Jan. 11, 1938. R. E. SNYDER 2,104,911

CHANGEABLE COLOR SPOTLIGHT

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Fig. 1.

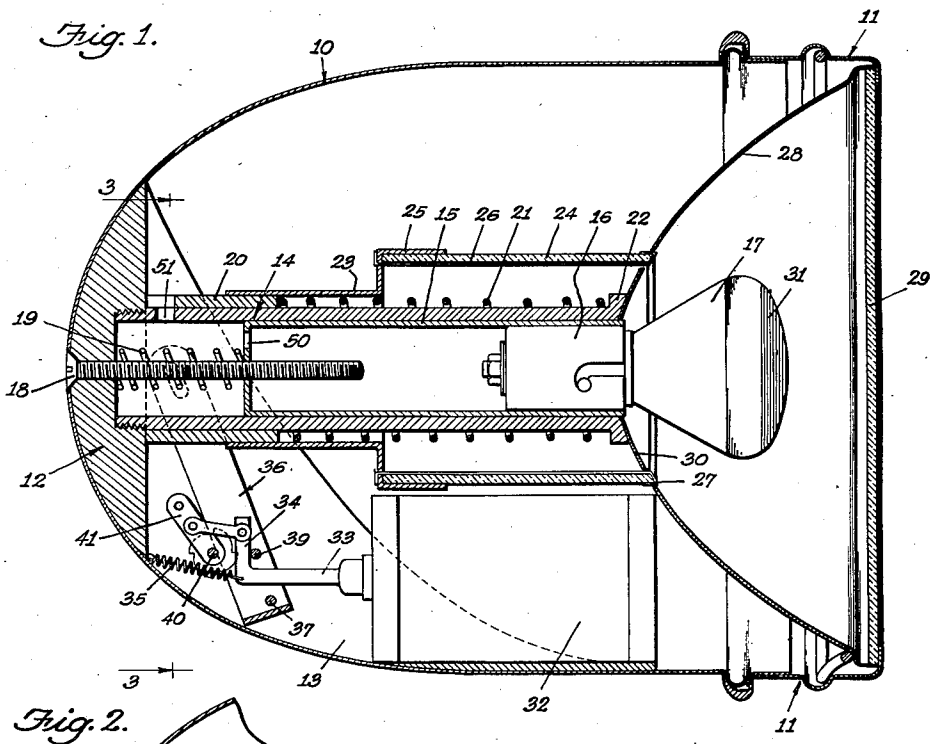


Fig. 2.

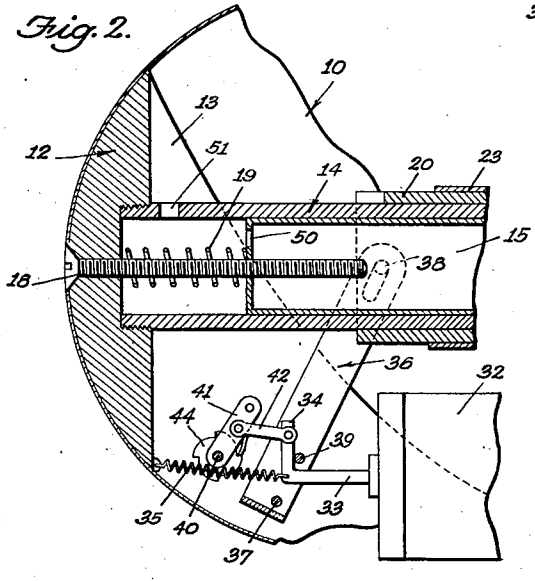
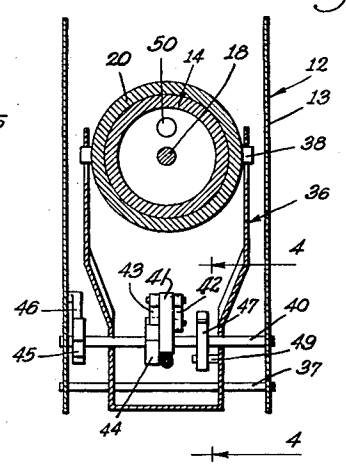


Fig. 3.



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Fig. 4.

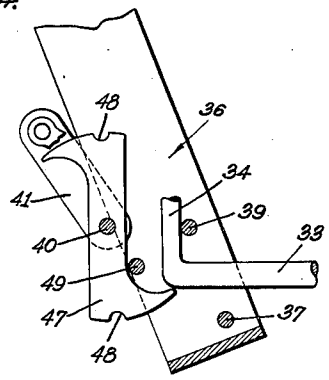


Fig. 5.

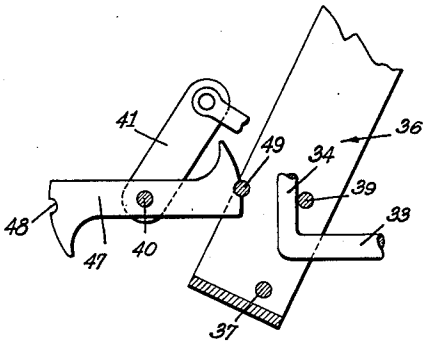
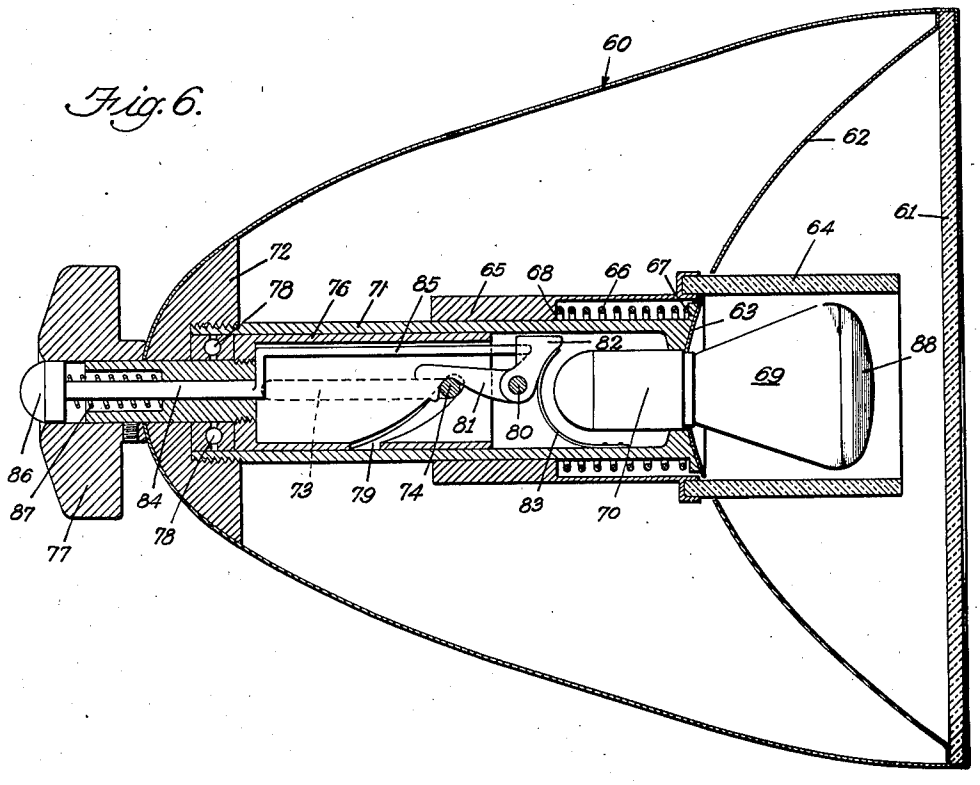


Fig. 6.



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Fig. 7.

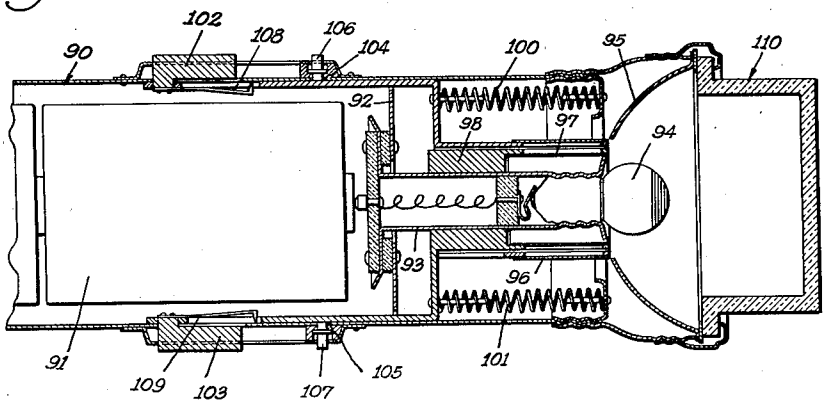


Fig. 8.

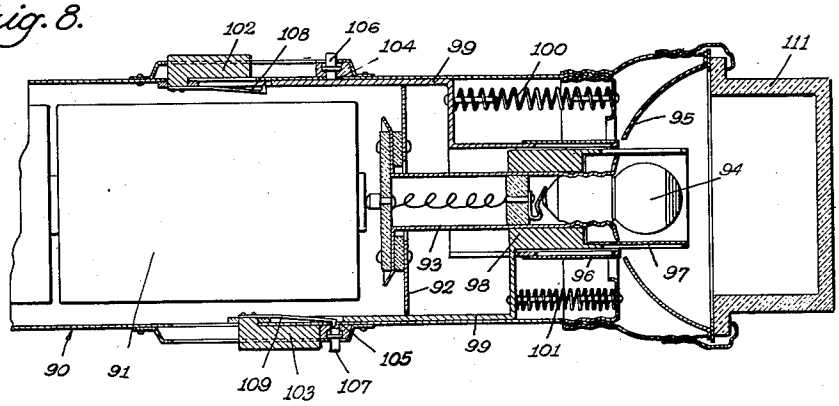
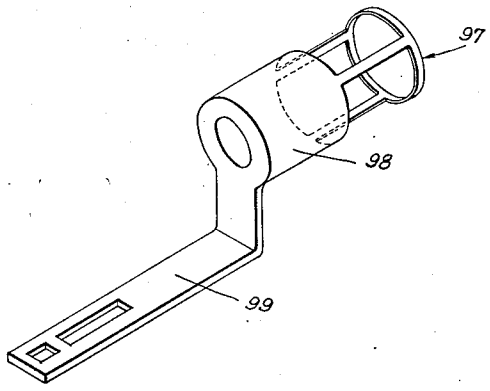


Fig. 9.



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2,104,911

CHANGEABLE COLOR SPOTLIGHT

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Application May 29, 1935, Serial No. 24,067

6 Claims. (Cl. 177—327)

This invention relates to lamp structures.

An object of the invention is to provide an improved lamp structure such as, for example, a spotlight, that may be advantageously employed upon police cars. In various municipalities it is now common practice for policemen to patrol various districts in automobiles of the same type and character as those employed by civilians. Such cars are generally equipped with spotlights having red lenses so that when occasion requires that the car be given right of way the spotlight may be turned on to throw a red beam indicating that the automobile is a police automobile and is entitled to the right of way through traffic. The spotlights on such automobiles which have the red lenses form an indicating means to criminals who may be on the watch for them in that the criminal on looking at the spotlight can determine from the presence of the red lens that the automobile is a police automobile.

One object of the present invention is to provide an improved spotlight which is of such design and character as to present an appearance normally of the conventional spotlight so that criminals cannot ascertain by merely looking at the spotlight that the automobile on which the spotlight is carried is a police car. At the same time, the spotlight is so designed that it may be immediately converted so that the beam of light projected therefrom is a red light so that the police car can thus obtain right of way through traffic as occasion may require.

Another object of the invention is to provide an improved lamp structure or spotlight having the above mentioned characteristics wherein there is a color changer adapted to be interposed between the light source of the lamp structure and its reflector having spring means normally urging the color changer into the retracted or inoperative position behind the reflector and to provide means for advancing the color changer against the effort of the spring means into an operative position where it is held until such time as it may be purposely released.

The invention may also be advantageously incorporated in a flashlight used by police to direct traffic.

Another object of the invention is to provide an improved lamp structure in which there are a plurality of color changers, each of which may be shifted into operative position so that the flashlight may optionally be caused to project a red beam of light, a green beam of light, or a white light.

Another object of the invention is to provide an improved lens for flashlights of such a design that the nature of the light thrown cannot only be ascertained from the point toward which the flashlight is directed but also from other points laterally of the direction of the projected beam.

With the foregoing and other objects in view, which will be made manifest in the following detailed description, and specifically pointed out in the appended claims, reference is had to the accompanying drawings for an illustrative embodiment of the invention, wherein:

Fig. 1 is a vertical section through a spotlight embodying one form of the present invention illustrating the position of the mechanism wherein the color changer is in retracted position.

Fig. 2 is a partial view in vertical section illustrating a portion of Fig. 1 and the mechanism therein shown in that position wherein the color changer is in projected position.

Fig. 3 is a sectional view taken substantially upon the line 3—3 upon Fig. 1 in the direction indicated.

Fig. 4 is a partial view in vertical section taken upon the line 4—4 on Fig. 3 illustrating the mechanism in the position wherein the color changer is retracted.

Fig. 5 is a view similar to Fig. 4 illustrating the mechanism in the position wherein the color changer is projected into operative position.

Fig. 6 is a sectional view through the spotlight illustrating an alternative embodiment of the invention.

Fig. 7 is a partial view in vertical section through a flashlight embodying the invention, the color changers being shown in retracted position.

Fig. 8 is a view similar to Fig. 7 illustrating one of the color changers in projected position.

Fig. 9 is a perspective view of one of the parts illustrated in Figs. 7 and 8.

Referring to the accompanying drawings, wherein similar reference characters designate similar parts throughout, and particularly to Figs. 1 to 5, the lamp structure is shown as incorporated within a suitable shell or housing 10 having thereon a suitable lens frame 11. Within the shell or housing there is disposed a frame 12 having downwardly and forwardly extending arms 13. A tubular member 14 is screwed into the back of frame 12 at about its center and within this tubular member there is slidably mounted a socket carrier 15 which carries the socket 16 for the electric lamp bulb 17. A screw 18 has its head exposed on the back of shell 10 and extends through frame 12 and is threaded into the

back of socket carrier 15. By rotating this screw the position of the socket carrier and, consequently, of the socket 16 and lamp bulb 17, can be adjusted so as to position the filament of the lamp bulb 17 at the focal point of its reflector. The socket carrier 15 is urged into forwardmost position by means of a spring 19.

Surrounding the tubular member 14 there is a slidable sleeve 20 which is urged into rearmost position by means of a spring 21 compressed between the end of the sleeve and a shoulder 22 on the tubular member 14. Fastened to the sleeve 20 there is a frame 23 for the color changer. The color changer may vary but is preferably in the form of a cylinder of glass 24 which is suitably colored, such as, for example, red. This cylinder has its rear end telescoping into the circular flange 25 on frame 23, and metal bands 26 extend through the frame at their rear ends, bending over against the frame. The forward ends of these bands are hooked over the forward edge of the color changer, as indicated at 27. In installing the color changer the bands may be sprung inwardly while the color changer is telescoped into flange 25 and the forward ends 27 snapped over the forward edge of the color changer. The reflector is divided into two parts, an outer part 28 which extends from the edge of lens 29 inwardly and rearwardly to a point adjacent the forward edge of the color changer, the other part of the reflector, indicated at 30, extends from the forward edge of the color changer to shoulder 22, where it is fastened thereto. The two parts 28 and 30 of the reflector cooperate to form the completed reflector of the lamp but are spaced from each other by an annular opening through which the color changer may be projected. A shielding means is disposed forwardly of the light source and in the preferred embodiment this is formed by applying a silvered coating 31 over the forward side only of the electric lamp bulb 17. The purpose of this shielding means is to prevent any light from the filament within the lamp from passing directly out through lens 29 and to cause all of the light emanating from the reflector through lens 29 to have been first reflected by the reflector.

By the above described construction it will be appreciated that lens 29 may be formed of clear glass and when the color changer is in retracted position, as shown on Fig. 1, the spotlight has the same general appearance as any conventional spotlight. However, when it is desired to convert the light thrown by the spotlight from a white light to a red light in securing right of way through traffic, on projecting the color changer forwardly substantially its complete length all light emanating from the filament passes through the cylindrical color changer before encountering the reflector and is thus converted to a red light so that all light reflected by the reflector through lens 29 is red. In this way the spotlight may optionally have a conventional appearance and produce a white light when the color changer is in the retracted position shown or it may be converted so as to throw a red beam or any other color, depending upon the nature of the color changer.

As a means for projecting the color changer into operative position a solenoid 32 is mounted on the frame between the forwardly extending arms 13. This solenoid has an armature 33, the rear end of which extends upwardly as indicated at 34. The armature is urged rearwardly by means of a tension spring 35 connecting the armature with the frame. The operation is that when the solenoid is energized the armature will be thrown forwardly against the action of spring 35 and when the circuit through the solenoid is broken the spring 35 will retract it into the position shown on Fig. 1.

A U-shaped yoke 36 is pivotally mounted upon a rod 37 extending across between the forwardly extending arms 13 of frame 12. This yoke has the upper ends of its arms slotted and bosses or trunnions 38 extend therethrough. A transverse bar 39 connects the arms of yoke 36 forwardly of the upwardly extending end 34 of armature 33 so as to be engaged thereby. Behind the yoke there is a transversely extending pintle 40 rotatably mounted in the arms 13. This pintle has loosely mounted thereon the lever 41 which is connected to the armature by means of a link 42. Lever 41 carries a spring actuated pawl 43 which is engageable with a ratchet wheel 44 on pintle 40. A similar ratchet wheel, which is reversed, and which is indicated at 45, is also mounted on pintle 40 and is engageable by a pawl 46. The latter ratchet wheel and pawl serve merely as a back-up ratchet to prevent reverse rotation of pintle 40. Pintle 40 carries a cam-shaped member 47, the shape of which is clearly indicated on Figs. 4 and 5. The cam-shaped member has opposed eye portions which are notched as indicated at 48 and these notches are designed to partially receive a small pin 49 carried by the yoke.

The wires leading to the solenoid 32 and to the socket 16 for lamp bulb 17 are not shown. These may be admitted to the shell at any suitable point, there being suitable openings 50 and 51 provided for leading these wires to the socket 16.

The operation of the construction shown in Figs. 1 to 5 is as follows:

When the construction is in the position shown in Fig. 1 and the solenoid 32 is energized armature 33 is drawn forwardly. This causes pin 39 to be engaged by portion 34 of the armature and the yoke to be swung forwardly about its pivot pin 37 as a center. This shifts sleeve 20 forwardly against the action of spring 21. At the same time lever 41 is swung forwardly through a ninety degree turn and pawl 43 engaging ratchet wheel 44 causes pintle 40 to undergo a ninety degree turn. This rotates cam 47 through ninety degrees, positioning notch 48 opposite pin 49 so that when the circuit is subsequently broken through solenoid 32 the yoke 36, sleeve 20, and color changer 24 will be locked or held in projected position against the returning effort of spring 21. When the circuit is broken through solenoid 32 the armature will be returned to its initial position shown in Fig. 1 by spring 35. On a subsequent energization of solenoid 32 the armature will again be drawn forwardly and during this forward movement pintle 40 will again be given a quarter turn by reason of pawl 43 having engaged the next succeeding tooth on ratchet 44. This second quarter turn of pintle 40 moves cam 47 out of engagement with pin 49, thus allowing yoke 36 to be returned and sleeve 20 and color changer 24 to be retracted by reason of spring 21.

From the above described construction it will be appreciated that an electrically operated means is provided which on successive energization will cause the color changer to first be projected into operative position and locked in such position, and that upon a subsequent operation or energization of the solenoid the color changer will be enabled to be released and allowed to be returned by spring 21.

In Fig. 6 there is disclosed an alternative form of construction. In this type of construction there is disclosed a shell 60 within which there is a lens 61 and a two part reflector, the parts of which are indicated at 62 and 63, the space between the parts enabling the color changer 64 to be projected therethrough. The color changer in this form of construction is carried on a slidable sleeve 65 urged into its rearmost position by spring 66 compressed between shoulders 67 and 68. The socket for the lamp 69 is indicated at 70 and is mounted on a socket carrier 71 which, in turn, is screwed into a frame 72 in the back of the shell. The socket carrier 71 is longitudinally slotted as indicated at 73 and a diametrical pin 74 extends across sleeve 65 and through the slots. Within the socket carrier there is disposed a rotary member 76 which is operable by means of a handle 77 on the back of the shell 60. Preferably, an anti-friction thrust bearing 78 is interposed between the rotary member and frame 72. The rotary member is provided with a helical slot 79 through which the diametrically extending pin or bar 74 extends. A latch member is pivotally mounted upon a diametrically extending pivot pin 80 arranged within the socket carrier 71 behind socket 70. This latch is in the form of a bell crank having two arms 81 and 82 and is urged in a counterclockwise direction by means of spring 83.

A releasing member 84 slidably extends through the center of the rotary member and provides a portion 85 which is engageable with arm 82 of the latch. This releasing member has a button 86 disposed centrally of handle 77 and is urged rearwardly by a spring 87.

In this type of construction, as before, the forward side of the lamp bulb 69 is preferably shielded as indicated at 88, to prevent light emanating therefrom from passing directly through lens 61.

In this type of construction the lens 61 may also be formed of clear glass and the color changer 64 may be colored such as, for example, red. When it is desired to convert the construction so as to produce a red beam the rotary member 76 is rotated by handle 77. The sides of the helical slot 79 engaging pin 74 produce advancement of sleeve 65 and of the color changer 64 against the action or effort of spring 66. As it approaches its forward movement pin 74 engages arm 81 of the latch, lifting it so that the latch hooks over the pin and holds the sleeve 65 in its projecting position. When it is desired to return the color changer 64 into its retracted position behind the reflector button 86 is pressed, causing the latch to swing in a clockwise direction against the action of spring 83. This releases pin 74 and allows sleeve 65 and color changer 64 to be retracted under the action of spring 66.

In the construction shown in Figs. 7, 8, and 9 the invention has been illustrated as having been incorporated in a flashlight. In this form of construction 90 designates the shell or casing adapted to receive one or more dry cells 91. On a partition 92 there is mounted a socket carrier 93 which carries or forms the socket for the lamp bulb 94, surrounding which there is a divided reflector 95. Through the annular space separating the portions of the reflector two color changers may be projected, one color changer being indicated at 96 and the other at 97. These color changers are mounted on suitable frames 98, each of which has a rearwardly extending extension 99 arranged adjacent the wall of the casing 90. Springs 100 and 101 urge these frames rearwardly, respectively, and independent of each other. The frames are so designed that one frame telescopes within the other but the extensions 99 are preferably arranged on opposite sides of the casing 90. On each extension 99 there is mounted a suitable handle, the handles being indicated at 102 and 103. The casing is provided with apertures 104 and 105 in which there are buttons 106 and 107. Fastened to each frame there are spring latches, these being indicated at 108 and 109.

In this type of construction when both frames and color changers are in released position as shown on Fig. 7 the beam of light which is projected is white or the color of the lamp 94. If it is desired to change the color, such as, for example, red, handle 102 is caused to slide forwardly compressing spring 100. When in its foremost position the end of spring latch 108 enters aperture 104 opposite button 106 so that the color changer is locked in its projected and operative position. By pressing button 106 latch 108 is caused to release and the color changer and its frame are returned to inoperative position by spring 100. To convert the light to another color handle 103 is moved forwardly, thus shifting the frame for color changer 97 into projecting position. This frame is locked in its projecting position by latch 109 entering aperture 105. By pressing button 107 spring 101 will retract the color changer into its inoperative position behind the reflector.

As a means for increasing the advantage of this type of construction when used for directing traffic, the lens 110 is preferably made with pronounced cylindrical walls, as indicated at 111. These cylindrical walls may be ground or sand blasted while the forward facing of the lens may be clear or sand blasted if desired. By having such a construction of lens the nature of the light thrown may be visible not only to persons directly forward of reflector 95 but may also be ascertained by persons who may be able only to see the cylindrical walls of the lens.

While in the forms disclosed herein the spring means is employed to normally urge the color changer into retracted or inoperative position, and means is provided for advancing the color changer against the effort of the spring means into operative position, there may be situations wherein it is desirable to have the construction reversed, that is, the spring means may be so arranged to urge the color changer into operative position and other means is employed for retracting the color changer against the effort of the spring means into inoperative position. The reversal of parts can readily be made by anyone skilled in the art and the details of construction for such a device have not been illustrated herein.

In all forms of construction the color changer is preferably formed of a clear material except for the color given to it. Where, however, it is desired to scatter some light from the reflector so that the light can be seen more readily from the side, portions of the color changer may be formed of frosted or ground glass. Such portions normally would be relatively small and would be either in the form of spots of frosted or ground glass or rings encircling the color changer. The purpose of this type of construction is to merely diffuse a small portion of the light and cause it to be scattered laterally on being reflected from the reflector.

From the above described constructions it will be appreciated that improved lamp structures have been provided which when incorporated into a spotlight enable the spotlight to have the appearance of a conventional spotlight except for minute detection of the visible rim or edge of the color changer. The nature of the light thrown, however, may be instantly changed to the color of the color changer for purposes of demanding right of way through traffic. Furthermore, when the invention is incorporated in a flashlight the light thrown may be readily converted from a white light to a light of different colors. In all types of construction the color changer is urged into its rearmost and inoperative position and means is provided for advancing it into operative position and latching it therein. Then, upon release of the latching means, the color changer is automatically returned to its inoperative position.

Various changes may be made in the details of construction without departing from the spirit or scope of the invention as defined by the appended claims.

I claim:

1. A lamp structure comprising means providing a shell, a parabolic reflector in the shell, a lens over the reflector, a light source between the lens and the reflector, shield means between the light source and the lens for preventing light from passing directly from the light source through the lens, a tubular color changer arranged about the light source adapted to be projected forwardly about the light source or retracted rearwardly, spring means urging the color changer into retracted position, means for moving the color changer forwardly against the action of the spring means, means for locking the color changer in its forward position, and means for causing the locking means to release, enabling the color changer to be retracted by the spring means.

2. A lamp structure comprising a light source, a parabolic reflector behind the light source, shield means forwardly of the light source so as to prevent light from passing directly from the light source forwardly through the open front of the reflector, a tubular color changer normally disposed rearwardly of the light source adapted to be moved forwardly between the light source and the reflector, spring means urging the color changer into normal position, means for moving the color changer forwardly, means for locking the color changer in its foremost position, and means for causing the locking means to release the color changer to allow it to be returned to normal position by the spring means.

3. A lamp structure comprising a light source, a parabolic reflector behind the light source, shield means forwardly of the light source so as to prevent light from passing directly from the light source forwardly through the open front of the reflector, a tubular color changer normally disposed rearwardly of the light source behind the reflector adapted to be moved forwardly between the light source and the reflector, spring means urging the color changer into normal position, means for moving the color changer forwardly, means for locking the color changer in its foremost position, and means for causing the locking means to release the color changer to allow it to be returned to normal position by the spring means.

4. A lamp structure comprising means providing a light source, a parabolic reflector behind the light source, means providing a shield forwardly of the light source so as to cause all light emanating from the light source to be reflected by the reflector through the open front of the reflector, a tubular color changer adapted to be interposed between the light source and the reflector, spring means urging the color changer into inoperative position, electrically operated means for moving the color changer into operative position, means for locking the color changer in operative position against the effort of the spring means, and means for causing the locking means to release.

5. A lamp structure comprising means providing a light source, a parabolic reflector behind the light source, means providing a shield forwardly of the light source so as to cause all light emanating from the light source to be reflected by the reflector through the open front of the reflector, a tubular color changer adapted to be interposed between the light source and the reflector, spring means urging the color changer into inoperative position, a solenoid, and means actuated by an energization of the solenoid for causing the color changer to be moved into operative position and held in operative position against the effort of the spring means, and upon a subsequent energization of the solenoid to be released so as to be returned by the spring means into inoperative position.

6. A lamp structure comprising means providing a light source, a parabolic reflector behind the light source, means providing a shield forwardly of the light source so as to cause all light emanating from the light source to be reflected by the reflector through the open front of the reflector, a tubular color changer adapted to be interposed between the light source and the reflector, spring means urging the color changer into one of its extreme positions, means for moving the color changer into the other of its extreme positions against the effort of the spring means, means for locking the color changer in said other of its extreme positions, and means for releasing the color changer so as to be subject to the effort of the spring means.

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