made alive through the main contact finger, which is always in contact with the common contact ring *l* at the base of the drum, all of the contacts being connected to this ring and in series with each other. If the vane *h* should be pointing in a direction, say due north, contact finger No. 1 would then be in connection with the upper contact 1 of the drum *f* and current would thus be supplied through No. 1 core of the 8 core cable to the junction box in the center pit *b* and thence to all the lights in parallel on the north indicating arrow 1.

A pilot flying at a height of 4000 to 5000 feet above the landing ground would see the white lights in an arrow formation which indicates the direction of the wind, and at the same time shows the best spot for landing. On descending to about 1000 feet from the ground both the red and white lights would be visible and at 500 feet, the red, white and green lights. Thus on the pilot

being able to see all the three colors he would know that he was nearing the ground and would flatten out for landing. The landing would preferably be made on the illuminated arrow or in immediate proximity to same.

As the indicator is laid out truly as a compass it would provide a ready means of checking the adjustment of the compass of an aeroplane immediately before taking flight.

If desired the indicator may be modified such as illustrated in Fig. 4 of the drawings. In Fig. 4 a number of trenches *a*² directed toward the cardinal and half cardinal points of the compass, radiate from a common center pit *b* and terminate at their outer ends in a surrounding trench *c*² of circular shape in plan. The interior of each trench *a*² is fitted with electric lamps which, if desired, may be differently colored in the manner and for the purpose above described in connection with the indicator shown in Fig. 1, and the circular trench *c*² is provided with electric lamps which are arranged to glow continuously. With this construction of the indicator, and when the latter is employed in conjunction with an operating or controlling mechanism such as described in connection with Fig. 3 and arranged to control the lamps in the trenches *a*², the direction of the wind is indicated by the glowing of the lamps in one of said trenches *a*², the indicator appearing to the aviator, as a circle of light and a straight line of light radiating from the circle to its center.

As the indicator is fitted with electric lamps it would be of a constant brilliancy and a decided improvement upon the system of flares used at present, the light from the flares varies greatly in a high wind.

What we claim is:—

1. In apparatus of the character described, a plurality of radial troughs arranged to indicate the directions of a compass, a plurality of sets of electric bulbs in each trough, each set of bulbs having a different color and being of different candle-power, the bulbs in the several sets being alternately arranged with the bulbs in the other sets so that each set of bulbs is capable of illuminating the trough for substantially its entire length, and means to supply current to each set of bulbs in proper order.

2. In apparatus of the character described, a plurality of radial troughs arranged to indicate the directions of a compass, a plurality of sets of electric bulbs in each trough, said sets having the same voltage so that they are adapted to burn in parallel in one circuit, each set of bulbs having a different color and being of different candle power, the bulbs in each set being alternately arranged with the bulbs in the other

sets so that each set of bulbs is capable of illuminating the trough for substantially its entire length, and means to supply current to the sets of bulbs in each trough in proper order.

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3. In apparatus of the character described, a plurality of arrow-shaped troughs arranged radially with their heads disposed outermost for indicating the cardinal and half-cardinal points of the compass, a plurality of sets of electric bulbs arranged within each arrow-shaped trough, said sets having the same voltage so that they are adapted to burn in parallel in one circuit, each set of bulbs having a different color and being of different candle power; the bulbs in each set being alternately arranged with the bulbs in the other sets so that each set of bulbs is capable of illuminating the arrow-shaped trough throughout substantially its entire area, and means operated by the wind to cause the sets of bulbs in each trough to glow in proper order.

4. In apparatus of the character described, a plurality of sets of electric bulbs arranged to indicate the cardinal and half-

cardinal points of the compass, each set of bulbs being arranged in arrow formation, a rotatable cylinder carrying stepped contacts, each contact disposed one above the other, 30 an annular contact on the cylinder, a support arranged near the cylinder, contact fingers carried by the support and arranged to engage the stepped contacts and the annular contact, two adjacent contact fingers 35 being adapted to simultaneously engage two corresponding stepped contacts when the cylinder is turned to a position indicating a point between a cardinal point and a half-cardinal point, and one of the contact fin- 40 gers engaging the annular contact to complete the circuit, circuits connecting the sets of bulbs with the contact fingers, a weather vane to turn the cylinder; and a fixed frame interposed between the weather vane and 45 the cylinder and carrying an indication of the cardinal points.

In testimony whereof we have hereunto signed our names.

WM. MORTIMER.
FREDERICK POTTEN.