United States Patent

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[54] **LUMINOUS DISPLAY DEVICE**
7 Claims, 3 Drawing Figs.

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[51] **Int. Cl.** **H05b 41/00**
[50] **Field of Search** ..... 240/51.12; 313/1, 109.5, 113, 220; 315/169, 313; 340/324 R, 334, 336, 343, 344

[56] **References Cited**
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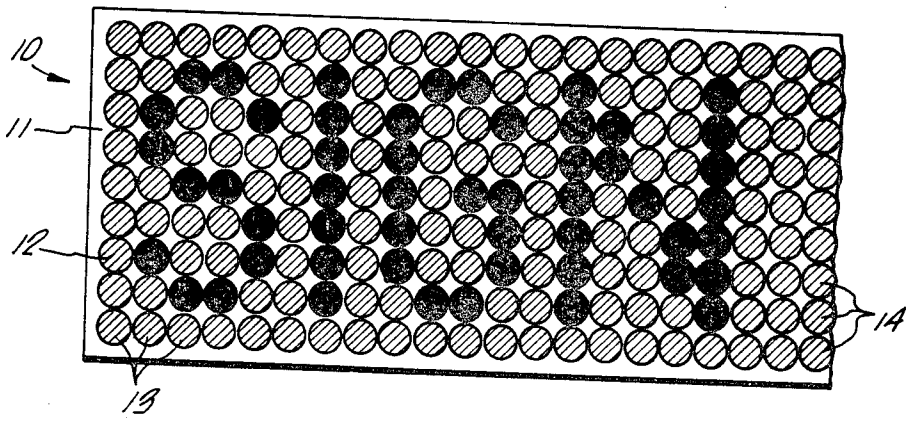
ABSTRACT: A display device adapted to be illuminated is disclosed herein having a reflective back member for carrying a spirally configured tube containing a gas such as Neon. Electrodes communicate the gas tube with a suitable power source for ignition purposes so that the ignited gas will produce a luminous glow. The devices are arranged in rows and columns and electrically couple together so as to selectively ignite a selected plurality of devices whereby a meaningful pattern is displayed, such as a letter or number, for example.



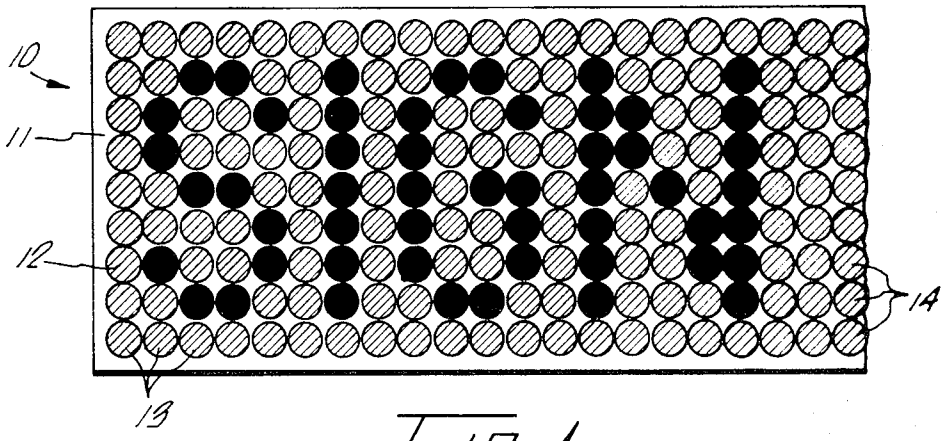


FIG. 1

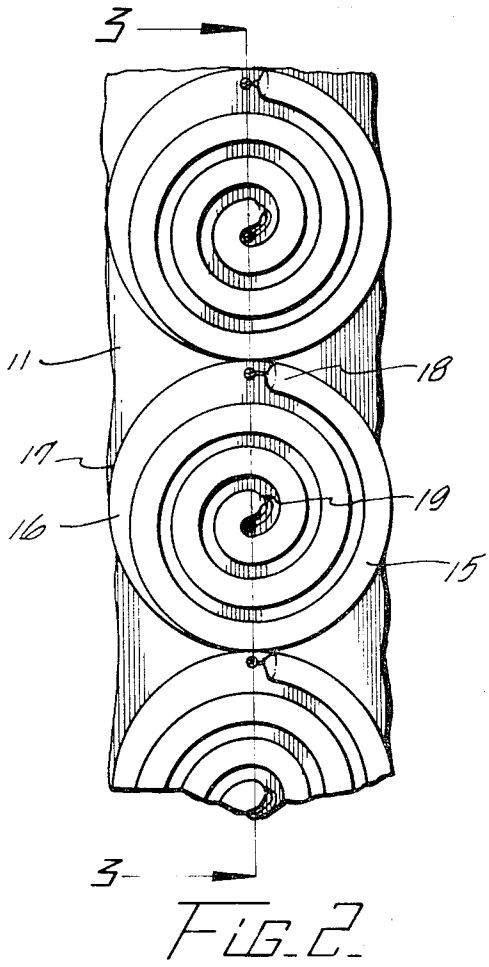


FIG. 2

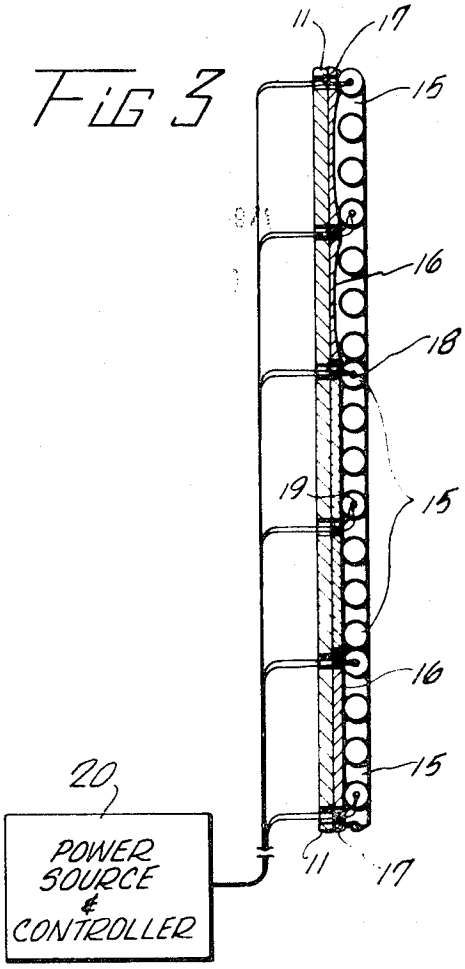


FIG 3

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LUMINOUS DISPLAY DEVICE

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to light reflecting display devices, signs, signals and the like. The invention is included in the class of inventions commonly referred to as visual display devices and, more particularly, to a novel display device having unusual and distinctive aesthetic characteristics as well as being especially noticeable so as to attract the visual attention of an observer.

2. Description of the Prior Art

In the display industry, it has been a longstanding problem to devise an appealing visual device, such as a sign or display board, that is not only distinctive from an aesthetic point of view but which is capable of attracting or diverting the visual attention of observers and persons passing the display device for a variety of reasons and purposes. Such a display device or sign may be employed for advertising purposes or identifying a business establishment, such as a restaurant or office building, for example. Although some conventional static display devices have been used for these purposes, certain problems and difficulties have been encountered which are due primarily to the fact that expensive lens systems are often employed to obtain startling optical effects and sometimes, such systems are employed in conjunction with elaborate lighting means to increase the visual appeal of the conventional display device. Obviously, such optical and lighting systems, whether used individually or in combination, are relatively costly to fabricate, install and maintain.

Furthermore, in some instances, it is highly desirable to enhance the overall effect of the display device by creating the illusion of movement by employing a variety of colors, not only in identifiable solid portions of the color spectrum but deriving an appealing fuse of colors as well. Conventional display apparatus offering such color effects are derived by using a rotatable disc or wheel having a plurality of multicolored segments thereon which are sequentially driven past the light source. In other instances, the effect of the movement is achieved by utilizing a variety of masks or interfering discs or plates which, when moved relative to each other, cause the displacement or alteration of transmitted light so that an optical illusion portraying movement is achieved. Conventional display apparatus, as briefly noted above, generally requires a high level of standby power, driving mechanisms and precise layout of the optical system during fabrication.

Still another of the conventional attention-attracting means is the moving message sign which incorporates a plurality of incandescent bulbs. Obviously, the cost of replacing these bulbs on a large sign is considerable and, as an ancillary problem, the expense for power is enormous. Moving message signs have also attempted to use neon tube segments to create the letters and numbers. However, the neon configuration is poor because it is very thin and the readability is impaired by the "jumpiness" when moving from one letter to the next. By employing a single neon tube segment for a character, the overall configuration is very limited since each character must be specially built or configured for its specific need and presentation.

SUMMARY OF THE INVENTION

The problems and difficulties encountered by conventional display apparatus and moving sign devices are obviated by the device of the present invention which provides, in one embodiment thereof, a gas-filled tube configured in a spiral shape which is carried on the front face of a reflective backing member. The ends of the tube are provided with suitable electrodes so that the gas contained or enclosed by the tube may be communicated with an exterior power source remotely located from the sign. The spirally configured gas-filled tube presents a relatively tight coil and has a diameter substantially equal to the diameter of the reflective backing member. A plurality of the devices are mounted on a back plate so as to present a plurality of rows and columns of the devices. By selectively igniting a plurality of the devices, individual characters, such as numbers or letters, may be illuminated so as to stand out from the background.

By such a construction, a static display device is formed whereby light supplied by gaseous illumination is reflected by the reflective surface of the backing member so as to diffuse and redirect the light in such a fashion that the light is reflected in a distinctive and appealing manner. Particularly, the light reflected and dispersed by the reflective surface of the backing means is greatly altered and diffused. A moving message is readily accommodated by the apparatus when connecting each of the devices to a controlled panel or controller whereby selected ones of the devices may be illuminated according to a program. When this is achieved, there is a decided lack of jumpiness as is normally noticed when employing conventional neon tube signs as noted above.

Therefore, it is among the primary objects of the present invention to provide a display device or sign including in its display area letters or characters which possess a high degree of visibility whether viewed in daylight or illuminated by the various artificial lighting means heretofore employed or proposed for illuminating signs.

It is another object of the present invention to provide a sign letter or character apparatus that possesses to an extraordinary degree, the ability to reflect as diffused light rays, the light that impinges upon it from a spirally configured neon tube light source and is further so constructed that such reflected light serves to make the letter or character visible when viewed by an observer from a wide angle with respect to the front of the sign.

It is still another object of the present invention to provide in a luminous sign an illuminating means of the gas-filled or so-called "neon tube" type in association with a novel form of light reflecting surface which is adapted, when the sign is being illuminated at night by means of the light emitted from the neon tube, to collect and reflect in a diffused form, a relatively large portion of the light rays emitted from such tube, and is further adapted, when exposed under daylight conditions when the neon tube is unlighted, to collect and reflect the light rays of direct or indirect sunlight in diffused form in such a way and to such a degree as to render unnoticeable or at least to minimize, the undesired effects of the outline of the neon tube above the sign letters or characters.

It is further object of the present invention to produce a luminous sign wherein illuminating means, substantially in view of the observer, are so associated with a novel reflecting surface as to illuminate the same and create a particularly pleasing diffused lighting effect upon the reflecting surface while leaving the face of the sign area fully exposed for illumination by sunlight in the daytime.

BRIEF DESCRIPTION OF THE DRAWINGS

The features of the present invention which are believed to be novel are set forth with particularity in the appended claims. The present invention both as to its organization and manner of operation, together with further objects and advantages thereof, may best be understood by reference to the following description, taken in connection with the accompanying drawings, in which:

FIG. 1 is a front elevational view incorporating the luminous display device of the present invention including a plurality of individual luminous display devices;

FIG. 2 is an enlarged front elevational view of the display device as used in the arrangement of rows and columns shown in FIG. 1; and

FIG. 3 is a longitudinal cross-sectional view of the individual display devices shown in FIG. 2 as taken in the direction of arrows 3—3 thereof.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to FIG. 1 of the drawings, a sign apparatus is illustrated in the direction of arrow 10 which includes a backboard 11 for mounting a plurality of individual display devices 12 in an arrangement of parallel rows 13 and parallel columns 14 extending across the exposed surface of the baseplate 11. In addition to the rows 13, a plurality of columns as indicated in the plane of numeral 14, are arranged in parallel columns extending from the bottom of the sign to the top of the sign. As indicated by crosshatching, the majority of the individual display devices 12 are not illuminated; however, as indicated by a lack of the crosshatching, other selected display devices are illuminated so as to define meaningful letters and characters. In the present instance, the word "SIGN" is portrayed by illuminated devices. By properly programming the plurality of individual display devices, the selected ones of the devices intended to portray a message may be repeatedly turned ON and OFF so as to attract the attention of the casual observer. In other instances, a controller or programmer may be coupled to the plurality of individual display devices so as to automatically control the illumination or lack thereof of selected ones of the display devices whereby a moving message may be created travelling across the face of the apparatus 10.

Referring now to FIG. 2, it can be seen that the apparatus includes a plurality of individual display devices 12 which take the form of a spirally configured gas-filled tube 15 which is mounted on a reflecting surface 16 of a backing member 17. The backing member may be readily bonded or secured to the exposed surface of the backboard 11 by any suitable means. However, it is to be noted that the backing members 17 touch one another for a given row and column so that the adjacent spiral tubes are intentionally located close together. Also, the diameter of each of the respective backing plates or members 17 are substantially equal to the diameter of the spiral tube 15. The spiral tube 15 is formed so that the coils are relatively close together and the overall coil tube is flat on its opposite sides. Although the tube is round, by flat, it is meant that the coil will lie against the backing surface 16 so that all coils of the spiral will touch. The coils of the spiral tube may be fixedly carried on the reflecting surface 16 of the backing member 17 by any suitable means, such as adhesive, bonding agent or other securement means. Also, if desired, the reflective surface 16 may be somewhat contoured as in a concave as shown by the two uppermost reflective surfaces in FIG. 3 manner so that the coiled tube 15 sets within the outline of the concave or depressed surface. When in this configuration, the reflective surface and backing member is substantially cuplike in cross section so as to diffuse light rays impinging thereagainst.

The opposite end of the coil as indicated by numerals 18 and 19 are suitably provided with sealed electrodes that pass through respective holes in the back member 17 and backplate 11 where communication is made with a suitable power source and controller 20 as shown in FIG. 3. Also, in FIG. 3, it can be seen that the coiled gas-filled tube 15 is carried in a secured fashion on the reflecting surface 16 of the backing member 17 which, in turn, is fixedly secured to the exposed face of the backing plate 11. The plurality of electrodes pass through the respective aligned apertures in the backing plate and the backing members so that proper wires and cabling may be connected from the electrodes to the power source and controller 120. The power source and controller 20 may be remotely located from the sign and may be suitably operated by pushbuttons, switches, relays or other automatic sequencing equipment for effecting a moving message or flashing message as previously discussed.

While particular embodiments of the present invention have been shown and described, it will be obvious to those skilled in the art that changes and modifications may be made without departing from this invention in its broader aspects, and, therefore, the aim in the appended claims is to cover all such changes and modifications as fall within the true spirit and scope of this invention.

What is claimed is:

1. A luminous display device comprising:
a length of gas-filled tube formed in a spiral configuration so that one end terminates at the center and the other end terminates at the outer convolution;
a backing member having a reflecting surface fixedly supporting said spiral configurated tube thereon;
said spiral tube having a diameter substantially equal to the diameter of said backing member;
a baseboard fixedly mounting said backing member thereon;
said backing member and said baseboard being formed with aligned holes;
an electrode carried on each end of said tube projecting through said aligned holes; and
a plurality of said spiral tube mounted backing members fixedly mounted on the same side surface of said baseboard and arranged in parallel rows and parallel columns.

2. The invention as defined in claim 1 including
a power source and controller means operable coupled to each of said electrodes for remotely energizing said gas-filled tubes in accordance with a predetermined program.

3. The invention as defined in claim 1 wherein
said spiral configured tube includes a plurality of closely spaced-apart coils progressively increasing in diameter.

4. The invention as defined in claim 3 wherein
the opposite sides of said spirally configured tube are substantially flat and parallel.

5. The invention as defined in claim 1 wherein
said reflective surface is slightly concave so as to diffuse light rays impinging thereagainst as emanating from said gas-filled tube.

6. The invention as defined in claim 1 including
means operably connected to said gas-filled tube for selectively energizing the gas therein so as to initiate and sustain illumination therefrom.

7. The invention as defined in claim 1 including
a plurality of said tubes mounted on a plurality of reflective surfaces in close proximity so as to provide a mosaic pattern.

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