Nov. 10, 1942. J. W. STEWART 2,301,471

ILLUMINATED SIGN

Filed Feb. 27, 1940

Fig. 1.

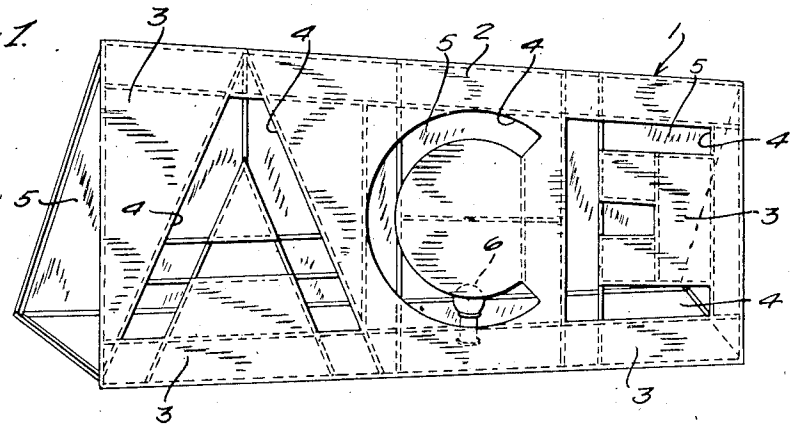


Fig. 2.

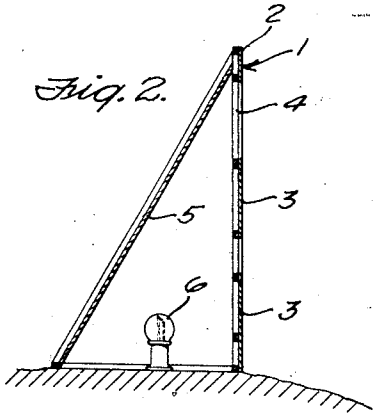


Fig. 3.

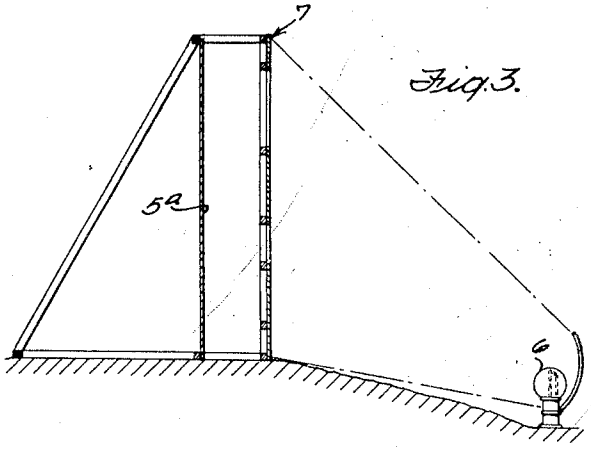


Fig. 4.

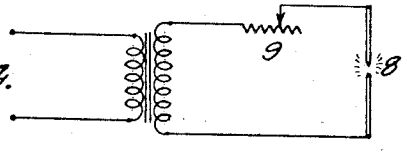


Fig. 5.

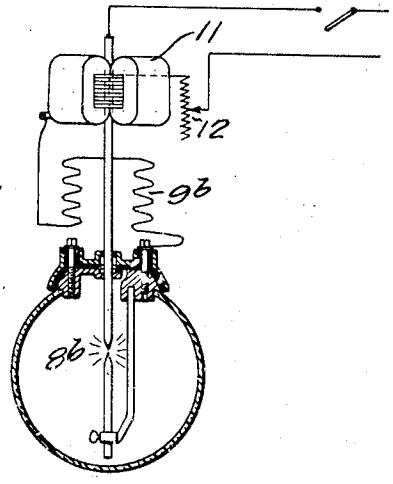
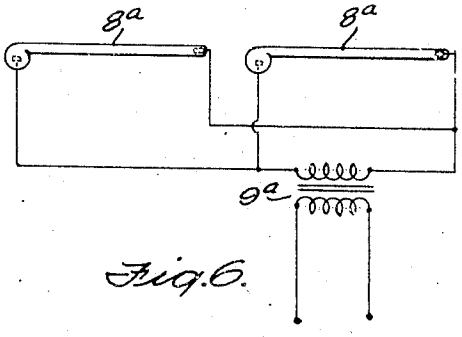


Fig. 6.



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ILLUMINATED SIGN

James W. Stewart, Oneonta, N. Y.

Application February 27, 1940, Serial No. 321,002

4 Claims. (Cl. 40—130)

This invention relates to illuminated signs and particularly to illuminated signs used for advertising purposes. One object of this invention is to produce an illuminated sign which will be visible a long distance and especially for use in outdoor advertising against a dark background.

Another object of this invention is to produce an illuminated sign which will exhibit the irregular and unpredictable variations of a natural phenomenon, and especially simulate an open fire by its flaming and flickering, and by this simulation will attract interest and attention.

It is another object of my invention to produce an illuminated sign which may be easily changed or transported and is cheap to build and operate.

It is another object of this invention to provide a sign which may be operated effectively without attendants, being merely connected to the neighboring power lines and visited at periodic intervals.

Other objects of my invention will be evident from the accompanying drawing and the following description. It is to be understood, of course, that the drawing and description are merely exemplary and are intended to enable anyone familiar with the art of illuminating signs to produce signs according to this invention with numerous variations in application to produce many novel effects.

In the drawing:

Fig. 1 is a perspective view of a sign constructed according to the preferred form of my invention;

Fig. 2 is a cross section of the sign shown in Fig. 1;

Fig. 3 is a modified view of my invention in which the sign is illuminated from the front;

Fig. 4 is a wiring diagram showing the circuit for the arc source of illumination;

Fig. 5 is a view of an open arc light such as may preferably be used with my invention; and

Fig. 6 shows a group of mercury pool enclosed arc tubes which may be used in place of the open arc of Fig. 5.

Referring first to Figs. 1 and 2, I have shown in these figures a preferred embodiment of my invention. The stencil 1 consists of a frame 2 covered with an opaque material 3, excepting for the openings 4 through which it is desired to have the light shine. These openings 4 may be, as shown, in the shape of letters, whereby to form words and transmit a written message. On the other hand, these openings may also form figures or in fact may form any character which it is desired to bring to the attention of the public. Back of the stencil 1 is a reflector 5, advantageously a diffuse reflector which may be simply a reflecting surface, such as a piece of wood or cloth. I have shown this reflector 5 as being placed at an angle with the stencil so as to join the stencil along the top edge and be at some distance from the stencil near the bottom edge. Near the bottom and between the stencil and reflector is placed the light source 6, as shown in Fig. 2. This light source is shown here as being merely an open arc lamp but, as will be explained later, it may effectively be one of a number of types of lamps. Preferably, however, this light source is operated in such a manner as to produce a flicker flaming effect and may be colored by the use of a metal salt such as strontium, barium, copper, sodium.

Fig. 3 shows an alternative form of the invention in which the source of light is placed in front of the sign which it is desired to illuminate. In this case no stencil is necessary but the sign 7 is advantageously painted in sharply contrasting colors. However, if desired, a stencil may be used and the effect of the shadows on the background behind the stencil will be found to be very effective. In this case the reflector 5a should be fairly evenly spaced from the stencil rather than at a variable distance as in the form shown in Figs. 1 and 2. In this form of my invention, as in the form shown in Figs. 1 and 2, various types of flickering illuminating devices may be used.

Fig. 4 shows a circuit which may be used with the light source in any of the foregoing embodiments. This consists of a standard arc light with the automatic restarting feature such as is commonly found in constant current street lighting circuits, but with electrodes that tend to operate poorly and give flaming flaring effects. With this arc lamp 8 is used a ballast choke 9. This ballasting choke is smaller than would normally be used to give smooth operation of the arc as in street illumination and the arc, therefore, tends to operate unstably, the overall current-voltage characteristic of the arc and ballast being without positive slope. Since the arc is in itself an unstable device, it will repeatedly restart, build up and break. The use of the automatic restarting type lamp, assures this repeated flaring and breaking of the arc, i. e., one in which a series solenoid coil is used to separate the electrodes as the current rises. At fixed current the lift of this solenoid is just sufficient to maintain proper separation, but when the current rises to

an abnormally high value, the strength of the solenoid increases, and with it the arc gap until the voltage will no longer sustain the arc, and it breaks. With the break the current ceases and the electrodes drop back into contact. This process is repeated continuously as the arc operates.

A well known mechanism for this purpose is shown in Fig. 5 wherein the arc lamp proper is shown at 8*b*, an inductance coil ballast at 9*b* and a solenoid for contacting and adjusting the electrodes is shown at 11. A variable impedance 12 permits finer adjustments of the over-all ballast to give the desired flicker effect.

By introduction into the arc of mineral salts and/or metals flaming arc and color effects can be produced due to vaporization from the electrodes of the metal or salt, thereby intensifying the desired flaring and flickering; and by using non-homogeneous mixtures for this purpose desired color variations can be produced. A higher lumen per watt output can also be attained in this way. These metals and/or salts may be provided, as is already well understood, by cored electrodes, by impregnation into a porous electrode material, by a separate stick of the material fed into the arc zone, or by stratifying layers of the foreign material into the electrode. The layers may be stratified either vertically or horizontally to the direction of burning, or at some angle, so that the arc color will either change rapidly from one to another, or change gradually as the arc burns through the electrode.

Although I have described here an arc having carbon or metallized carbon electrodes, it may be advantageous to use solid metal electrodes to produce a more unstable arc, and it will be desirable in many cases to arrange the electrodes so that they operate at a separation in excess of what would normally be required to give a smooth flickerless light. Whether carbon or metal electrodes are used the enclosing glass globe, if used, should advantageously be open to allow ample ventilation, so as to provide sufficient oxygen to prevent quieting of the arc by using up the oxygen supply. The use of automatic feeds for the electrodes has been suggested throughout, but the feed might be at a set speed, or might even be manual.

In place of the open arc light which has been described one of the self-starting vapor lamps, e. g., a mercury pool arc light 8*a* of the low pressure type, may be used, and also with insufficient ballast, 9*a*, e. g., as shown in Fig. 6. These lamps when under-ballasted will become unstable and will drop out or overload to the point where the pressure rises by vaporization to such extent that they will blow themselves out; and following the fall in pressure due to cooling will restart. The use of a group of these lights connected in parallel on the same ballast will result in their repeatedly starting and blowing themselves out, in random sequence.

By putting several of these lamps across the same ballast, a sequence of action can be assured, since it will not be possible for more than one of the lamps to burn at a time. As soon as one of the lamps blows itself out due to vaporization, the resulting increased voltage will cause another of the lamps to start, this process continuing from lamp to lamp.

The effect on the sign may be greatly enhanced if the different lamps of the group have different gas and/or vapor fillings to give different colors and/or if the fixed gas used for starting gives a color different from that given by the vapor, e. g., Ne-Hg.

The most effective results are obtained by the random flashes of the light obtained by my invention whereby the appearance of a natural phenomenon is most closely approached, and the monotonous regularity of the flashing sign is avoided.

It is not essential that all lamps of the group be connected to the same ballast, but the effect is more desirable, since it assures frequent but very brief periods of complete extinction following the bright flares.

While in the above description the reflector has been specified as advantageously a diffuse reflecting surface, it may be advantageously a mirror or metallic reflecting surface, or especially a "sparkled" surface made, for example, by cementing crystalline particles or mirror fragments on the reflecting surface or crumpled metal foil, etc.

While this invention is referred to generally as an advertising sign, it is to be understood that it may be used wherever it is desired to attract attention, for example, in other communication devices such as beacon, etc., in which case reflectors and lenses will be used to concentrate light along one or more directions instead of the reflectors and stencils described above.

What I claim is:

1. An advertising sign comprising a hidden erratic arc light illuminating the sign with an unstable, high intensity illumination, an illuminated part exposed to view of the observer, and a relatively dark part adapted to intercept light from said source, whereby to contrast with the illuminated part.

2. An advertising device which comprises a sign to be illuminated and an arc light to illuminate said sign, the arc light having as the arcing surface electrodes including a substance volatile when exposed to the arc and a plurality of interspersed substances of different arcing properties, whereby to give an irregular sputtering, flaming arc.

3. An advertising sign as described in claim 1 in which the arc lamp is underballasted, whereby to give an unstable, flickering discharge.

4. The combination with an advertising sign of an arc light which comprises, a constant potential source of electrical energy, a ballast, electrodes adapted to carry the arc, the ballast being of such a low impedance that the arc is unstable, and a stick interposed in the arc stream between the electrodes, said stick being of a substance to cause a flaming effect, and said electrodes having substances included therein to give the arc a flaming effect.

JAMES W. STEWART.