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HIGH-FREQUENCY ACTIVATED NEON SIGN

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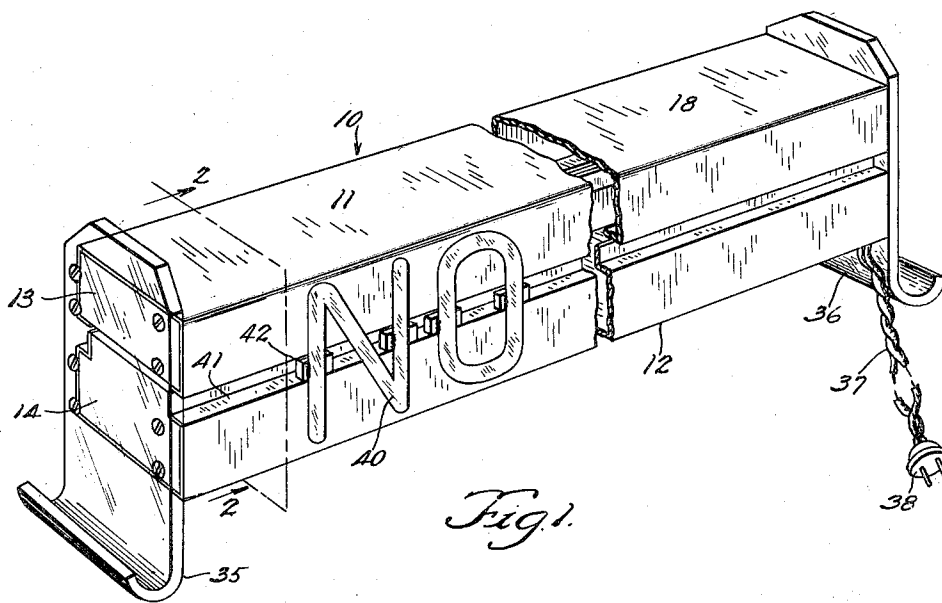


Fig. 1.

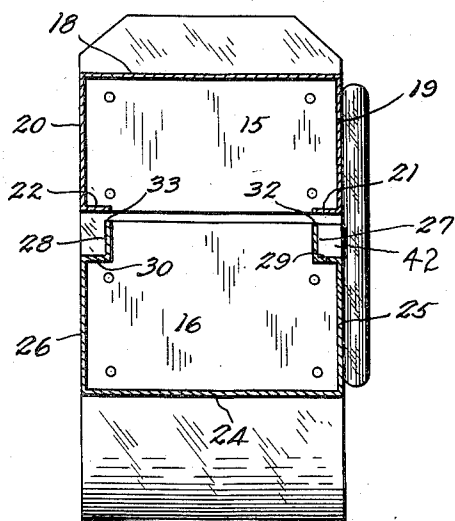


Fig. 2.

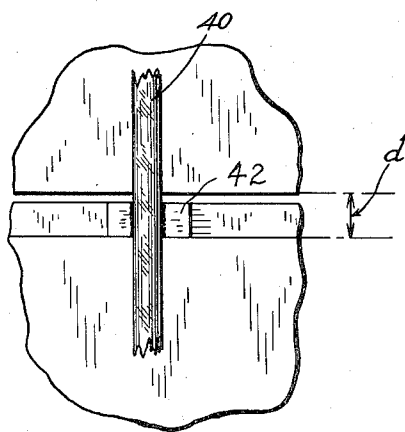


Fig. 3.

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HIGH-FREQUENCY ACTIVATED NEON SIGN

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9 Claims. (Cl. 40—130)

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This invention relates to an electric sign and is an improvement upon the invention disclosed and claimed in my prior U. S. Patent No. 2,488,169, patented November 15, 1949. As disclosed in said application, ionization and luminescence of gas-filled envelopes may be accomplished in an unusually effective manner by impressing high frequency electric currents on electrodes having large surface area and so disposed as to provide an active electrode gap of between about one sixty-fourth of an inch and about three-fourths of an inch and particularly of between about one sixty-fourth of an inch and about three-eighths of an inch. As disclosed in said application, it is desirable to dispose such gas-filled envelopes as close as possible to the electrode surfaces. Thus, the most intense portions of the electric fields are effective for ionization and luminescence.

The invention hereinafter disclosed and claimed improves upon the invention disclosed in the above-identified patent by providing electrode surfaces so shaped as to cooperate with magnetic retaining means carried by the sign elements for maintaining the same in the proper position. The Browner patent referred to above discloses the use of permanent magnets and ferromagnetic members cooperating to retain sign elements in position. This invention utilizes the conducting properties of magnet materials so that the electrodes and magnets cooperate in such a manner as to provide the desired gap area and to maintain the sign element in close proximity to the electrode surfaces.

For a more thorough understanding of the invention, reference will now be made to the drawing wherein Figure 1 shows an isometric view of a structure embodying the present invention;

Figure 2 is a section on line 2—2 of Figure 1; and

Figure 3 is an enlarged detail.

Excepting for sign elements, a metal housing, generally indicated by numeral 10, encloses the entire structure. Housing 10 comprises top portion 11, bottom portion 12, end plates 13 and 14 at one end and corresponding plates 15 and 16 at the other end. Housing 10, either in part or in whole, may consist of any metal or any rigid-supporting means, either insulating or conducting, upon which an electrically conducting surface is provided. Part 11 of the housing has a generally U-shaped section consisting of top panel 18, sides 19 and 20 and inturned edge portions 21 and 22.

Bottom portion 12 of the housing is also of a

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generally U-shaped cross section having bottom panel 24, sides 25 and 26 and internally off-set edge portions 27 and 28. Offset portions 27 and 28 are connected to their respective sides 25 and 26 by step portions 29 and 30, respectively. Offset portions 27 and 28 terminate in free edges 32 and 33, respectively. Edges 32 and 33 are spaced from inturned lips 21 and 22. The spacing may vary within wide limits and is unimportant for the purposes of this invention. Thus as an example, a spacing of about one-sixteenth inch has been used.

The entire housing is maintained in rigid fixed relation by insulating members 35 and 36, bolted to the end plates with the end plates rigidly secured to the housing proper as by spot welding. Within the housing, there is disposed means for generating high frequency oscillations, at any suitable frequency, preferably between about one megacycle and about three hundred megacycles. Other frequencies, however, may be used. While any oscillator may be used for generating such frequencies, the oscillating system described and claimed in the copending application of Browner, Ser. No. 690,794, filed August 15, 1946, and now abandoned, is particularly effective and is preferred. Cord 37 and plug 38 may be used for supplying energy to high frequency system.

For the purposes of this invention, it is necessary that offset portions 27 and 28 be of ferromagnetic material. Thus, sheet iron is satisfactory. The remainder of electrodes 11 and 12 may either be of sheet iron or may consist of any other electrically conducting material. The electrically conducting material may be in any suitable form, such as a conducting film sprayed or otherwise formed on any suitable rigid backing member of insulating material, such as glass, Bakelite or the like. A simple construction, however, may be provided by forming members 11 and 12 of sheet iron or sheet steel. The dimensions and depth of offset portions 27 and 28 are not important and may vary within wide limits.

Cooperating with the electrodes formed by the housing are one or more sign elements generally indicated by numeral 40. Such sign elements may be formed in any shape and consist of sealed transparent insulating material, such as glass, within which are one or more ionizable gases or vapors. In general, such sealed glass envelopes are similar, except for the lack of electrodes, to conventional neon sign elements and may contain the same gas or mixture of gases or vapors. Thus, as an example, one or more rare gases may be used, depending upon the color

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desired. The size of a sign element is such that it extends across space 41 formed between portion 21 of the electrode and step 29. The sign element is preferably so disposed and so proportioned that portions thereof may overlie parts 19 and 25 of the electrodes without, however, exceeding the limits defined by the outer edges thereof.

In order to maintain a sign element in position, small magnets 42 are cemented or otherwise secured to the exterior of a sign element at an intermediate portion thereof. Such magnets may be formed of any suitable material, such as "Alnico" or the like. Magnets 42 are designed to have any desired dimension along the length of the sign. However, the width of the magnet is so selected as to be less than distance d between step 29 and inturned edge portion 21. The difference between the magnet width and distance d is in the range of critical gap dimensions specified in the first-mentioned Browner application, namely between about one sixty-fourth of an inch and about three-fourths of an inch, with a preferred range of about between about one sixty-fourth of an inch and about three-eighths of an inch. The thickness of a magnet is so chosen as to be substantially equal to the amount of offset represented by step 29.

Offset 27 must have sufficient width for mechanical support of a sign element. Thus, as an example, a width of about five-eighths inch has been used. The width is unimportant otherwise and may have any desired value. Obviously, distance d must be greater than about one sixty-fourth of an inch or whatever active gap is desired for exciting a sign element.

It will be evident that, when a sign element is disposed in position, magnet 42 will fit into recessed region 41 and permit the sign element itself to lie substantially flush against panels 19 and 25 of the housing. In disposing a sign element, it is essential that a magnet fit against offset 27 and not extend across the gap between edge 32 and lip 21. A magnet bearing against ferromagnetic offset 27 will maintain a sign element tightly in position. It is understood that a sign element may have as many magnets as necessary.

Each magnet 42 has sufficient electrical conductivity so that the surface of the magnet adjacent a sign element becomes an electrode surface. Hence, a sign element may be disposed in close proximity to the active electrode surfaces and extend across a suitable gap of critical dimensions and be retained by magnetic means.

It is understood, of course, that the reverse face of the sign formed by portions 20 and 26 is similar to the one described and may have sign elements. If desired, the housing may be so constructed that letters may be disposed against one side only.

In the actual operation of a sign, the gap between the free edges of bottom portion 12 and the lips of upper portion 11 merely function as capacitors. An actual gap of the dimensions falling within the ranges specified above is only formed when a sign element carrying a magnet is disposed in operative relationship to the electrodes. As many sign elements as desired may be disposed in position.

The electrode surfaces may be protected in any suitable fashion against weather by paint, varnish or by any other suitable coating. It is not essential that metallic contact exist between magnets 42 and offsets 27 or 28. Any insulat-

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ing coating between the two merely provides a condenser with offset 27 and magnet 42 as the opposing electrodes.

If large sign elements are to be accommodated, a structure corresponding to Figs. 5 or 8 of the first-mentioned Browner application may be provided having a number of separate parallel offsets. Thus, a large sign element may have magnets at various portions thereof cooperating with various offsets.

I claim:

1. A neon-type sign comprising one electrical conductor having a portion lying in a flat plane, a second electrical conductor having a portion lying in the same flat plane, said two conductors being spaced from each other, said second conductor having a ferromagnetic portion offset from the flat plane and opposed to an edge portion of said first conductor, said conductors being adapted to have high frequency electric currents impressed thereon to provide a difference of potential therebetween, and at least one sign element consisting of a sealed transparent envelope containing an ionizable medium and being free of electrodes, at least one permanent magnet attached to said sign element, said magnet being so proportioned and disposed with respect to said sign element that said sign element may be disposed adjacent the two flat portions of the conductors and extend across the offset with the magnet extending to said offset and cooperating therewith to maintain the sign element in position, said magnet functioning to provide a conductor adjacent the sign element and defining an active gap with one of said other conductors of between about one sixty-fourth of an inch and about three-quarters of an inch.

2. The structure of claim 1 wherein said conductors are formed of sheet iron.

3. The structure according to claim 1 wherein said one conductor has an inturned edge portion opposed to said ferromagnetic offset portion.

4. The structure of claim 1 wherein said active gap between said magnet and first conductor is between about one sixty-fourth of an inch and about three-eighths of an inch.

5. The structure according to claim 1 wherein said one conductor has an inturned edge portion opposed to said ferromagnetic offset portion and wherein the active gap between the magnet and one conductor is between about one sixty-fourth of an inch and about three-eighths of an inch.

6. A neon-type sign comprising a housing having sides in generally parallel planes, the two sides being similar and each side having one electrical conductor having a portion lying in a flat plane, a second electrical conductor having a portion lying in the same flat plane, said two conductors being spaced from each other, said second conductor having a ferromagnetic portion offset from the flat plane and opposed to an edge portion of said first conductor, said conductors being adapted to have high frequency electric currents impressed thereon to provide a difference of potential therebetween, and at least one sign element for each side, said sign element consisting of a sealed transparent envelope containing an ionizable medium and being free of electrodes, at least one permanent magnet carried by said sign element, said magnet being so proportioned and disposed on said sign element that said sign element may be disposed adjacent the two flat portions of the conductors

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and extend across the offset with the magnet extending to said offset and cooperating therewith to maintain the sign element in position, said magnet functioning to provide a conductor adjacent the sign element and defining an active gap with said first conductor of between about one sixty-fourth of an inch and about three-quarters of an inch.

7. The structure according to claim 6 wherein said housing is of sheet iron and wherein said active gap is between about one sixty-fourth of an inch and about three-eighths of an inch.

8. A neon-type sign comprising two generally U-shaped elongated metal members, insulating means for retaining said members in rigid predetermined relation with the free ends of said U's in opposed spaced relation to form a housing with the sides of said U's being aligned and having portions in spaced parallel planes, one of said side portions having an offset extending inwardly of the housing, there being one offset on each side of the housing, said U members being adapted to have high frequency currents impressed thereon to provide a potential difference therebetween, and at least one sign element for each side, said sign element consisting of a sealed transparent envelope free of electrodes and containing an ionizable medium, at least one permanent magnet carried by said sign element, said magnet being so proportioned

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and disposed on said sign element that said sign element may be disposed adjacent the sides of said two U's across the offset with the magnet extending to said offset and cooperating therewith to maintain the sign element in position, said magnet functioning to provide a conductor adjacent the sign element and defining an active gap with a cooperating U side, said gap having a transverse dimension of between about one sixty-fourth of an inch and about three-eighths of an inch.

9. The structure of claim 8 wherein said housing has means within the same for generating high frequency currents to be impressed on said U members.

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