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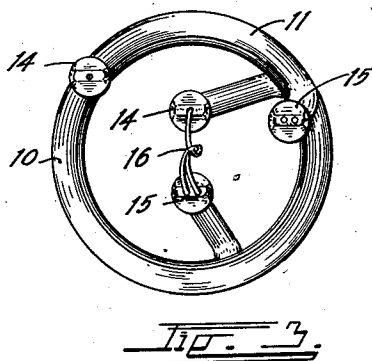
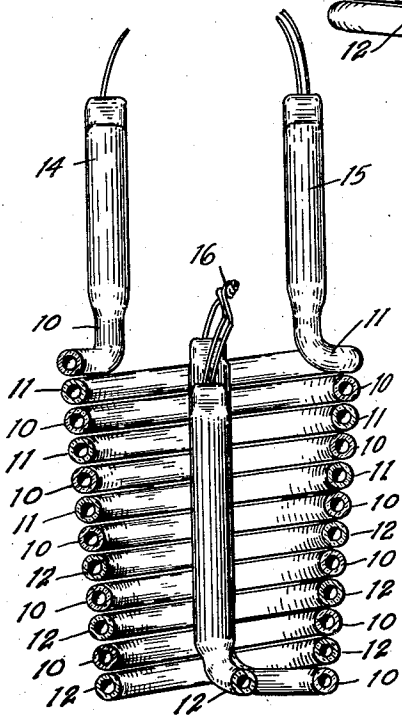
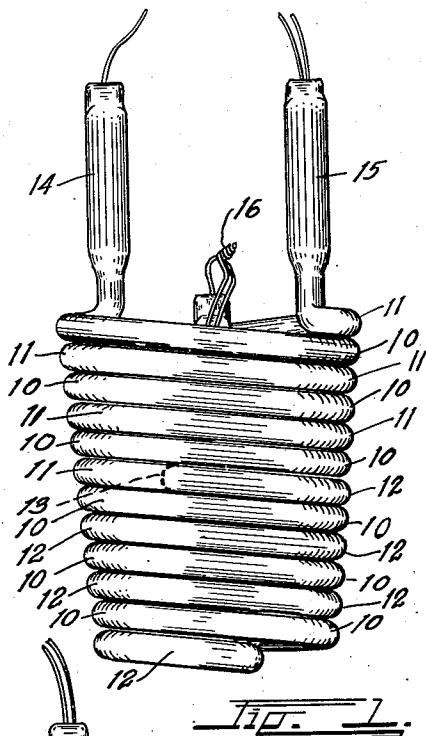
D. F. SAWYER

2,205,672

LIGHTING ELEMENT AND FIXTURE THEREFOR

Filed Oct. 13, 1938

2 Sheets-Sheet 1



INVENTOR.

DAVID F. SAWYER.

BY

W. H. M. M. M.

ATTORNEY.

June 25, 1940.

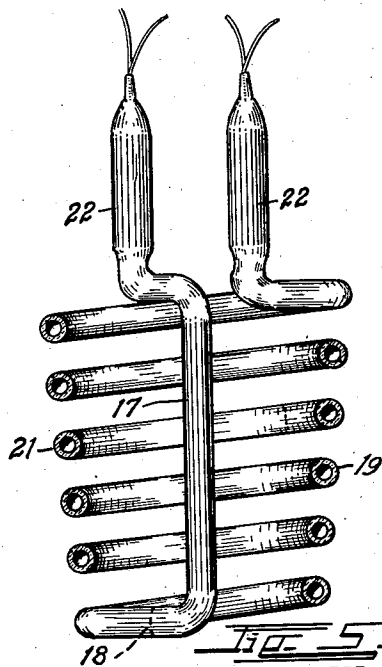
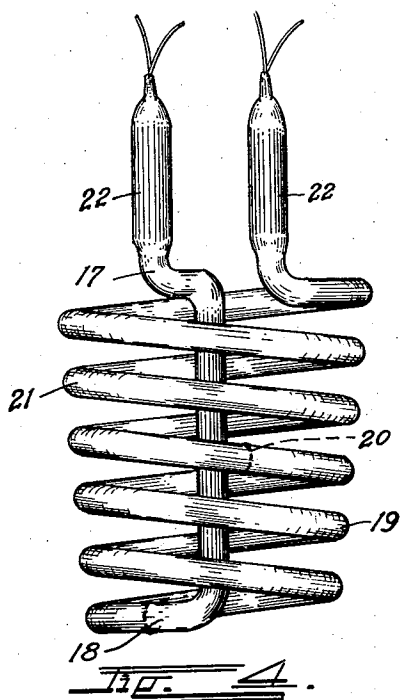
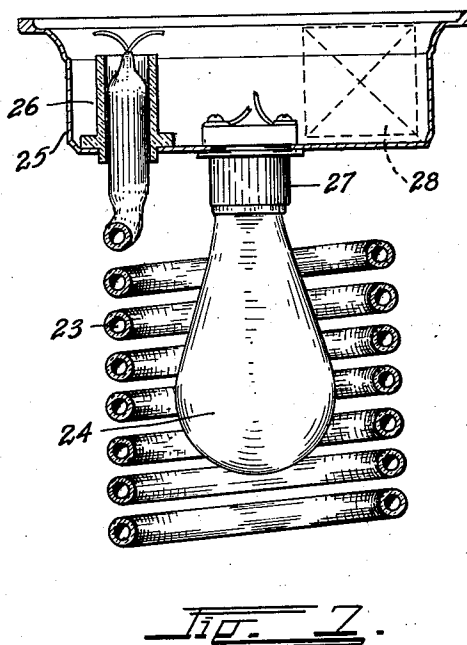
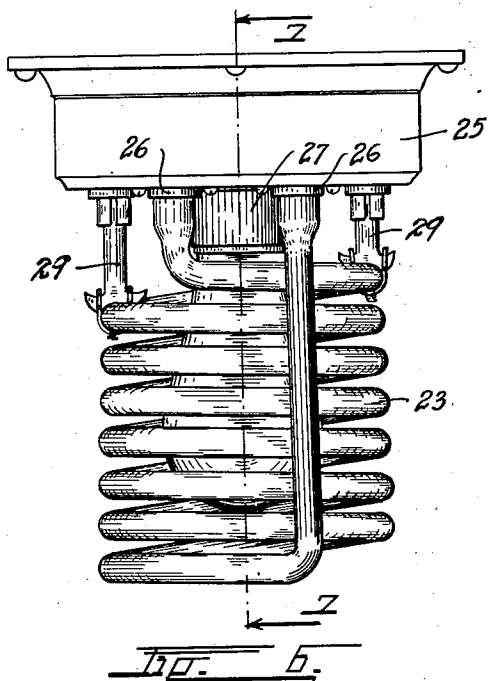
D. F. SAWYER

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LIGHTING ELEMENT AND FIXTURE THEREFOR

Filed Oct. 13, 1938

2 Sheets-Sheet 2



INVENTOR.
DAVID F. SAWYER.
BY *David F. Sawyer* ATTORNEY.

UNITED STATES PATENT OFFICE

2,205,672

LIGHTING ELEMENT AND FIXTURE
THEREFOR

David F. Sawyer, Rock Springs, Wyo.

Application October 13, 1938, Serial No. 234,763

3 Claims. (Cl. 240-1.1)

This invention relates to illuminating light fixtures, more particularly intended for interior illumination.

Attempts have been made to use gaseous light tubes, such as neon tubes, fluorescent tubes, etc. for interior illumination. These attempts have not been completely successful. The neon tubes are too intense in color toward the blue end of the spectrum and if changed by using red gas, they are too intense toward the red extremity of the spectrum, thus producing an unbalanced colored light that is annoying and not desirable. Also, the usual neon tube does not emit light at a sufficient intensity for indirect or direct interior illumination. To increase this intensity, the newer fluorescent tubes have been developed. These tubes, however, emit a light of a color toward the blue, indigo, and violet end of the spectrum and are deficient in the yellow, oranges and red, and are therefor very tiring and annoying to the eyes and are false to reflected color.

This invention has for its principal object the provision of a unit light fixture which will emit a synthetic light approaching white or daylight in color so that it will be accurate for color matching and non-tiring upon the eyes and which will have sufficient intensity for economical use in either direct or indirect space lighting units.

Another object of the invention is to provide a lighting fixture, in which tubular light sources may be employed which will be small, compact and self-contained so that it may be connected direct to the usual light wires in a building or other structure.

Other objects and advantages residue in the detail construction of the invention, which is designed for simplicity, economy, and efficiency. These will become more apparent from the following description.

In the following detailed description of the invention reference is had to the accompanying drawings which form a part hereof. Like numerals refer to like parts in all views of the drawings and throughout the description.

In the drawings:

Fig. 1 is a side view of one form of the improved tubular element of the fixture.

Fig. 2 is a vertical section therethrough.

Fig. 3 is a plan view thereof.

Fig. 4 is a side view of an alternate element which may be employed in the invention.

Fig. 5 is a section through the form of Fig. 4.

Fig. 6 is a side view of a third alternate form of the invention in which incandescent light is combined with tube emitted light. With this

form a typical fixture or mounting element is shown which may be used with any of the other forms.

Fig. 7 is a vertical section through the form of Fig. 6.

Most individual sources of light such as rare gas tubes, fluorescent tubes, incandescent filaments, etc. are all deficient in color at one extremity or the other of the spectrum. This invention contemplates the mixture of these various elements in a single compact lighting unit so that the entire length of the spectrum colors may be obtained from a single unit in their proper proportions.

In the first form of the invention, illustrated in Fig. 1, two, separate, independent, helical, tubular coils are employed. One coil being threaded into the other so that all the turns of both coils lie in the same cylindrical or conical plane. It is preferred for the usual overhead unit to employ a slightly conical shape for both units. The light emitted by the combination of coils produces the complete spectrum of color running from red to violet.

The unit is constructed by combining a red neon tube 10 with a coiled fluorescent tube which is formed in two parts 11 and 12 welded together, as shown at 13, intermediate their extremities to form a continuous single gas space. The neon tube is provided at its extremities with the usual electrode extremities 14 and the complete combined fluorescent tube 11-12 is provided with the usual fluorescent tube extremities 15. The inner extremity 14 of the neon tube is connected directly to the inner extremity 15 of the fluorescent tube as indicated by the connection 16. This places both tubes in electric series with each other.

The two tubes can be easily interthreaded after completion by holding the tubes eccentric with each other so that portions 14 and 15 will not contact each other upon each rotation. There is sufficient space between the adjacent turns of one tube to allow passage therebetween of the other tube.

The neon tube provides the necessary colors in the red and orange end of the spectrum. The portion 11 of the fluorescent tube is internally coated with fluorescent powder of a type extremely strong in the yellow and green portions of the spectrum while the remaining portion 12 of the fluorescent tube is coated with fluorescent powder to produce a light extremely strong in the blue, indigo, and violet extremity of the spectrum. This combination provides a complete, balanced

spectrum and careful spectroscopic measurements of the light produced show it to be synthetic daylight in color. The position of the tubes are such that none of the tube turns shadow any of the other turns and a very efficient unit is produced.

In Figs. 4 and 5 another unit is illustrated in which the complete color spectrum is built up by combining or attaching sections of fluorescent tubes together in one tube to build up the complete spectrum. In this form, one section of fluorescent tube 17 is coated with a powder to produce what is called "Golden light," that is a light extremely strong in the orange, red and yellow colors. The tube 17 is continuously welded, as shown at 18, to an intermediate section of tube 19. This section is coated with powder to produce the intermediate spectrum color blending from the yellow-green to the blue. The tube section 19 is welded as shown at 20 to a third fluorescent tube 21 coated with fluorescent powder to produce the colors toward the blue, indigo and violet extremity of the spectrum.

When the welds are completed a single, rigid, complete conical, helical coil is formed terminating at two electrode extremities 22. The total result of this unit is to produce white, daylight similar to the previous unit with the use of but a single coil.

In Figs. 6 and 7 a combination is shown wherein advantage is taken of the usual incandescent bulb. As is well known, incandescent lights are extremely strong in the red, orange and yellow end of the spectrum but are deficient in the blues, indigos, and violets. By combining the light of an incandescent bulb 24 with the light from a fluorescent tube 23 which is particularly strong in the colors blue, indigo and violet, a combined or synthetic light is produced closely simulating daylight in color.

Both the tube and the light are mounted in a fixture canopy 25 provided with suitable tube sockets 26 and lamp sockets 27. The weight of the tube is supported from the canopy upon glass insulating posts 29. The canopy may be made a sufficient size to contain a transformer in a position as indicated at 28 for supplying the high voltage current necessary for the fluorescent tubes. The tubes illustrated in the previously described

forms are also mounted for use in a similar fixture canopy.

While various forms of the invention have been described and illustrated herein, the same principle is involved in all of them. That is, the combination of luminous tubes with other sources of light to produce the complete white light spectrum. The combination may be made by connecting a series of different luminous tubes or fluorescent tubes, as shown in Fig. 5; or by mixing combination fluorescent tubes with a neon tube, as shown in Fig. 1; or by mixing the light from an incandescent lamp and a fluorescent tube, as shown in Fig. 2.

While a specific form of the improvement has been described and illustrated herein, it is desired to be understood that the same may be varied, within the scope of the appended claims, without departing from the spirit of the invention.

Having thus described the invention, what is claimed and desired secured by Letter Patent is:

1. A light source comprising: a helical, luminous glass tube; a second luminous, helical tube threaded into said first tube so that the turns of the second tube will come intermediate the turns of the first tube, said two tubes being connected in series with each other, one of said tubes consisting of a plurality of tubes of different color characteristics permanently welded together.

2. A light source comprising: a helical fluorescent glass tube, consisting of two tubes of different color characteristics permanently welded together; a helical neon tube threaded into said fluorescent tube so that the turns of the neon tube will come intermediate the turns of the fluorescent tube, said tubes being connected in series with each other.

3. A luminous tube light source comprising: a helical-conical-shaped glass tube consisting of two tubes of different color characteristics permanently welded together; a second helical-conical-shaped glass tube of a still different series of color characteristics, said second tube being threaded into said first tube so that the turns of said first tube will come intermediate the turns of said second tube.

DAVID F. SAWYER.