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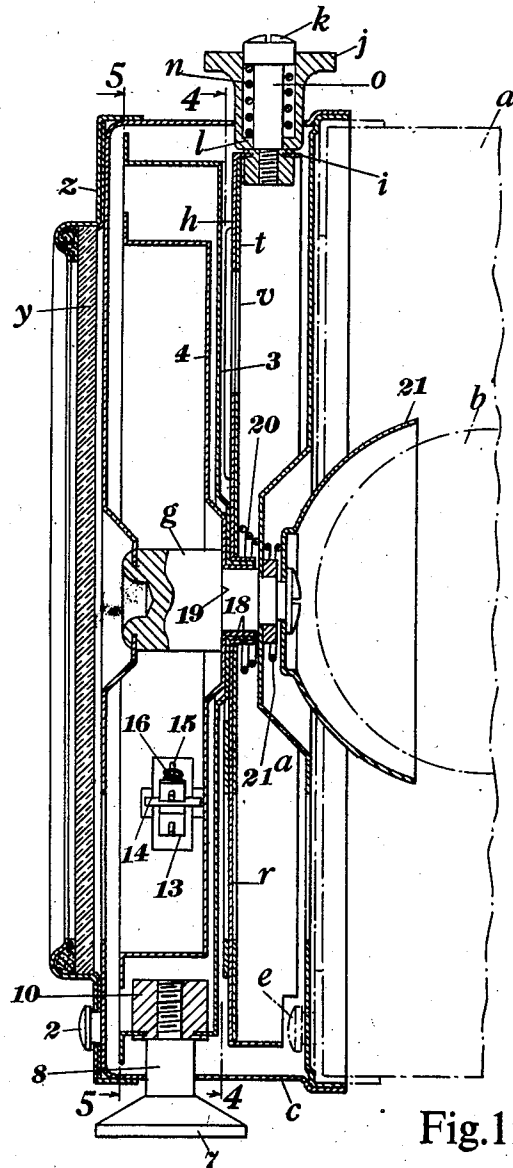
A. C. W. ALDIS

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SIGNALING LAMP

Filed March 2, 1942

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SIGNALING LAMP

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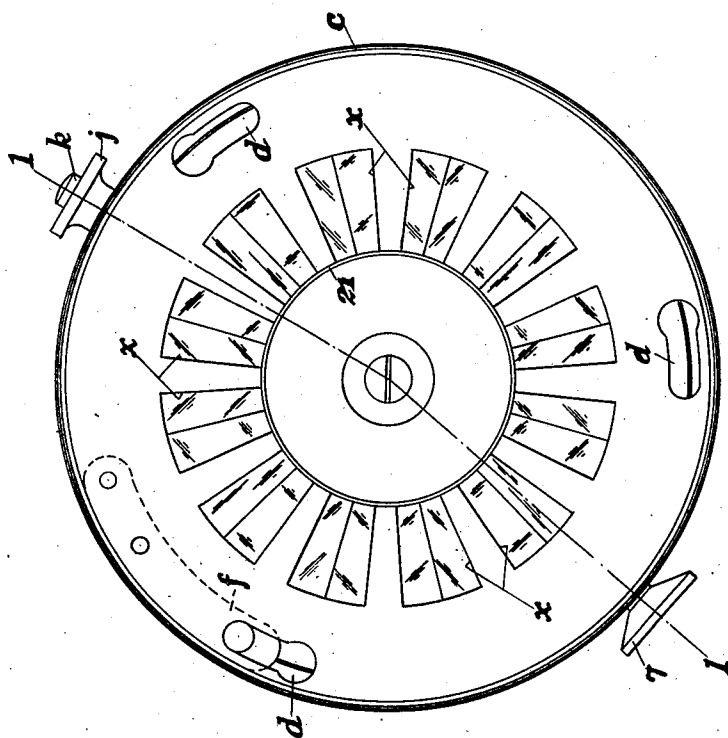


Fig. 2

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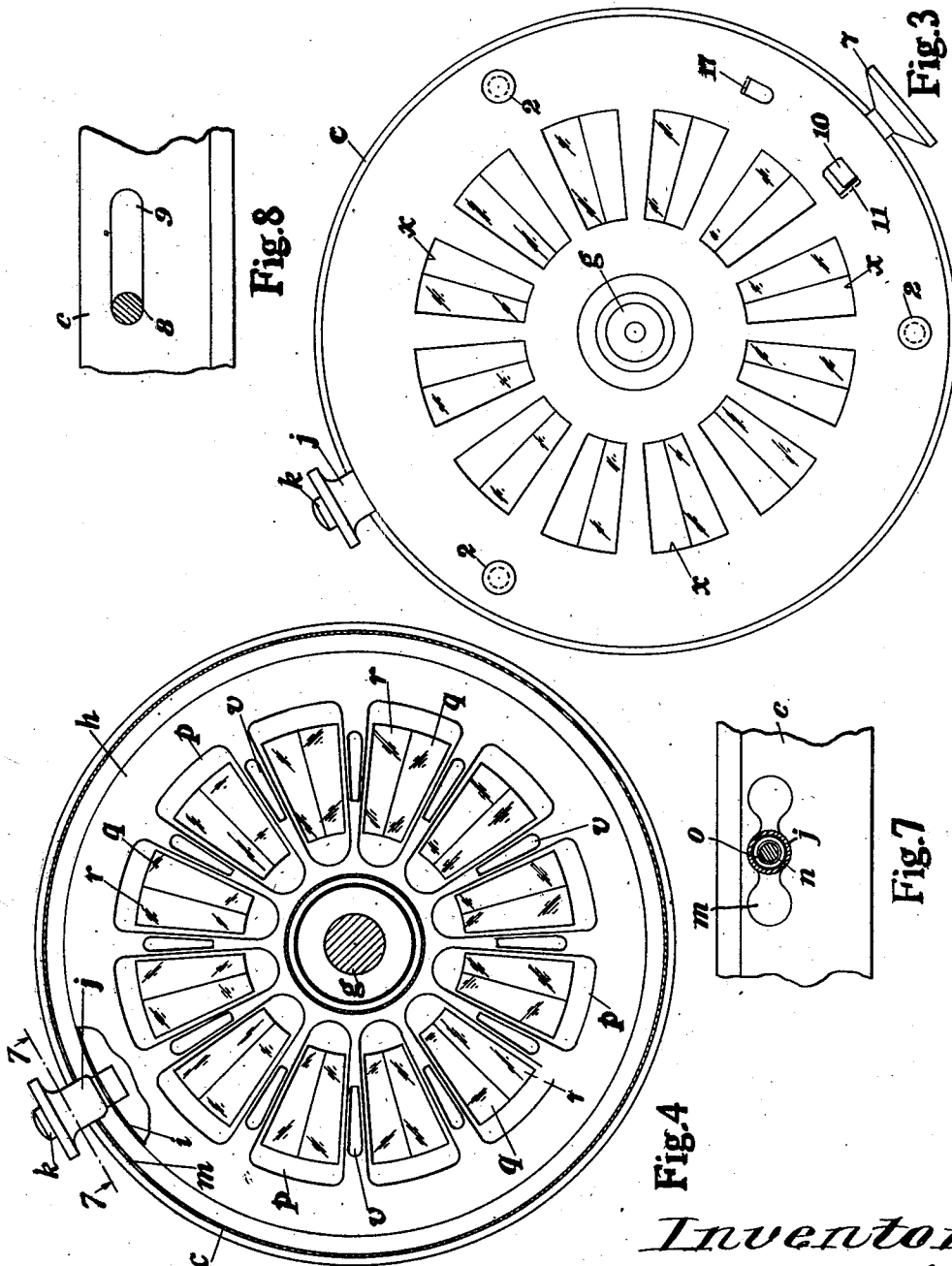
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SIGNALING LAMP

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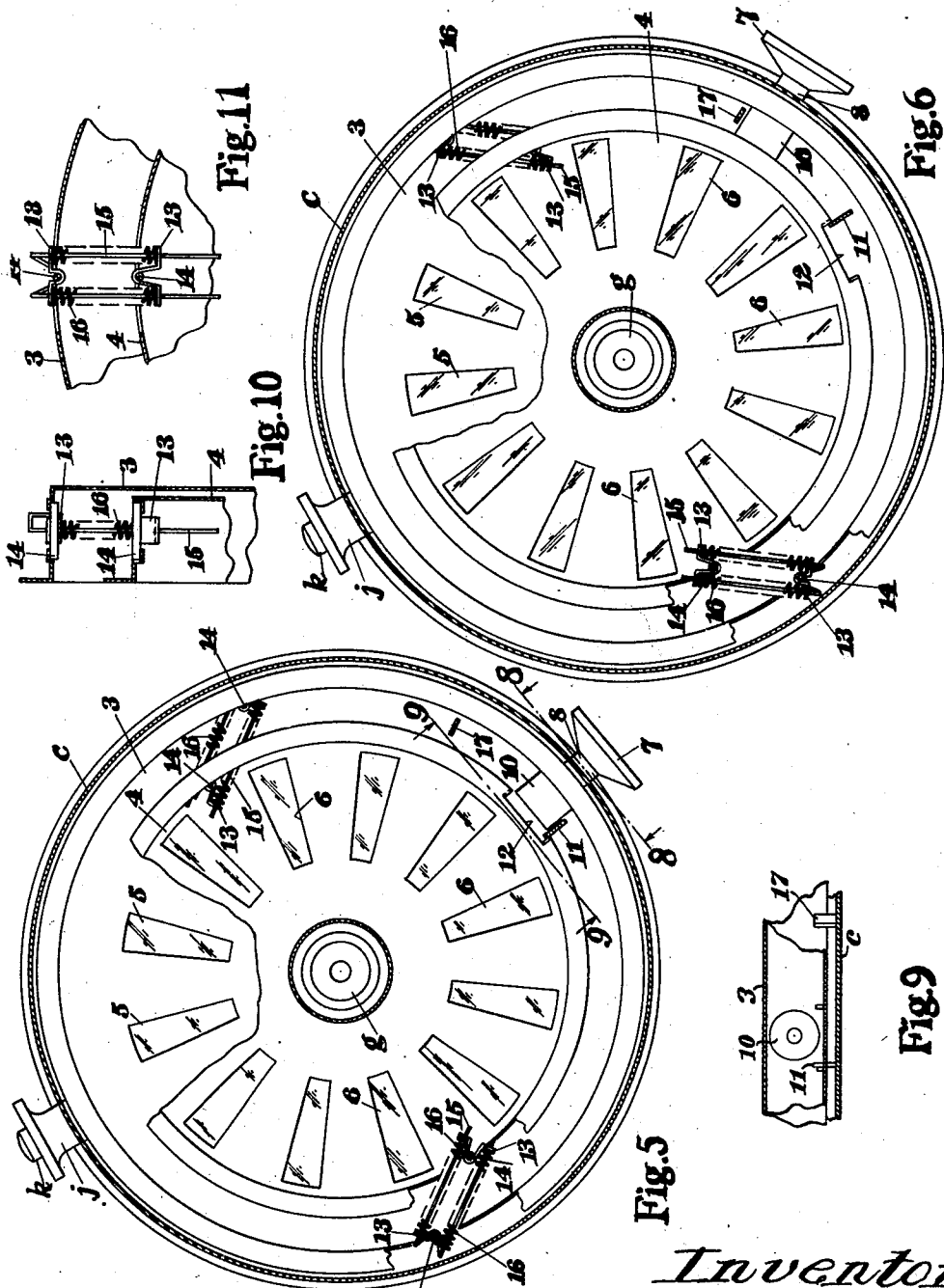
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SIGNALING LAMP

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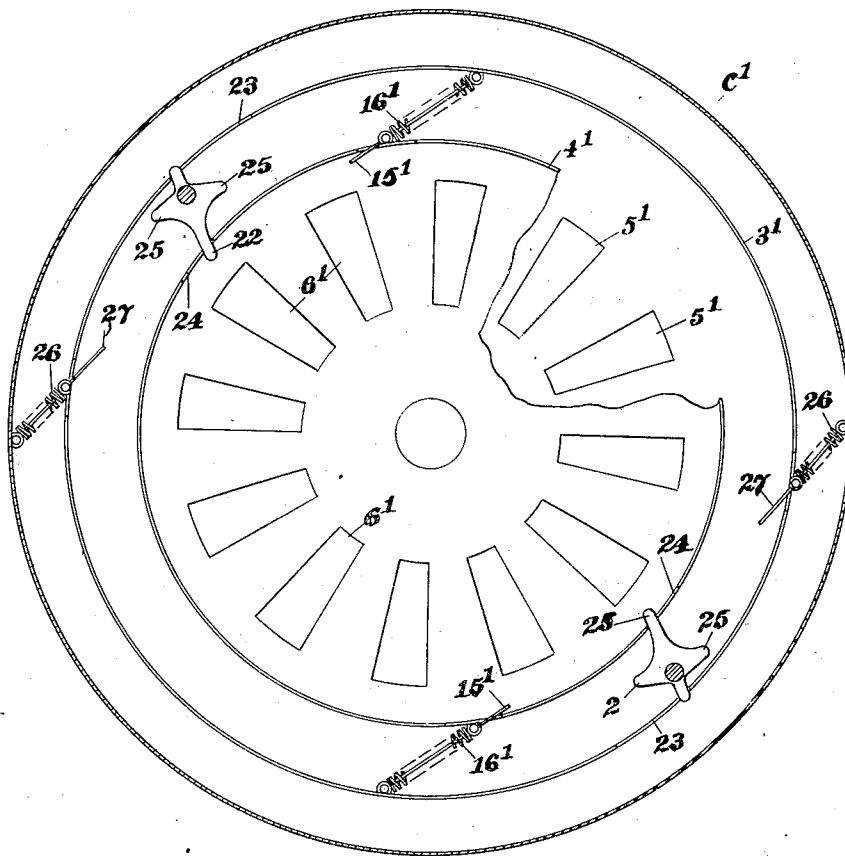


Fig. 12

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UNITED STATES PATENT OFFICE

2,363,566

SIGNALING LAMP

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In Great Britain September 13, 1941

7 Claims. (Cl. 116—18)

This invention relates to signaling lamps for naval, aeronautical, military and other uses, and of the kind by which different coloured light flashes can be emitted under the control of a shutter.

The object of the present invention is to provide an improved shutter enabling as large an amount as possible of the light from the source to be utilised in the flashes, while making certain that when the shutter is operated there is initially a complete eclipse of the first coloured flash before the second different coloured flash is emitted.

The invention comprises the combination of a pair of coaxially arranged oscillatory discs formed with similar spaced apertures which normally register with each other and which are so arranged that by appropriate relative movement of the two discs the apertures in each disc are first obscured and then brought into register with different apertures in the other disc, means whereby one of the discs can be actuated by the signaler, and an over-centre spring mechanism interconnecting the two discs in the vicinity of their peripheries and adapted to impart opposite movements to the other disc.

In the accompanying sheets of explanatory drawings:

Figure 1 is a sectional side elevation, Figure 2 is a rear elevation, and Figure 3 a front elevation (with some of the parts removed) of a signaling lamp attachment embodying the invention, Figure 1 being taken on the line 1—1 of Figure 2 and being drawn to a larger scale than Figures 2 and 3.

Figures 4 and 5 are sections drawn to the same scale as Figures 2 and 3 and taken respectively on the lines 4—4 and 5—5 of Figure 1 looking in the direction of the arrows.

Figure 6 is a similar view to Figure 5 illustrating the shutter in another position.

Figures 7 and 8 are fragmentary sectional views taken respectively on the lines 7—7 of Figure 4 and 8—8 of Figure 5 looking in the direction of the arrows.

Figure 9 is a fragmentary sectional view taken on the line 9—9 of Figure 5 looking in the direction of the arrows.

Figures 10 and 11 are fragmentary sectional views drawn to a larger scale than Figures 1 to 9 and illustrating in its fully compressed condition one of the over-centre springs shown in Figures 5 and 6.

Figure 12 is a diagrammatic part sectional

front elevation illustrating a modified form of the invention.

In Figure 1 *a* indicates a signaling lamp which contains a light source in the form of an incandescent filament bulb *b*, and to the front of which is secured an attachment whereby the light emitted from the lamp can be utilized for sending signals consisting of successive flashes of any two of three different colours, for example red-green, white-red, or green-white.

In the example shown in Figures 1 to 11 the attachment above-mentioned consists of a short cylindrical sheet metal casing *c* containing means as hereinafter described for enabling the required different coloured flashes to be obtained. One end (hereinafter termed the inner end) of the casing *c* is formed with key-hole slots *d* which by engagement with headed studs *e* on the front of the lamp *a* serve to attach the casing to the lamp front, the casing being held in position by the engagement of one of the heads of the studs on the lamp with a hole or recess in a spring blade *f* on the inner side of the inner end of the casing.

Arranged coaxially within the casing *c* is a short shaft *g* which at one end is secured to the outer end of the casing, and which at the other end is reduced and extends through a corresponding hole in the inner end of the casing.

Also arranged within the casing *c* is a composite colour screen disc *h* which at its centre is pivotally supported by the shaft *g*, and which is formed with a peripheral flange *i* having attached to it a finger piece *j* whereby the disc can be moved angularly about its axis to any of three different positions.

The finger piece *j* is made to a hollow form and is slidably mounted on a stem *o* which at one end is secured to the disc flange *i*, and which extends outwardly through a circumferential slot *m* in the periphery of the casing *c*, the stem being surrounded by a compression spring *n* which at its opposite ends abuts against a head *k* on the stem and a shoulder *l* in the inner end of the finger piece. The slot *m* is

formed with three enlargements as shown for accommodating the inner end of the finger piece *j*, the arrangement being such that when the disc *h* is in any of the three different positions above-mentioned the inner end of the finger piece can be caused by the spring *n* to enter one of the slot enlargements and thereby hold the disc against undesired movement. When it is required to move the disc *h* from any one of its three positions to another, the signaler first pulls the finger piece *j* outwardly against

the action of the spring *n* until the inner end of the finger piece is clear of the slot *m* in the periphery of the casing *c*, whereupon the signaler can actuate the finger piece to move the disc into its new position. Upon the signaler releasing the finger piece *j* its inner end is caused by the spring *n* to enter the adjacent enlargement of the slot *m* and hold the disc in its new position.

Concentrically with its axis the disc *h* is formed with an annular group of equally spaced segmental gaps *p* of the same size. Each of the gaps *p* is covered at one side by a pair of similar and contiguous transparent or translucent panels *q*, *r*, made from glass, Celluloid or other convenient material, the panel *q* being coloured green, and the panel *r* being coloured red. The panels *q*, *r*, are situated in depressions formed in one side of the disc *h* and are retained in position by another disc *t*, the latter being formed with gaps which correspond and register with the gaps *p* in the disc *h*. Each of the radial portions of the disc *h* separating adjacent gaps *p* is formed with an aperture *v* which registers with a similar aperture in the corresponding portion of the other disc *t*, and through which white light from the beam projected by the signaling lamp *a* can pass, the size of the apertures being preferably such as to make the white light passing through these apertures equivalent in intensity (as viewed from the front of the casing *c*) to the light passing from the lamp through the coloured panels *q*, *r*. To permit the passage of light from the lamp *a* into and out of the casing *c*, the front and rear ends of the latter are each formed with a similar annular group of equally spaced gaps *x*, the size and position of these gaps being such that in each of the above-mentioned positions of the screen-disc *h* light entering each gap in the rear end of the casing can pass through either of the adjacent coloured panels *q*, *r*, or aperture *v* of the screen-disc.

To prevent access of dust to the interior of the casing *c* through the gaps *x* in the front end of the casing, these gaps may be covered by a flat or other glass piece *y* which may be the ordinary front glass of the lamp *a*, and which is secured to the front of the casing by its frame *z*, the latter having key-hole apertures for engaging headed studs *2* on the casing front. Also the slot *m* in the periphery of the casing *c* may be covered by a rubber protective piece (not shown) carried by the finger piece *j*.

Arranged within the casing *c* at the front side of the screen-disc *h* is a shutter consisting of a pair of coaxially arranged oscillatory discs *3*, *4*, of different diameters, these discs being pivotally mounted on the shaft *g* in close proximity to each other and to the screen-disc, and having flanged peripheries as shown. The shutter disc *3* is formed concentrically around its axis with an annular group of apertures *5*, and the other shutter disc *4* is formed with a similar annular group of apertures *6*, the arrangement being such that by appropriate relative movement of the two shutter discs the apertures therein can be brought into register with each other and with different light paths through the screen-disc *h*. Moreover the size, spacing and position of the apertures *5*, *6*, in the shutter discs *3*, *4* are such that whilst each of the apertures can allow the passage through it of the maximum amount of either green, red, or white light, the shutter discs are capable of assuming a relative position in which light passing through the screen-disc *h* is intercepted.

The first shutter disc *3* is provided with a thumb piece *7* whereby it can be conveniently oscillated by the signaler when holding the lamp *a* in his hands. The thumb piece *7* is formed or provided on the outer end of a short stem *8* which passes through a circumferential slot *9* in the periphery of the casing *c*, and which at its inner end is in screw thread engagement with a boss *10* on the flanged periphery of the said disc. The ends of the slot *9* form stops which serve by contact with the adjacent sides of the thumb piece stem *8* to determine the amount of the angular movement that can be imparted to the shutter disc *3*, this amount being equal to the pitch of the alternate light paths through the screen-disc *h*.

The second shutter disc *4* is connected to the shutter disc *3* by any convenient over-centre spring mechanism which is also sometimes termed load and fire mechanism. The amount of angular movement that can be imparted to the second shutter disc *4* is equal to one-half of that which can be imparted to the first shutter disc *3*, and is determined by contact of a stop *11* on the inner side of the front end of the casing *c* with the ends of a slot *12* in the periphery of the second shutter disc. As shown the over-centre spring mechanism above-mentioned is formed by a pair of devices adapted to co-operate respectively with diametrically opposite portions of the shutter discs *3*, *4*. Each of these devices comprises a pair of swivel pieces *13* respectively supported in spaced relationship on the flanged peripheries of the two shutter discs *3*, *4*, by pins *14*, a pair of wire rods *15* which at one pair of adjacent ends may be formed integrally with each other and adapted to embrace one of the pins, and which at positions near these ends are secured to the adjacent swivel piece, the other ends of the rods being freely slidable through holes in the other swivel piece, and a compression spring *16* mounted on each rod with its ends abutting against the two swivel pieces. Instead of employing a pair of these devices as shown, only one or more than two may be employed. Further, each of the devices may be provided with a single rod and spring.

The parts of the over-centre mechanism above described are normally held together by contact of the stem *8* of the shutter thumb piece *7*, with either end of the circumferential slot *9* in the periphery of the casing *c*. To prevent separation of the parts of the over-centre mechanism in the event of the stem *8* being detached from its supporting boss *10* on the shutter disc *3*, the stop *11* for determining the extent of the movement of the other shutter disc *4*, and another stop *17* also on the inner side of the front end of the casing, are adapted by contact with the boss to prevent undesired relative movement of the shutter discs under the action of the over-centre mechanism. The stops *11* and *17* are conveniently formed by lugs pressed out of the front end of the casing *c*.

To provide adequate bearing surfaces for the screen-disc *h* and the shutter discs *3*, *4*, these discs are formed with flanges *18* around their central holes through which the shaft *g* passes, and the flanges are supported one within the other on the shaft. Further the central portions of the shutter discs *3*, *4*, are of dished form and are held in contact with each other between a shoulder *19* on the shaft *g* and the central portion of the screen disc under the action of a spring *20* surrounding the shaft, this spring be-

ing arranged between the panel-retaining disc *t* and a central dished portion of the inner end of the casing *c*.

On the inner projecting end of the shaft *g* is mounted a cup-shaped screen *21* for the adjacent side of the lamp bulb *b*. This cup-shaped screen *21* prevents emission from the lamp *a* of direct light from the bulb *b*, and insures that the coloured panels *q*, *r* and apertures *v* of the screen-disc *h* receive signaling light only from the concentrated signaling beam projected by the lamp. To prevent accidental damage to the lamp bulb *b* when the attachment above described is applied to the front of the lamp *a*, the cup-shaped screen *21* is resiliently supported on the shaft *g* by a spring *21^a* situated between the cup-shaped screen and the inner end of the casing *c*.

The shutter above described is such that in either of the two limit positions of the shutter discs *3*, *4*, the apertures *5*, *6*, in these discs register with each other and allow light of one colour to pass through them. Supposing it is required to send signals consisting of alternate red and green flashes, the screen disc *h* is set so that in one extreme position of the shutter a red light is shown and in the other a green light. It will be assumed that the shutter is in the extreme position in which the apertures *5*, *6*, in the discs *3*, *4*, register with each other to permit the passage of red light. To move the shutter from this extreme position to the other the signaler imparts appropriate angular movement to the first shutter disc *3* through the thumb piece *7*. The first effect of the movement imparted by the signaler to the thumb piece *7* is to move the first shutter disc *3* relatively to the second shutter disc *4* into a position in which the shutter serves to intercept the light passing through the screen disc *h*. During this movement each of the springs *16* of the over-centre mechanism is compressed as shown in Figures 10 and 11. After the first shutter disc *3* has been moved slightly beyond its mid-position the energised springs *16* move the second disc *4* in the opposite direction to the first disc. At the end of the movements of the two shutter discs *3*, *4*, the shutter is in its other extreme position in which the apertures *5* register with different apertures *6* to permit the passage of green light. Return of the shutter is effected by opposite movement of the thumb piece. By appropriately setting the screen disc *h* flashes of any other pair of the three colours can be emitted, that is to say white-red or green-white.

In the modification shown diagrammatically in Figure 12, the majority of the component parts are similar or analogous to those of the previously described example, and these parts are indicated by the same reference characters as those employed in Figures 1 to 11 but suffixed by the numeral 1. The shutter shown in this modification is intended to be used in conjunction with a two-colour screen disc (not shown) having a concentrically arranged annular group of equally spaced gaps, alternate gaps being adapted to transmit light of two different colours, for example, red and green. The shutter comprises a pair of coaxially arranged oscillatory shutter discs *3¹*, *4¹*, the disc *3¹* being movable by the signaler, and being connected to the disc *4¹* by over-centre mechanism. The latter is similar to that above described and includes springs

16¹ on rods *15¹*. As in the previous example the first shutter disc *3¹* is formed concentrically around its axis with an annular group of apertures *5¹*, and the other shutter disc *4¹* is formed with a similar annular group of apertures *6¹*, the arrangement being such that by appropriate relative movement of the two shutter discs the apertures therein can be brought into register with each other and with different light paths through the screen-disc. At each of a pair of diametrically opposite positions on the front end of the fixed casing *c¹* and near the peripheries of the shutter discs *3¹*, *4¹* is pivoted a trigger lever *22* which serves by co-operation with the shutter discs to move or propel the over-centre mechanism *15¹*, *16¹* through its central position of unstable equilibrium. As shown each trigger lever *22* has a short arm which passes through a circumferential slot *23* in the flanged periphery of the first shutter disc *3¹*, a long arm which passes through another but shorter circumferential slot *24* in the flanged periphery of the second shutter disc *4¹*, and a pair of lateral projections *25* adapted by contact with the flanged periphery of the first shutter disc to limit the extent of the pivotal movement that can be imparted to the trigger lever. Looking at the drawing it will be assumed that the first shutter disc *3¹* is being moved by the signaler in a counter-clockwise direction. During the greater part of this movement the second shutter disc *4¹* and the trigger levers *22* remain stationary, and this condition persists until the first shutter assumes a position in which the passage of light through the apertures *5¹*, *6¹* is interrupted. The springs *16¹* of the over-centre mechanism are, however, compressed by the movement of the first shutter disc *3¹* and this mechanism is caused to assume a position of unstable equilibrium. Immediately after the above-mentioned condition is reached the continued movement of the first shutter disc *3¹* causes the trigger levers *22* to impart opposite movement to the second shutter disc *4¹*, this latter movement being sufficient to move or propel over-centre mechanism *15¹*, *16¹* through its position of unstable equilibrium and thereby enable it to complete the opposite movement of the second shutter disc rapidly. If desired only one trigger lever may be provided.

In addition to the over-centre spring mechanism *15¹*, *16¹* interconnecting the shutter discs *3¹*, *4¹*, additional over-centre spring mechanism may be provided between and adapted to interconnect the flanged periphery of the first shutter disc *3¹* and the periphery of the casing *c¹*. This additional over-centre mechanism, which includes springs *26* and rods *27* similar to those of the mechanism first described, serves to complete the movement of the first shutter disc *3¹* independently of the signaler. Thus during the initial part of the movement of the first shutter disc *3¹* by the signaler, the additional over-centre springs *26* are compressed, as well as the springs *16¹* of the first mechanism. As soon as the additional over-centre spring mechanism has passed its central position it continues the movement of the first shutter disc *3¹* independently of the signaler for actuating the trigger lever or levers *22*.

It will be seen that Figure 12 is purely diagrammatic and illustrates only a sufficient number of parts to enable the modification described to be understood.

By the modification illustrated in Figure 12 larger light apertures can be used than in the

example shown in Figures 1 to 11, because the shutter apertures of the modification can be made nearly as large as the obscuring radial parts between them, whereas in the first example the obscuring radial portions of the shutter must, of necessity, be at least twice the angular width of the light apertures in the shutter.

The invention is not limited to the examples above described as subordinate constructional details may be varied to suit different requirements.

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

1. For use with a signaling lamp of the kind specified, a shutter comprising the combination of a pair of coaxially arranged oscillatory discs formed with similar spaced apertures which normally register with each other and which are so arranged that by appropriate relative movement of the two discs the apertures in each disc are first obscured and then brought into register with different apertures in the other disc, means whereby one of the discs can be actuated by the signaler, and an over-centre spring mechanism interconnecting the two discs in the vicinity of their peripheries and adapted to impart opposite movements to the other disc.

2. A shutter as and for the purpose claimed in claim 1 and having in combination with it a composite colour screen disc arranged coaxially with the shutter discs and consisting of relatively fixed parts, and means whereby the colour screen disc can be angularly adjusted into and secured in any one of a plurality of different positions.

3. A shutter as and for the purpose claimed in claim 1 and having at least one trigger lever operatively associated with the two discs and adapted under the action of one of the discs to move the over-centre spring mechanism through its central position of unstable equilibrium.

4. A shutter as and for the purpose claimed in claim 1 and having in combination a fixed member carrying the discs, at least one trigger lever operatively associated with the two discs and

adapted to move the over-centre spring mechanism through its central position of unstable equilibrium, and additional over-centre spring mechanism interconnecting the disc adapted to be actuated by the signaler and the fixed member carrying the discs.

5. A shutter as and for the purpose claimed in claim 1, in which the over-centre spring mechanism comprises at least one swivel piece supported by each of the discs, at least one rod secured to the swivel piece on one of the said discs and passing freely through a hole in the swivel piece on the other of the said discs, and a compression spring mounted on the rod with its ends abutting against the associated swivel pieces.

6. A shutter as and for the purpose claimed in claim 1 and having in combination a fixed member carrying the discs, at least one trigger lever operatively associated with the two discs and adapted to move the over-centre spring mechanism through its central position of unstable equilibrium, and additional over-centre spring mechanism interconnecting the disc adapted to be actuated by the signaler and the said fixed member, each of the over-centre spring mechanisms comprising at least one swivel piece supported by each of the parts to be interconnected, at least one rod secured to the swivel piece on one of the said parts and passing freely through a hole in the swivel piece on the other of the said parts, and a compression spring mounted on the rod with its ends abutting against the associated swivel pieces.

7. A shutter as and for the purpose claimed in claim 1 and having in combination at least one trigger lever operatively associated with the two discs and adapted to move the over-centre spring mechanism through its centre position of unstable equilibrium, the trigger lever being mounted on a fixed axis and having a pair of arms extending respectively into slots formed in peripheral portions of the discs, and means being provided for limiting the extent of the movement that can be imparted to the trigger lever.

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