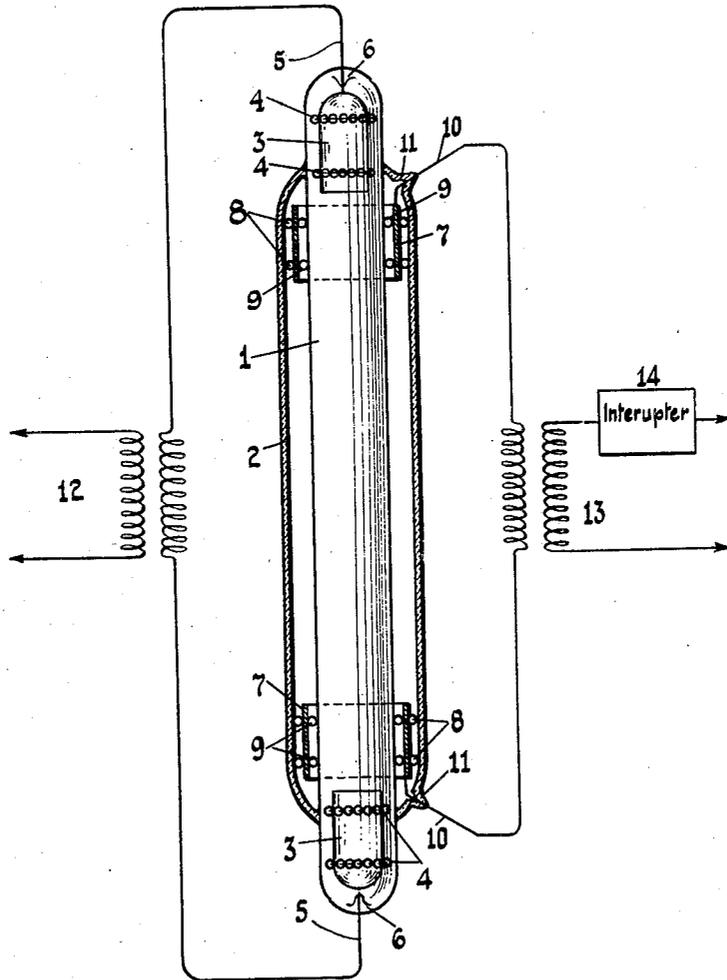


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L. L. BECK
COLOR FLASHER
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UNITED STATES PATENT OFFICE

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COLOR FLASHER

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This invention relates to vacuum tube lamps in which a column of more or less rarefied gas or mixture of gases or vapors is caused to glow and radiate light by the passage of an electric current therethrough, such as the well-known neon lamps. In lamps of this type, as is well known, the passage of a small current through a column of neon at low pressure causes the neon to emit a beautiful orange light of high intensity. The addition of other substances to the gas changes the characteristics of the gas as is well known. For instance, the addition of a small amount of mercury to the gaseous path causes the light produced to be bright blue, in striking contrast to the normal color of neon light, as is well known in the art.

I have found that it is possible to combine two lamps of the type described so as to produce a physically unitary lamp which may be flashed intermittently in contrasting colors, thereby producing a striking and novel effect of great value for advertising signs and the like.

It is an object of the invention to provide a physically unitary lamp which may be flashed in contrasting colors of high illuminating intensity.

It is still a further object of my invention to provide a lamp containing a plurality of independent gaseous conducting paths having coincidental or partly coincidental axes, and lying one within the other, arranged to produce contrasting color effects.

It is still a further object of my invention to provide lamp which may be made to flash intermittently in contrasting colors by the use of an interrupter or circuit breaker, in only one of the lamp circuits.

It is still a further object of my invention to provide a lamp having the characteristics described which shall be simple to build and rugged in construction.

Still other objects will be apparent from the specification.

The features of novelty which I believe to be characteristic of my invention are pointed out with particularity in the appended claims. My invention itself however, both as to its underlying principles and as to its practical embodiments, will best be understood by reference to the specification and accompanying drawing, in which the single figure is a view partly broken away and partly in section of a lamp and illuminating system according to my invention.

I have found that the light radiated from a column of neon at low pressure has the peculiar characteristic of blanketing or shutting off the light radiated by a column of neon at low pressure having mercury therein. In other words, if a neon lamp having mercury therein and radiating a brilliant blue light be placed behind a neon lamp without mercury and radiating the characteristic orange light, the blue light cannot be seen. I have found that advantage of this peculiar fact may be taken, to produce a lamp which alternately flashes orange and blue. In accordance with my invention I arrange a column of neon at low pressure with mercury therein, and surrounding it, a column of neon at low pressure without mercury. The inner column of course radiates the well known blue light, the outer column, the well known orange light, but as previously pointed out, when the outer or orange light is being radiated, the inner blue light cannot be seen, nor is the color of the orange light modified in any way so far as I am able to observe by the blue light within.

In order to arrange for an alternating flashing of orange and blue with this arrangement I keep the inner or blue column continuously illuminated whereas the outer or orange column is illuminated intermittently. The result is that during the moments when the outer column is illuminated the lamp glows with a brilliant orange light while during such intervals as the outer col-

umn is deenergized, the lamp glows with a brilliant blue light.

Referring now more particularly to the drawing, 1 indicates an envelope or container of transparent material such as glass which I may term the inner envelope. Electrodes 3 of any suitable type are provided for energizing the inner column and may for example be of the type shown provided with strings of glass beads 4 strung on wire to prevent contact between the electrodes and the envelope and connected to a source of potential through lead-in wires 5 passing through a press 6. The lead-in wires are connected to the secondary terminals of a transformer 12, the primary of which is adapted to be connected to any source of supply. The envelope 1 as will be readily understood is evacuated and a quantity of neon at low pressure inserted therein together with a small amount of mercury after which the inner envelope is sealed.

A second or outer envelope 2 is also provided encircling the inner envelope 1 and connected thereto in a manner to provide an annular chamber between the walls of the envelopes 1 and 2. This chamber is suitably evacuated and supplied with the gas desired such as neon without mercury at the proper pressure. Suitable electrodes 7 are provided for energizing this second column of gas such for example as the annular electrodes shown, and held spaced from the outer envelope 2 by strings of glass beads 8 strung on wire surrounding the electrodes 7 and held spaced from the inner envelope 1 by means of suitable strings of glass beads 9 strung on wire positioned within the electrode 7. The electrodes are for example carried and supported also by lead-in wires 10 passing through a press 11 and are connected to the secondary terminals of a suitable transformer 13. For the purpose of causing intermittent flashing of the outer column, an interrupter 14 of any suitable type will be connected in series with the primary of transformer 13. In addition suitable switches not shown may be provided for turning on and off either or both columns as desired.

From what has already been said it will be understood that the inner column will be continuously energized during operation of the lamp and will radiate a typical blue color characteristic of neon and mercury. The outer column will be energized intermittently and during the periods of energization will glow with the orange color characteristic of neon and will completely mask the blue light from the interior column. While the outer column is deenergized the blue light will be visible.

It is well known in the art that neon has practically zero thermal lag, lighting up and dying down practically simultaneously with the passage of current through it and it will

therefore be understood that in the operation of my arrangement as described the lamp will alternately flash orange and blue emitting a light of high intensity and of strikingly contrasting colors.

If it is desired to use an additional set of contacts on the interrupter, it is of course possible to arrange for the inner column to be energized only during the intervals when the outer is de-energized, in which case the masking phenomenon is no longer utilized, and the relative positions of the blue and orange columns may be reversed if desired.

While I have shown and described the preferred form of my invention it will be understood that modifications and changes may be made as will be apparent to those skilled in the art without departing from the spirit of my invention.

What I claim is:—

1. An illuminating system comprising a gaseous conducting path arranged to radiate light of predetermined characteristics, a second gaseous conducting path arranged to radiate light of different characteristics, said paths being disposed at least partially one within the other, means for energizing the outer of said paths intermittently and means for energizing the inner of said paths substantially continuously.

2. An illuminating system comprising a gaseous conducting path arranged to radiate light of predetermined characteristics, a second gaseous path at least partially surrounding said first path and arranged to radiate light of characteristics which prevent the observance of light from said first path, means for energizing said first path substantially continuously, and means for energizing said second path intermittently.

3. An illuminating system comprising a gaseous conducting path containing neon at low pressure and mercury, a second gaseous path at least partially surrounding said first paths and containing neon at low pressure, means for energizing said first path substantially continuously, and means for energizing said second path intermittently.

4. A method of producing flashing contrasting colors with a pair of gaseous conducting paths disposed one within the other, which comprises energizing the outer path intermittently, and energizing the inner path substantially continuously.

5. A method of producing flashing contrasting colors with a pair of gaseous conducting paths disposed one within the other, both of said paths containing a rare gas and the inner containing mercury which comprises energizing the outer path intermittently, and energizing the inner path substantially continuously.

6. A method of producing flashing contrasting colors with a pair of gaseous conducting paths disposed one within the other,

- both of said paths containing neon and the inner containing mercury which comprises energizing the outer path intermittently, and energizing the inner path substantially continuously. 70
- 5 7. An illuminating device comprising a luminescent tube containing electrodes in direct contact with a rare gas, a second tube likewise provided and at least partly enclosed by the first tube, electrical discharge means of low frequency for illuminating the gas in each tube including means for interrupting the illumination of the said first tube. 75
- 10 In testimony whereof, I have hereunto set my hand this 29th day of April, 1926.
LEO L. BECK.
- 15 8. An illuminating device comprising a luminescent tube containing electrodes in direct contact with a rare gas, a second tube likewise provided and also containing mercury and at least partly enclosed by the first tube, electrical discharge means of low frequency for illuminating the gas in each tube including means for interrupting the illumination of the said first tube. 80
- 20 9. An illuminating device comprising a luminescent tube containing electrodes in direct contact with neon, a second tube provided with electrodes in like manner and containing neon and mercury and at least partly enclosed by the first tube, electrical discharge means of low frequency for illuminating the gas in each tube including means for interrupting the illumination of the said first tube. 85
- 25 10. An illuminating device comprising a luminescent tube containing electrodes in direct contact with a rare gas, a second tube likewise provided and at least partly enclosed by the first tube, electrical discharge means of low frequency for illuminating the gas in each tube including means for interrupting the illumination of the said first tube, the rare gas in said first tube being adapted upon illumination to mask light emitted by the illuminated gas in the second tube. 90
- 30 11. An illuminating device comprising a luminescent tube containing electrodes in direct contact with a rare gas, a second tube likewise provided and at least partly enclosed by the first tube, means for interrupting the illumination of the said first tube, each tube being adapted to be illuminated by low frequency electrical discharge. 95
- 35 12. The method of producing flashing contrasting colors which comprises discharging electric current through a column of rare gas substantially continuously and through a second column of gas intermittently, the second column having the property of masking the light of the first column and being so disposed with respect to the first column that the light of the first column is masked during the periods of operation of the second column. 100
- 40 13. The method of producing flashing contrasting colors which comprises discharging electric current substantially continuously through a column of rare gas containing mercury and through a column of neon intermittently, the neon column having the property of masking the light from the mercury column and being so disposed with respect to the mercury column that the light of the mercury column is masked during the periods of operation of the neon column. 105
- 45 14. The method of producing flashing contrasting colors which comprises discharging electric current through a column of rare gas containing mercury and through a column of neon intermittently, the neon column having the property of masking the light from the mercury column and being so disposed with respect to the mercury column that the light of the mercury column is masked during the periods of operation of the neon column. 110
- 50 15. The method of producing flashing contrasting colors which comprises discharging electric current through a column of rare gas containing mercury and through a column of neon intermittently, the neon column having the property of masking the light from the mercury column and being so disposed with respect to the mercury column that the light of the mercury column is masked during the periods of operation of the neon column. 115
- 55 16. The method of producing flashing contrasting colors which comprises discharging electric current through a column of rare gas containing mercury and through a column of neon intermittently, the neon column having the property of masking the light from the mercury column and being so disposed with respect to the mercury column that the light of the mercury column is masked during the periods of operation of the neon column. 120
- 60 17. The method of producing flashing contrasting colors which comprises discharging electric current through a column of rare gas containing mercury and through a column of neon intermittently, the neon column having the property of masking the light from the mercury column and being so disposed with respect to the mercury column that the light of the mercury column is masked during the periods of operation of the neon column. 125
- 65 18. The method of producing flashing contrasting colors which comprises discharging electric current through a column of rare gas containing mercury and through a column of neon intermittently, the neon column having the property of masking the light from the mercury column and being so disposed with respect to the mercury column that the light of the mercury column is masked during the periods of operation of the neon column. 130