Aug. 23, 1938. P. SARACCO 2,127,757

BEACON LIGHT

Filed Aug. 9, 1935

Fig. 1.

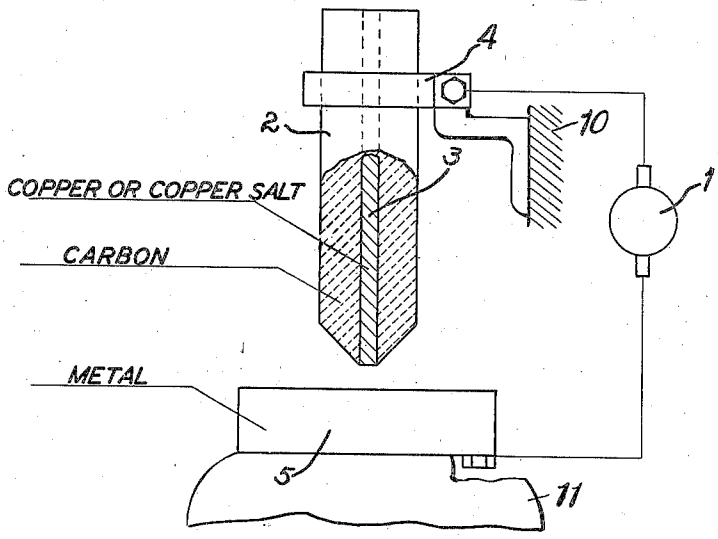
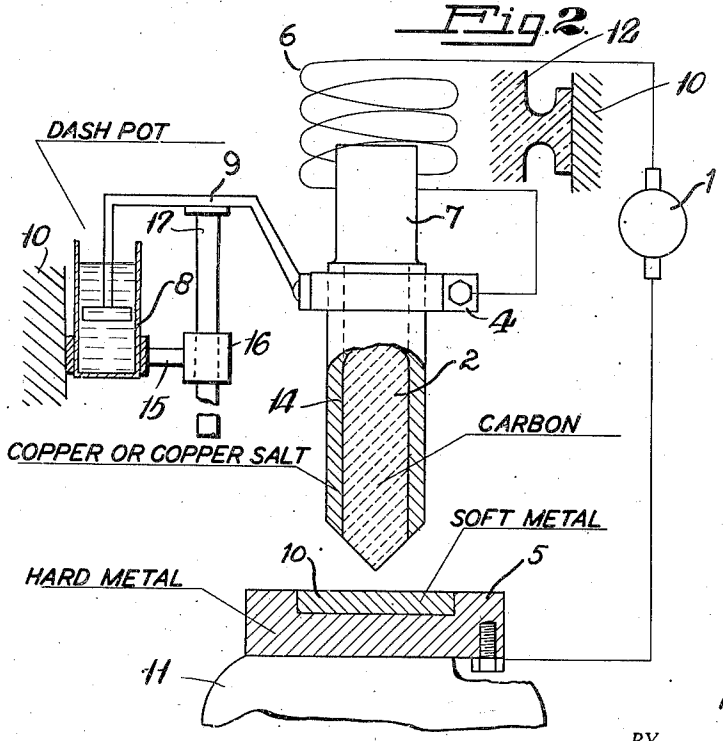


Fig. 2.



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BEACON LIGHT

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Application August 9, 1935, Serial No. 35,459

1 Claim. (Cl. 176—121)

My invention relates to a beacon light, and more particularly to a light of exceptionally high intensity.

Among the objects of my invention are: To provide an arc light visible for relatively long distances; to provide an arc light having its maximum intensity in the green region of the chromatic spectrum; and to provide a means and method of producing a primary green light of high intensity.

My invention possesses numerous other objects and features of advantage, some of which, together with the foregoing, will be set forth in the following description of specific apparatus embodying and utilizing my novel method. It is therefore to be understood that my method is applicable to other apparatus, and that I do not limit myself, in any way, to the apparatus of the present application, as I may adopt various other apparatus embodiments, utilizing the method, within the scope of the appended claim.

Referring to the drawing:

Figure 1 is a diagrammatic representation, partly in section, of one modification of the arc of my invention.

Figure 2 is a diagram, also partly in section, of another modification of my arc.

My invention broadly comprises the use of an arc wherein substantially the entire amount of energy is contained within a relatively narrow band of wavelengths in the neighborhood of 4500–5500 Angstroms, and the preferred visible color is a brilliant green or bluish-green.

I prefer to utilize an arc in which the vapor conducting the arc current is almost wholly that of a metal which when vaporized will produce the desired colors; and I prefer in this regard to strike the arc in copper vapor or a mixture of zinc and copper vapors; the first example giving a pure green flame; the second example giving a bluish-green flame; both of which I have found to be highly efficient.

Broadly as to apparatus, I prefer to utilize a unilateral arc, that is, to have only one of the electrodes carry any carbon, the other electrode being a relatively heavy metal block. The materials supplying the metallic vapors may be incorporated in the carbon alone or carried partly by the carbon and partly by the block. I may prefer to have both the carbon and the block carry the vaporizable metals, and in this case I may utilize the carbon to carry one of the metals and the block to carry the other.

I may desire to burn the arc steadily, or to flash it intermittently. In all cases, I prefer to expose my arc directly to the atmosphere without enclosure.

Other broad objects of my invention may be more readily understood by direct reference to the drawing.

A generator 1 preferably supplies direct current at a voltage of thirty to forty volts, at two hundred to five hundred amperes. A carbon rod 2 is provided having a central core 3, as shown in the modification illustrated in Figure 1. The carbon is supported by a clamp 4 to which one pole of the generator is directly connected.

The opposing electrode is a metal block 5 to which the other pole of the generator is attached. Clamp 4 is movably attached in any convenient manner to a support 10, and metal block 5 may be fastened to any convenient foundation 11.

In case I desire to produce an arc having a pure green flame, I make the metal plate 5 preferably of steel and form the core 3 of the carbon 2 of either metallic copper or a copper salt, sal ammoniac mixed with graphite. I prefer to utilize the copper salt for the lower current densities and the copper metal for the higher current densities.

With the generator 1 supplying a current of from two to five hundred amperes, the tip of the carbon rod is touched to the metal block and pulled away; and in the high intensity arc which follows, the copper, either from the metal or the salt, is vaporized to a sufficient extent to cause the arc to be almost completely dominated by the color of vaporized copper, which is an intense brilliant green. One of the reasons for using such a high current density is to insure the fact that sufficient copper is vaporized to completely dominate the arc; and I have also found in this regard that satisfactory vaporization of copper does not take place between two carboniferous electrodes, as in the latter case there is an excess of carbon vapor with insufficient vaporization of the copper, so that the arc approaches in color that of a plain carbon arc rather than a copper arc.

In Fig. 2 I have shown a slightly different modification of my device, where the current to the arc is passed through a solenoid 6 mounted on an insulating bracket 12 and connected in series with a movable arc electrode. The arc electrode in this case comprises a central core 7 of magnetic material attached to a carbon rod 2 having a copper or copper salt shell 14. The solenoid 6, rigidly supported by bracket 12, is positioned around core 7 so that its magnetic field may act thereon to lift the movable arc electrode when

current passes therethrough. Solenoid 6 is rigidly supported by conventional supporting means, not shown in the drawing. I then prefer to attach to the clamp 4 a dash pot 8 by an arm 9, so that the carbon 2 will be pulled slowly away from the block 5 under the influence of the current in the solenoid acting upon core 7 until the arc breaks, whereupon current will cease flowing in solenoid 6 connected in series therewith; and I prefer to adjust the dash pot so that the carbon will fall rapidly until it touches the block and re-establishes the current in the solenoid to produce a new arc. Dash pot 8 is supported by a dash pot bracket 15, the same bracket being provided with a bearing 16 through which a slide 17 operates, this slide being connected to arm 9. Inasmuch as my electrode combination insures instantaneous vaporization of the copper, each flash will be of the intense green desired, having a maximum radiation in the neighborhood of 5200 Angstroms.

In the carbon 2 illustrated in Figure 2, I have shown a slightly different method of incorporating the copper or copper salt, in this case placing it on the carbon as a heavy layer on the outside instead of as a core, and I have found that it will vaporize satisfactorily in either position.

In case I desire to modify the color values of my arc by combining within the arc flame the vapors of other metals, I prefer to do so by imbedding within the metal block 5, which is preferably of steel, an insert 10 of a softer metal, and I have found that zinc is very satisfactory for this purpose as it adds to the green color of the copper arc a bluish-green component which modifies the straight copper spectrum so that it is darker in terms of color, the combined color being a modified green of shorter wavelength which is, in many cases, even more satisfactory for fog penetration than is the copper vapor alone. There is no tendency for the zinc to leave the cavity in the block 5, and I have found it a fact that during the operation of the arc, that the softer metal is molten and boiling, the vapor being used in the arc. Various oxides and slags are formed within the cavity and in the softer metal, but this does not harm the operation of the arc in any way. There is of course some corrosion of the metal plate due to the action of the intense arc, but I have not found that the spectrum of the iron enters into the arc in any perceptible degree.

I claim:

A beacon light comprising an open arc between a carboniferous electrode containing vaporizable metal imparting a characteristic color to said arc flame and a pool of molten and boiling metal open to the atmosphere, solid at atmospheric temperatures and maintained in liquid condition by the heat of the arc, a solid heat-resistant metal container for confining said molten metal in position to act as an electrode in said arc, said container being positioned so that no part thereof contacts said arc, and means for intermittently breaking the arc between said carboniferous electrode and said molten metal and re-making said arc before said molten metal solidifies.

PETER SARACCO.