July 28, 1931. F. HOTCHNER 1,816,220

CHANGEABLE LUMINOUS DISPLAY

Filed April 6, 1931 2 Sheets-Sheet 1

Fig. 1

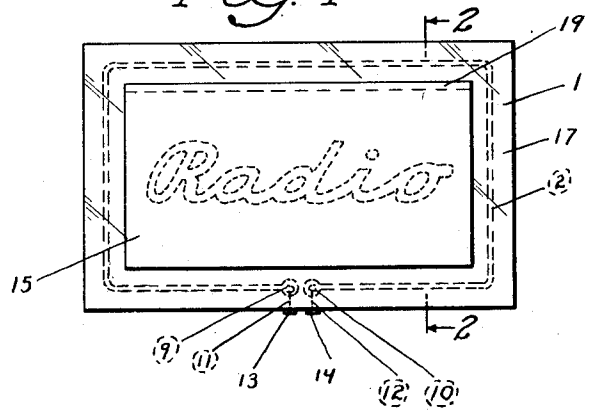
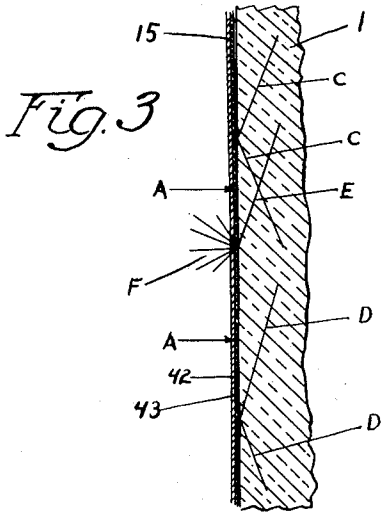


Fig. 2

Fig. 3



Inventor

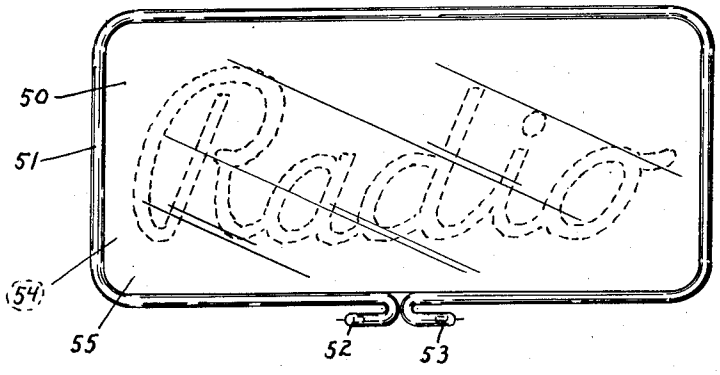
Fred Hotchner

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CHANGEABLE LUMINOUS DISPLAY

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Fig. 4



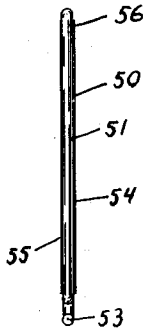


Fig. 5

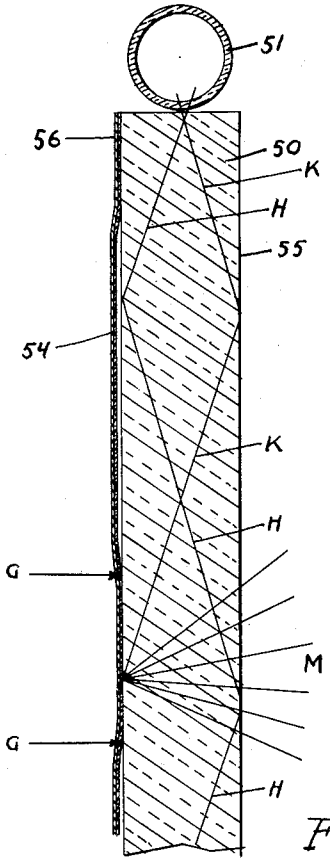


Fig. 6

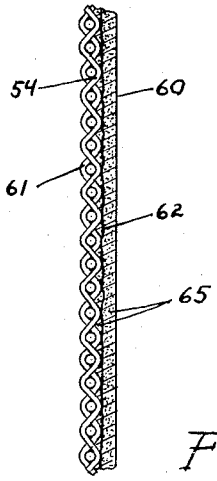


Fig. 7

Inventor

Fred Hotchner

Patented July 28, 1931 1,816,220

UNITED STATES PATENT OFFICE

FRED HOTCHNER, OF LOS ANGELES, CALIFORNIA

CHANGEABLE LUMINOUS DISPLAY

Application filed April 6, 1931. Serial No. 528,032.

This invention relates to a changeable luminous display and the object thereof is to provide an illuminated display having means to write at will upon a display surface thereof any desired copy and eradicate the same without using any paints, pigments, writing material, mechanical contrivances or special tools.

I have discovered that if light is passed thru a body of glass or any other suitable light transmitting material at such an angle that a material portion thereof is reflected back into the body of glass at a surface thereof, an illuminated display may be produced by positioning close to that surface a sheet of translucent material having a surface adhesive to the surface of the glass. Thus upon pressing down any portion of the sheet until an intimate contact is made with the glass, light will escape from the glass at such portions thus rendering such portions luminous to the eye.

The most suitable way of introducing the light into the body is thru an edge thereof. In a previously filed co-pending application of mine No. 384,172, dated August 7, 1929 I have disclosed a manner of producing a body of light transmitting material with a discharge passageway formed thru the same in which an ionization conductor is placed and illuminated by the passage of current. Such a device is very suitable for the main element in this invention. However the invention may be practiced in numerous other manners, such for instance as by utilizing a sheet of glass with a luminous tube positioned around the edge thereof so that a material portion of the radiation therefrom enters the glass at such an angle as to be reflected from the surface to be used for changeable display purposes.

Among the objects of the invention is the production of a changeable sign of the general type described in which no writing material need be used; the production of a changeable sign in which the copy may be instantly changed by the simple operation of stripping up the display sheet; the production of a sign of the general type described which may be made either as a single or a double faced sign; and the production of a sign of the general type described in which the source of illumination is utilized as part of the visible display.

It is a further object of the invention to produce a sign of the general type described in which a very high degree of the total radiation from the illuminating tube is effectively directed into the changeable display section.

It is a further object of one form of the invention to direct the dispersed light at the characters substantially entirely to one side of the plane of contact with the glass in order to double the intensity of the sign.

Further objects will be apparent from the accompanying drawings and the description below, it being understood that the invention is not limited to the particular embodiments shown but may be variously embodied within the purview of the claims which are to be limited only by the prior art and the specific limitations embodied therein.

An embodiment of the invention is shown in the accompanying drawings in which Figure 1 is a front view of a sign made according to this invention and Figure 2 is a cross section of the same taken on the line 2—2. Figure 3 is an enlarged cross section of a portion of the glass body and the display sheet to illustrate the relative proportion of the elements of the changeable portion more accurately than is shown in Figure 2 in which the degree of depression of the copy portions of the display sheet is exaggerated for the purposes of illustration.

Figure 4 is a front view of a modified form of the invention.

Figure 5 is a side view of the same.

Figure 6 is an enlarged section of a portion of the same.

Figure 7 is a greatly enlarged section of the display sheet used in the sign shown in Figure 4.

Numeral 1 indicates a body of glass having formed therethru a discharge passage indicated by 2. Any suitable method of fabrication may be used to form this device. The particular illustrated device may be made according to the disclosure of my application

No. 384,172 according to which the body 1 is formed of two sheets of glass 3 and 4 having grooves 5 and 6 which upon being juxtaposed form the passage 2. Electrode terminals 9 and 10 are provided at the ends of the passage and lead in conductors 11 and 12 connect the same to the terminal contacts 13 and 14.

The display sheets 15 and 16 are positioned on the surfaces 17 and 18 of the glass body and are preferably permanently secured thereto along the edges 19 and 20. The lower edges 21 and 22 are loose and the sheets may be raised and peeled away from the surfaces as shown by the dotted lines in Figure 2.

The inside surfaces of the display sheets indicated by 23 and 24 are so treated that upon being pressed down onto the glass an intimate contact is formed therewith thru which light may escape from the body of glass and render the display sheet luminous to the eye at such places. I have found that a soft rubber coating on the display sheet serves this purpose admirably and also serves to retain the depressed portions of the display sheet in contact with the glass. It is desirable that the light be diffused or dispersed at the depressed places. This may be done by providing a translucent display sheet or the property of scattering the light may be provided by the coating material.

In Figure 2 a finger is shown in dotted lines illustrating a manner in which copy may be written on the device. Thus at the place indicated by 25 copy is being formed. At the places indicated by 26 on the same side and by 27 and 28 on the reverse side copy has already been formed and the display sheet is in contact with the glass. The portions indicated by 29, 30, 31, 32, 33 and 34 are out of contact with the glass and hence to the eye these portions are relatively dark as the radiation incident upon the glass surface adjacent thereto is returned into the glass body by total reflection. I have shown spaces indicated by 35, 36, 37, 38, 39 and 40 at these places, but it is to be understood that the spaces shown are exaggerated as is also the degree of depression of the copy areas of the display sheet. Actually the two may be in contact at these places but as long as the contact is not sufficiently intimate to provide a substantial continuity of matter permeable to light the effect is the same as tho they were separated a material distance. To eradicate the copy the lower edges of the sheets are lifted and stripped off the glass as shown by the dotted lines in Figure 2.

In Figure 3 I have shown on an enlarged scale a section of the glass and the display sheet to more correctly illustrate the condition of the two. The sheet indicated by 15 consists of the flexible body 42 which may be of such material as parchment, and the layer of adhesive material 43 which may be soft rubber. The portion between the arrows A—A is in contact with the glass sufficiently intimate to render it luminous.

The path of a ray of light indicated by C—C is shown reflected back from a portion of the surface of the glass at which the rubber is in indifferent contact or slightly separated therefrom. This is also shown for another ray by D—D. However a ray indicated by E falls upon a portion of the surface at which intimate contact has been made and is dispersed, a material portion of the light being scattered out into the air as shown by F and constituting that portion of the light which serves to render the copy luminous. It is to be understood however that the dispersed light is scattered in all directions from each point of dispersion and hence some of the light at the illuminated copy is returned into the body of glass.

In Figures 4, 5, 6 and 7 I show how a single faced sign of very high efficiency may be made according to this invention.

The main element in this case may be made as before with the discharge passage formed within the glass body. However I have shown an alternative construction. Numeral 50 indicates a sheet of glass having a luminous tube 51 around the edge thereof serving as a border and the source of radiation for the changeable copy. Any suitable mounting may be used to support the same in a finished sign and provide the electric connections to the electrode terminals 52 and 53. The display sheet 54 in this case is on the reverse side from that exposed directly to view and indicated by 55 and the dispersed radiation reaches the eye after passing across the glass body.

The display sheet is preferably secured at one edge to the glass sheet as shown at 56 and the lower edge left so that it can be lifted and stripped off to eradicate the copy. In Figure 6 the portion indicated by the arrows G—G is in contact with the glass sufficiently intimate to become luminous. The path of a ray which falls upon a surface unaffected by the display sheet is shown by H—H. The path of a ray which falls on copy space is shown by K—K. The ray in this case is dispersed and directed entirely in one direction from the display sheet.

This is indicated at M. It will be noted that the light which delineates the copy to the eye passes thru the body of glass to the observer. Thus twice the effective illumination is directed to view. It will also be readily seen that there is a certain percentage of these redirected rays which leave the point of dispersion at an angle so sharp that they are again reflected into the body of the glass at the exposed surface of the glass. However such rays are those whose angle is beyond the useful range for display purposes and hence there is a certain measure of efficiency thus

gained as they are reflected within the glass and to a measure heighten the brilliance of the copy.

Numeral 54 in Figure 7 indicates the display sheet which has a surface 60 which is adhesive to glass. The sheet has the property of reflecting most of the light falling upon it. It is also preferred that it disperse or diffuse the light altho this is not essential in all cases. The main member of the sheet consists of a flexible body indicated by 61 which may be made of fabric as indicated in the view. Any other suitable material, however, may be used such as metallic foil or parchment. The adhesive surface is preferably formed by a layer of soft rubber indicated by 65. Unvulcanized rubber serves well for this purpose as it adheres firmly to glass yet may be peeled off without leaving any smudge or detached particles. If the layer of adhesive is opaque then it should be of a light color so that reflection takes place at the surface of contact. If it is transparent then a layer of metallic foil as indicated by 62 is sealed in the body preferably in contact with the fabric and serves as the reflector. Another suitable method is to make the fabric itself of bright metallic wires so that the light is dispersed from the surface of the wire.

The term "copy" as used herein is to be understood as referring to any written message.

In a generic sense the term "display pattern" as used herein includes any pattern of inscriptions, characters, figures, numerals, symbols, ornaments, designs, borders or signs, whether including but one of any such devices, or a number of any of such devices or any combination of such devices when used as an intended visible portion of the display according to the invention.

The term "translucent" is used herein in its broadest sense as describing any body thru which radiation may pass in such quantities as to render the same luminous to the eye from any normal angle of view.

In my prior application Serial No. 526,344, certain features disclosed herein are claimed, and it is to be understood that the features claimed herein are improvements over said prior application.

Having thus described my invention, what I claim is:

1. In a changeable display sign, a body of light transmitting material, means to pass radiation therethru at an angle such that a material percentage thereof is reflected back into said body from a surface and a sheet of translucent material having a surface thereof adhesive to said surface of said body positioned close to said surface of said body and so disposed that upon pressing portions of said sheet down onto said surface of said body a portion of the radiation incident upon said surface is dispersed and caused to leave said body thru said portions thus rendering the same luminous to the eye.

2. In a changeable display sign, a body of light transmitting material, means to pass radiation therethru at an angle such that a material percentage thereof is reflected back into said body from a surface thereof and a sheet of translucent material having a surface thereof adhesive to said surface of said body so that upon being pressed together an intimate contact is formed and radiation from within said body is caused to leave the same thru the contact regions.

3. In a changeable display sign, a body of light transmitting material, means to pass radiation therethru at an angle such that a material percentage thereof is reflected back into said body from a surface thereof, and a sheet of translucent material secured at one edge to said surface and disposed so that it may be pressed closely to said surface of said body to provide a region of contact thru which radiation from within said body may escape from the same.

4. In a changeable display sign, a body of light transmitting material, means to pass radiation therethru at an angle such that a material percentage thereof is reflected back into said body from a surface thereof, and a sheet of flexible material having a surface finished so that upon being pressed down into intimate contact with a surface of said body a portion of the radiation incident upon said surface of said body is dispersed and caused to leave said body thereby rendering the regions of contact luminous to the eye.

5. In a double faced changeable sign, a sheet of light transmitting material, means to pass radiation therethru at angles such as to be reflected between the opposite surfaces thereof, and sheets of flexible translucent material positioned on opposite surfaces thereof, the surfaces of said sheets of flexible material closest to the surfaces of said body being so finished that upon being pressed down onto said body they make intimate contact thereat and provide an exit for a portion of the radiation incident upon said contact surfaces.

6. In a double faced changeable sign, a sheet of light transmitting material, means to pass radiation therethru at angles such as to be reflected between the opposite surfaces thereof, and sheets of flexible translucent material positioned on opposite sides thereof, the surfaces of said sheets of flexible material closest to the surfaces of said body being adhesive to said body when pressed thereupon.

7. A sheet of light transmitting material, means to radiate rays of light edgewise thru said sheet so that they are reflected back into said sheet from the surfaces thereof, and a flexible sheet of material permeable to rays of light having a surface adhesive thereto disposed near to a surface of said sheet of

light transmitting material so that upon pressing portions of said flexible sheet thereupon a path is provided for the escape of rays of light therefrom thus rendering such portions luminous.

8. A sheet of light transmitting material, means to radiate rays of light edgewise thru said sheet so that they are reflected back into said body from a surface thereof, and a flexible sheet of material permeable to rays of light fastened at an edge thereof to said sheet of light transmitting material and having a surface adhesive to said light transmitting material so that upon being pressed thereupon the two unite to form a surface of contact thru which rays of light escape from the first said sheet thus rendering the areas of contact luminous to the eye.

9. The method of writing luminous copy on a display sign including a body of light transmitting material having radiation transmitted therethru and reflected back into the same from a surface thereof, which consists in positioning a sheet of light transmitting material having a surface capable of making intimate contact with said surface of said body adjacent said surface of said body and pressing together portions of the surfaces thereof thereby causing radiation to escape from said body thru said sheet.

10. The method of eradicating luminous copy in a sign on which copy has been written according to claim 9 which consists in peeling said sheet off of the said surface of the said body.

11. The method of writing copy on a display sign including a body of light transmitting material having radiation transmitted therethru and reflected back into said body from a surface thereof which consists in positioning a sheet of light reflecting material having a surface capable of making intimate contact with said surface of said body adjacent said surface of said body and pressing together portions of the surfaces thereof thereby dispersing the radiation incident upon the said portions and causing radiation to escape from said body.

12. The method of eradicating luminous copy in a sign on which copy have been written according to claim 11 which consists in peeling said sheet off of the said surface of the said body.

13. In a changeable display sign, a sheet of light transmitting material, means to pass radiation therethru in such manner as to be reflected between opposite surfaces thereof, a flexible sheet of material positioned adjacent one of the surfaces thereof and visible as a display surface thru said sheet of light transmitting material, said flexible sheet having a surface adhesive to said light transmitting material whereby upon pressing portions of the two together the radiation incident upon those portions from within said sheet of light transmitting material is altered in its reflection as compared with the reflection from other portions of the surface of said light transmitting material thus delineating to the eye a display pattern.

14. In a changeable display sign, a sheet of light transmitting material, means to pass radiation therethru in such manner as to be reflected between opposite surfaces thereof, a flexible sheet of material positioned adjacent one of the surfaces thereof and visible as a display surface thru said sheet of light transmitting material, said flexible sheet having a surface adhesive to said light transmitting material and having light reflecting qualities differing from the light reflecting quality of the surface of said light transmitting material whereby upon pressing portions of the two together the radiation incident upon such portions is caused to change its angle of reflection thereby passing thru said sheet of light transmitting material at an angle at which it escapes therefrom and becomes visible to the eye.

15. In a changeable display sign, a sheet of light transmitting material, means to pass radiation therethru in such manner as to be reflected between opposite surfaces thereof, a flexible sheet of material positioned adjacent one of the surfaces thereof, said flexible sheet having its near surface so finished as to make intimate contact with the surface of said light transmitting material when portions of the two are pressed together and to disperse the radiation incident upon the surface of contact so established whereby portions of such radiation are caused to leave the sheet of light transmitting material and delineate a display pattern to the eye.

Signed at Chicago, Ill., this 3rd day of April, 1931.

FRED HOTCHNER.