

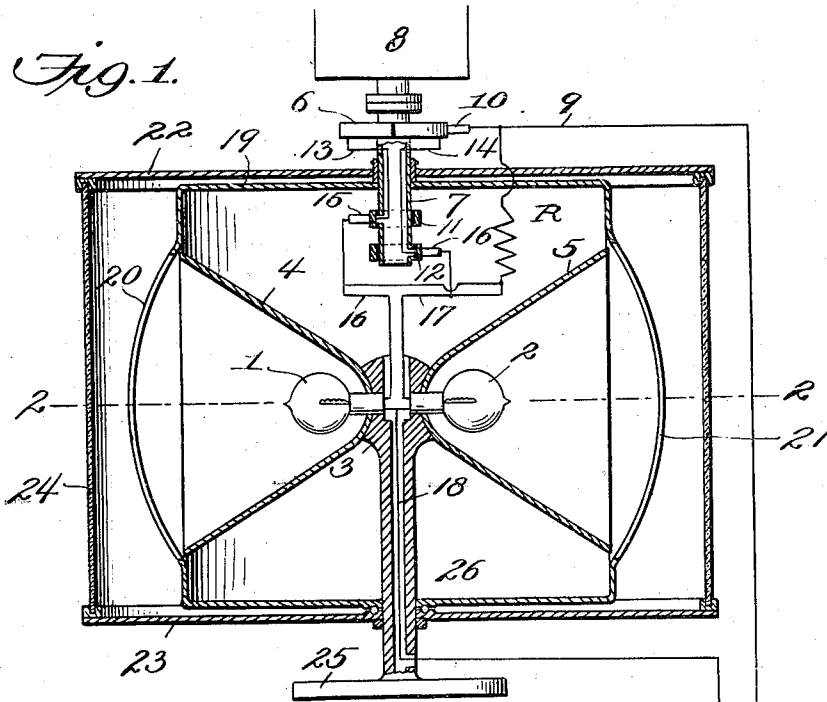
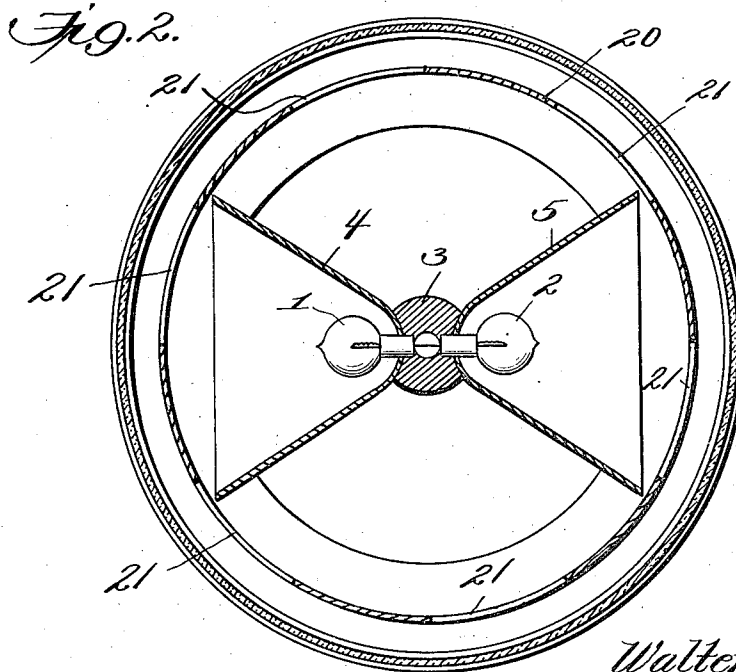
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W. H. COOK

ELECTRIC ILLUMINATING DEVICE

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Inventor

Walter H. Cook

Witness

C. D. Bateman

C. D. Bateman

By

James L. Norris

Attorney

UNITED STATES PATENT OFFICE.

WALTER H. COOK, OF NEW ORLEANS, LOUISIANA.

ELECTRIC ILLUMINATING DEVICE.

Application filed July 1, 1920. Serial No. 393,274.

To all whom it may concern:

Be it known that I, WALTER H. COOK, a citizen of the United States, residing at New Orleans, parish of Orleans, and State of Louisiana, have invented certain new and useful Improvements in Electric Illuminating Devices, of which the following is a specification.

My present invention relates to improvements in electric illuminating devices, and the primary object of the invention is to provide means whereby a relatively high degree of illumination can be obtained with economy in the consumption of electric current.

According to the present invention, the light, which may be supplied from a lamp of relatively low power, is concentrated or intensified into a beam, and the current is supplied intermittently to the lamp. By interrupting or reducing the strength of the current for the lamp at a sufficiently high frequency, the light, which is projected therefrom will give the effect substantially of continuous illumination, due to persistence of vision. A shutter is also provided for intermittently intercepting the light beam in phase with the interruption of or reduction in strength of the current to the lamp, whereby flicker is eliminated or minimized. In the preferred embodiment of the invention, a plurality of lamps and reflectors are used for projecting light beams in different directions, and means is provided for supplying current of illuminating strength intermittently and successively to the different lamps, in conjunction with a shutter which is common to the different lamps and which operate to intercept intermittently the beams of light therefrom in phase with the interruption of the supply of illuminating current to the different lamps.

To these and other ends, the invention consists in certain improvements and combinations and arrangements of parts, all as will be hereinafter more fully described, the features of novelty being pointed out particularly in the claims at the end of the specification.

In the accompanying drawing—

Figure 1 represents a central vertical section of an electric illuminating device constructed in accordance with one embodiment of the invention; and

Figure 2 represents a transverse section on the line 2—2 of Figure 1.

Similar parts are designated by the same reference characters in the several views.

Electric illuminating devices constructed in accordance with the present invention are adapted for use generally for illuminating purposes, although it is particularly suitable for use in the illumination of streets and roadways. The preferred embodiment of the invention is shown in the accompanying drawing and will be hereinafter described in detail, but it is to be understood that the invention is not restricted to the precise construction shown, as equivalent constructions are contemplated and will be included within the scope of the claims.

The illuminating device, as shown in the present embodiment of the invention, comprises a suitable number of electric lamps, two lamps 1 and 2 being shown in the present instance, which are of the incandescent type and these lamps are arranged according to the direction in which the light therefrom is to be projected. In the present instance, the illuminating device is constructed to project light in diametrically opposite directions and the lamps are accordingly mounted on the opposite sides of a support or standard 3, which may be mounted upon a post or the like. The lamps are provided with means for concentrating or intensifying the light therefrom into beams, and for projecting these light beams in the appropriate directions. Preferably and as shown, projectors in the form of reflectors 4 and 5 are provided for this purpose, the reflectors facing in opposite directions and having the respective lamps 1 and 2 suitably located in focus therewith.

According to the present invention, means is provided for supplying electric current of illuminating strength intermittently to each lamp and where, as in the present instance, a plurality of lamps are used, the current of illuminating strength is supplied successively to the different lamps. Different means may be provided for accomplishing this purpose, the means shown comprising a commutator 6, the segments of which correspond in number to the number of lamps to be supplied with current therefrom. This commutator is mounted on a revoluble shaft 7, which may be

driven from an electric or other suitable motor 8 and one terminal 9 of an electrical supply circuit is connected to the brush 10 which bears on the commutator. The shaft 7 also carries a pair of collector rings 11 and 12, the collector ring 11 being connected by the conductor 13 to one of the segments of the commutator, and the collector ring 12 being connected to the other commutator segment by the conductor 14. A brush 15 bears on the collector ring 11 and this brush is connected by the conductor 16 to one contact or terminal of the lamp 1, while another brush 16 bears on the collector ring 12 and is connected by the conductor 17 to one contact or terminal of the other lamp 2. The other contacts or terminals of the lamps 1 and 2 may be connected to a common return wire 18, the latter being connected to the other terminal of the supply circuit. By this circuit arrangement, during each revolution of the shaft 7, current from the main line would be supplied alternately to the lamps 1 and 2, it being understood that while current is being supplied to one of the lamps, the supply of current to the other lamp is completely interrupted. It is preferable, however, to provide means whereby the current is not completely interrupted, but its strength is merely reduced to a strength below that necessary to maintain the lamps in luminous condition, so that not only will sparking at the commutator be reduced or eliminated, but the filaments of the lamps will be kept heated during their non-luminous periods, thus facilitating their heating up to incandescence when again supplied with current of illuminating strength. The arrangement preferred for accomplishing this purpose comprises a suitable resistance R, one terminal of which is connected to the supply wire 9 at one side of the commutator and the other terminal of which is connected to the lamp wires 16 and 17 at the opposite side of the commutator.

The present invention also provides means for eliminating or minimizing flicker, and for increasing the frequency of the flashes of light, it comprising a shutter having blades which intercept the beam of light from each lamp during the periods that the current is supplied thereto, the shutter operating at different speeds and having different numbers and widths of blades to vary the frequency and the width of the projected light beams, or to otherwise produce illuminating effects of different kinds, as may be desired. The shutter, as shown, comprises preferably a casing 19 having opposed heads, one of which is fixed to the revoluble shaft 7 so that the shutter will revolve with this shaft, and the other head loosely surrounds the stationary support or standard 3. The shutter also has a peripheral portion 20 which is closed to form

blades, with intervening openings 21 through which the light beam may be projected from each lamp by its reflector, when any of these openings is brought into register with the respective reflector, and the respective lamp is receiving current. For example, when current is supplied to the right-hand lamp 2, a beam of light will be projected from the lamp 2 toward the right. At this time the supply of current to the left-hand lamp 1 is interrupted. A half revolution of the shaft 7, and the shutter connected thereto, interrupts or reduces the strength of current supplied to the right-hand lamp 2 and supplies current to the left-hand lamp 1, in consequence of which a beam of light is projected by the reflector 4 toward the left. By revolving the shaft 7 and the shutter connected thereto at a sufficiently high speed, the frequency at which the flashes of light are projected from the respective lamps, will be sufficiently high to produce substantially the effect of continuous illumination in the eyes of observers, due to the persistence of vision. Of course, it will be understood that the illuminating device may be used for various purposes and in some instances it may be desirable to supply and interrupt or reduce the strength of the current at lower frequencies and for some purposes the shutter may be omitted. In the construction shown the shutter has six openings and six blades of imperforate portions while the commutator has two segments, in consequence of which the current at illuminating strength will be supplied to each lamp at a frequency of, for example, sixteen times per second, while the shutter will intercept the light from each lamp at a frequency of forty-eight times per second. The frequency and the number of openings in the shutter may be varied, however, as will be hereinafter explained. The operative parts of the illuminating device are preferably enclosed in a suitable housing to reduce wind resistance. As shown, a housing is provided which comprises upper and lower heads 22 and 23 and a glass or other transparent portion 24, the housing, as shown, being supported on a base 25 to which the upright or support 3 is attached, and the upper head 22 providing a bearing for the revoluble shaft 7. An anti-friction bearing 26 may be provided between the shutter and the lower head of the housing.

The number of openings in the shutter can be varied and they may be of different widths as desired, and also the speed of revolution of the shutter can be increased or decreased so as to produce in effect a succession of flashes of light and darkness which alternate so rapidly that either the eye does not catch the effect at all or catches it but slightly. The primary purpose in using the

shutter is to increase the frequency of the periods of light and darkness, while the lamp is increasing its brilliancy, while it is fully lighted, and while its brilliancy is diminishing and while the current at illuminating strength is being supplied and cut off, and hence the shutter acts to prevent or minimize flicker produced by the supplying and cutting off of the current at illuminating strength relatively to the lamp. This is based upon the phenomenon that the human eye will transmit to the brain a certain number of separate impressions per second as separate impressions, but beyond that number the impressions become merged into one another so that the effect is that of continuity. If the flashes of light and the alternating periods of darkness occur at too low a frequency or are disproportionate to one another, then the eye will perceive the difference. In this latter condition, persistence of vision acts only incompletely instead of producing the illusion of steady or continuous illumination, the recurring flashes of light and periods of darkness will be perceptible as a flicker. Flicker is objectionable because it causes eye strain in proportion to the amount of flicker. If the flicker is excessive it is highly injurious to the eyes. It has been found that if the flashes of light and the periods of darkness recur and continue at equal periods and at the rate of forty-eight or more of each to the second, the effect will be, to all intents and purposes, that of continuous illumination. By using the shutter to increase the number of flashes of light and darkness, a blending or dissolving effect can be obtained.

The number and size of the blades on the shutter and the speed of revolution of the shutter may also be varied to satisfy the character of illuminating current supplied to the lamp. For instance, when alternating current is used, it would be preferable to avoid bringing the shutter blade or blades into synchronism with one side of the alternation of the current, as this would tend to produce a waving effect in the illumination, that is to say, the brightness of illumination would alternately increase and diminish, due to the fact that the shutter blades would act in approximate synchronism with the alternation of the current. Of course, where a waving effect in the illumination is desired, as for example, in advertising devices, the number and size of the blades on the shutter and the speed of revolution thereof may be proportioned and adjusted to secure such effect. For continuous illumination, the current at illuminating strength is preferably supplied to each lamp at a frequency of sixteen or more times per second and the shutter would be constructed and operated to intercept the projected light about forty-eight or more times per second. The fre-

quency at which the current at illuminating strength is supplied to the lamp, or the construction or speed of revolution of the shutter may be varied, or both may be varied, when a waving or flicker effect is desired. 70

I claim as my invention:—

1. An illuminating device comprising an electric lamp, means cooperative therewith for concentrating the light therefrom into a beam and projecting such beam, means for supplying electric current of illuminating strength intermittently but at a regular frequency to said lamp, and a shutter having a blade of less width than the width of said light beam and movable across said beam during the periods that illuminating current is supplied to the lamp. 75

2. An electric illuminating device comprising an electric lamp, means for supplying electric current of illuminating strength intermittently but at a regular frequency to said lamp, and a shutter for partially intercepting the light from the lamp at a greater frequency than the interruptions in the supply of illuminating current thereto. 80

3. An electric illuminating device comprising an electric lamp, means for concentrating the light therefrom into a beam and for projecting such beam, means for supplying electric current of illuminating strength intermittently but at a regular frequency to the lamp, and a shutter for partially and intermittently intercepting the light beam from the lamp in definite ratio to the frequency of supply of current to the lamp. 85

4. An electric illuminating device comprising an electric lamp, means for concentrating the light therefrom into a beam and for projecting such beam, means for supplying electric current of illuminating strength intermittently and at a regular frequency to the lamp, and a multiple bladed shutter operative to partially intercept the light beam from the lamp at a predetermined frequency which is higher than the frequency of supply of illuminating current to the lamp. 90

5. An electric illuminating device comprising a plurality of electric lamps, means for concentrating the light from such lamps into beams, means for successively supplying and interrupting the supply of current of illuminating strength at a regular frequency to the different lamps, and a shutter common to the different lamps and having a plurality of blades each of which is narrower than the beam from each lamp, the shutter being operative to partially intercept the beams of light from the lamps at a regular frequency which is higher than the frequency at which the illuminating current is supplied to the respective lamps. 105

6. An electric illuminating device comprising a source of light, means for concentrating the light therefrom and for pro- 110

jecting such light, means for supplying electric current of illuminating strength intermittently to the light source, and a revoluble multiple-bladed shutter for partially intercepting the projected light, at a frequency which is higher than the frequency at which the illuminating current is supplied to the source of light.

7. An electric illuminating device comprising a plurality of electric lights, means for concentrating and projecting each light, means for successively supplying and interrupting the supply of current of illuminating strength to the different lights and a revoluble multiple-bladed shutter common to the different lights and operative at a regular frequency to intercept the light therefrom.

8. An electric illuminating device comprising an electric lamp, means for concentrating the light and for projecting such light, means for supplying current of illuminating strength intermittently and at a regular frequency to the lamp, and a multiple-bladed shutter for intermittently interrupting the projected light.

9. An electric illuminating device comprising a plurality of electric lamps arranged to project light in different directions, means for supplying electric current of illuminating strength alternately to the different lamps, and a shutter for intercepting intermittently and at a regular frequency the light from the lamps.

10. An electric illuminating device comprising a source of light, means for concentrating the light therefrom and for projecting such light, means for supplying electric

current intermittently to the light at the full voltage of the lamp, means for supplying a constant electric current to the lamp at a lower voltage, and a shutter for intercepting the projected light at a regular frequency in definite ratio to the frequency of supply of full voltage current to the lamp.

11. An electric illuminating device comprising a plurality of electric lights, means for concentrating and projecting each light, means for successively supplying and interrupting the supply of full voltage current to the different lights, and means for supplying a constant current of lower voltage to the different lights, and a shutter common to the different lights and operative at a regular frequency to intercept the light therefrom at a definite ratio to the frequency of supply of full voltage current to the lights.

12. An electric illuminating device comprising a plurality of electric lamps arranged to project light in different directions, means for supplying electric current of illuminating strength alternately and at a regular frequency to the different lamps, and means for constantly supplying a low voltage electric current to the different lamps, and a shutter for partially intercepting intermittently and at a regular frequency the light from the lamps.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

WALTER H. COOK.

Witnesses:

SENÉ H. VIOSCA,
WILLARD VIOSCA.