Sept. 25, 1962 W. APATOFF ETAL 3,056,019

DISPLAY DEVICE

Filed Nov. 25, 1957

2 Sheets-Sheet 1

FIG. 1

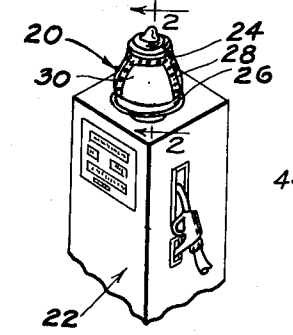


FIG. 2

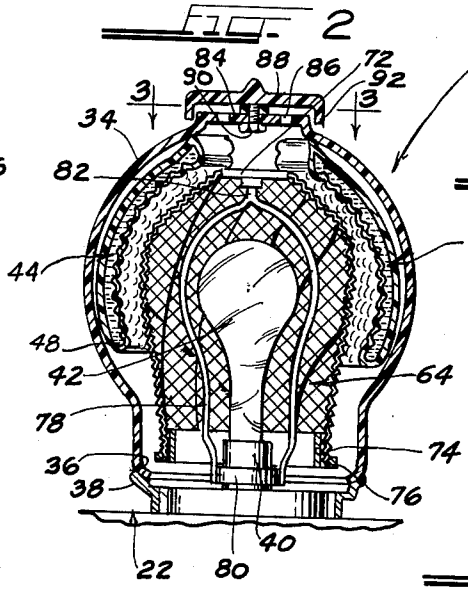


FIG. 3

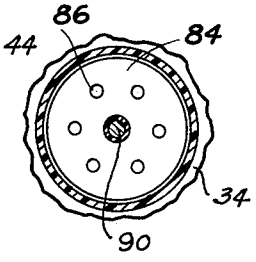


FIG. 4

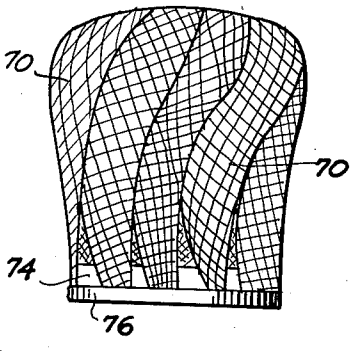


FIG. 5

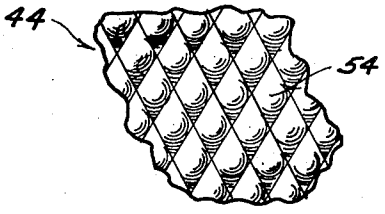


FIG. 6

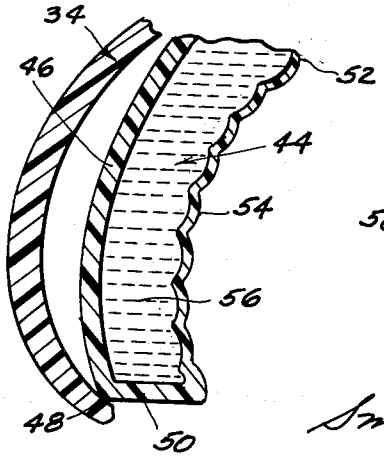


FIG. 7

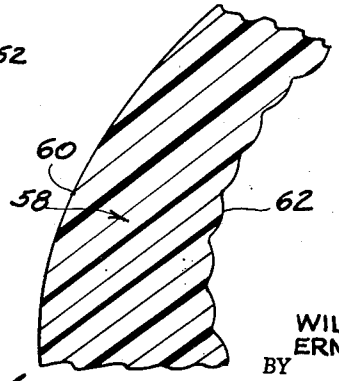
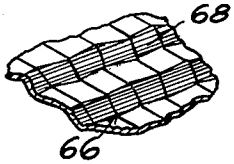


FIG. 8



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2 Sheets-Sheet 2

FIG. 9

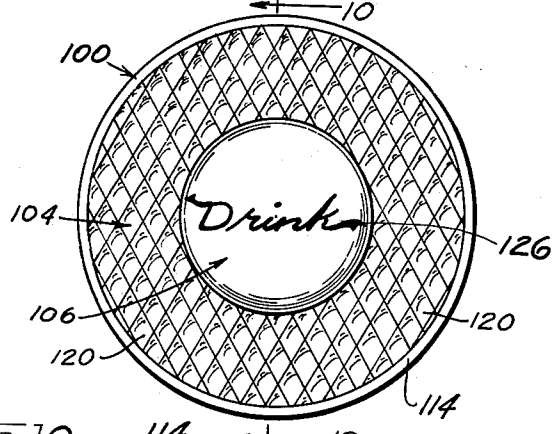


FIG. 10

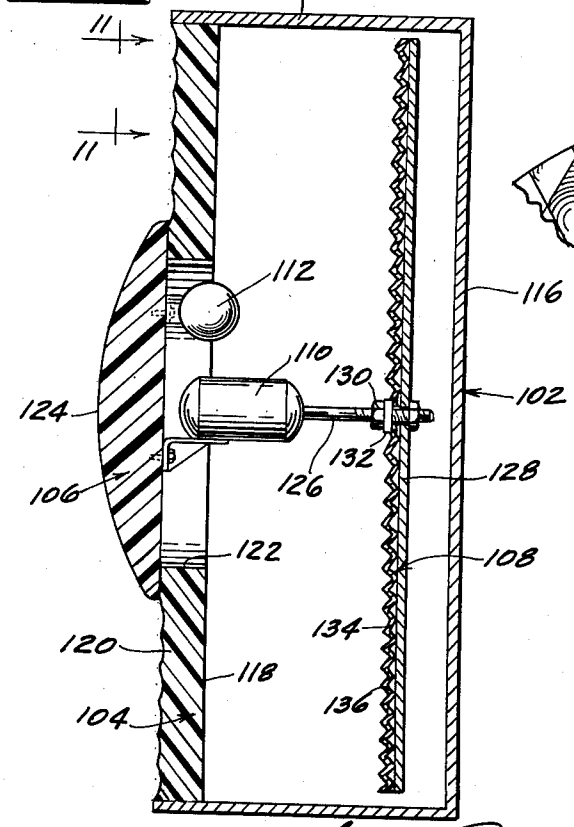
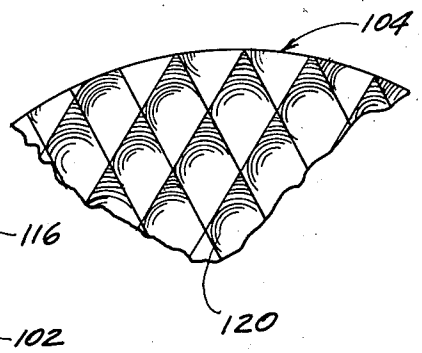


FIG. 11



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3,056,019

DISPLAY DEVICE

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Filed Nov. 25, 1957, Ser. No. 698,647
7 Claims. (Cl. 240—10.1)

This invention relates to animated displays and more particularly to illuminated and animated display devices.

The sale of many items of commerce can be increased and enhanced if the attention of a prospective purchaser of the goods can be attracted and held. To this end merchandisers utilize displays at or adjacent to the point of sale in an effort to attract customers and consummate sales. The effectiveness of such displays is enhanced if the display is animated, i.e., if the display has moving parts or at least establishes the illusion of motion. Effective lighting can also increase the value of the display and further value is obtained in certain instances if the lighting or the displays are colored. Rapidly changing lighting effects also enhance the attractiveness of the display.

Accordingly, it is an important object of the invention to provide an improved animated and illuminated display of the type set forth.

Another object of the invention is to provide an improved display of the type set forth in which the illusion of movement is created therein without employing exterior moving parts which might be handled and damaged by salesmen or customers.

In connection with the foregoing object, it is still another object of the invention to provide a display in which the animation is obtained by moving portions of the display by means of a heat motor driven by the heat from the light for the display.

Yet another object of the invention is to provide an improved illuminated display in which the lighting effects appear to be moving continuously and dramatically; whereby more effectively to attract the attention of potential purchasers.

Still another object of the invention is to provide a display wherein the illusion of rising bubbles can be obtained whereby to provide a pleasing and eye-catching display.

Yet another object of the invention is to provide in a display of the type set forth an improved lens which together with a suitable light source gives the illusion of rapidly and dramatically changing the light presentation whereby to give added attraction to the display.

In connection with the foregoing object it is another object of the invention to provide a lens system in cooperation with a light reflecting and refracting system whereby external lighting enhances the animated character of the display and in no wise detracts therefrom as has been the case in certain prior displays.

A further object of the invention is to provide a faceted lens which presents an attractive and pleasing appearance in combination with a moving light reflecting surface both when the light source is between the lens and the light reflecting surface and when the light source is disposed in a position to shine through the lens and onto the light reflecting surface.

In connection with the foregoing object, it is a still further object of the invention to provide an improved lens of the type set forth wherein a unique and interesting interplay is obtained when light sources are positioned both such as to shine through the lens onto the cooperating reflecting surface and to shine from a position intermediate the lens and the reflecting surface.

These and other objects and advantages of the invention will be better understood from the following description when taken in conjunction with the accompanying drawings. In the drawings wherein like reference numerals have been utilized to designate like parts throughout:

FIGURE 1 is a fragmentary view in perspective of the top of a gasoline dispensing pump showing one form of an animated and illuminated display mounted thereon and made in accordance with and embodying the principles of the present invention;

FIGURE 2 is an enlarged view in vertical section through the display of FIGURE 1 substantially as seen in the direction of the arrows along the line 2—2 thereof;

FIGURE 3 is a view in horizontal section on an enlarged scale through the top of the display device of FIGURE 2 substantially as seen in the direction of the arrows along the line 3—3 therein;

FIGURE 4 is a side elevational view of the rotor of the heat motor with the light reflecting surface thereon and forming a part of the display device;

FIGURE 5 is an enlarged fragmentary view illustrating the form of the facets of the lens forming a part of the display of FIGURES 1 and 2;

FIGURE 6 is a view on a further enlarged scale illustrating the construction of the lens and illustrating more specifically a vertical section thereof;

FIGURE 7 is a view similar to FIGURE 6 showing another preferred form of the lens;

FIGURE 8 is a view on an enlarged scale illustrating the light reflecting surface incorporated in the rotor of FIGURE 4;

FIGURE 9 is a plan view of a second preferred form of the invention;

FIGURE 10 is an enlarged view in vertical section through the display of FIGURE 9 substantially as seen in the direction of the arrows along the line 10—10 thereof; and

FIGURE 11 is an enlarged view of a portion of the lens face substantially as seen in the direction of the arrows along the line 11—11 of FIGURE 10.

Referring first to FIGURES 1 through 8 of the drawings there is shown one preferred form of the invention embodied in a display device generally designated by the numeral 20, the display device 20 being mounted on the top of a gasoline dispensing pump 22. The purpose of the display 20 is to advertise and attract purchasers to buy the gasoline dispensed through the pump 22. It will be seen that the display 20 has been illustrated as being substantially globe shaped and provided with horizontally extending bands 24 and 26 interconnected by vertically extending bands 28. The intersection of the various bands 24, 26 and 28 provide four surfaces 30.

Referring more specifically to FIGURE 2 of the drawings, it will be seen that the display 20 includes an outer housing 34 formed of plastic which is shaped exteriorly to simulate the globe seen in FIGURE 1 as has been described above and including thereon the various decorations 24, 26 and 28. The lower end of the housing 34 is provided with an inwardly directed flange 36 which is

adapted to rest upon and be supported by an outwardly and upwardly extending flange 38 which is mounted on the top of the gasoline pump 22. Also mounted on the top of the gasoline pump 22 is a suitable electrical socket 40 which receives therein a light bulb, for example, a 200 watt light bulb to provide light and heat to illuminate and power the display 20.

Each of the four surfaces 30 is provided on the inner surface thereof with a curved lens generally designated by the numeral 44, the construction of the lens 44 being shown more clearly in FIGURES 5 and 6 of the drawings. Each lens 44 includes a curved outer wall 46 which is disposed toward the inner surface of the housing 34 and is suitably attached thereto as at points 48. The periphery of the wall 46 has walls 50 formed thereon and extending inwardly toward the center of the housing 34. The inwardly directed edges of the walls 50 are joined by a wall 52 which serves to close the lens 44 to provide a hollow space therein. Preferably all of the walls of the lens 44 are formed of a suitable transparent plastic material, a preferred form of plastic material being the acrylic plastics. Any suitable thickness of the plastic material may be utilized as for example 30 gauge.

Formed in the surface of the wall 52 is a plurality of individual lens facets 54. The lens facets 54 have been illustrated in FIGURE 5 as being diamond-shaped and are formed convexly and extend toward the center of the housing 34. Preferably the lens facets 54 are formed as portions of a sphere and have a curvature such that they have a focal length equal to the distance to the light reflecting surface which will be described more fully hereinafter.

The volume bounded by the walls 44, 50 and 52 is filled with a suitable light transmitting fluid 56. In general any light transmitting fluid may be utilized. For example the fluid 56 may be distilled water, a mixture of water and alcohol, a mixture of water and glycerol, mineral oil, or the like.

There is shown in FIGURE 7 of the drawings a second form of the housing 34 in which the housing wall and the lens facets are all formed from a single piece of plastic 58 which is solid from the decorated surface 60 to the lens facets 62 thereof. The lens facets 62 are preferably formed substantially like the lens facets 54. It has been found that the construction of FIGURE 7 provides a good animated display.

Disposed within the housing 34 and substantially concentrically with the lens 44 is a light reflecting member generally designated by the numeral 64. Preferably the surface of the light reflecting member 64 is formed of some good light reflecting material such as aluminum. Furthermore, preferably the light reflecting surface is formed of a plurality of discrete light reflecting facets, each of the facets being disposed in a different plane than the immediately adjacent facets. An example of such a material is shown in FIGURE 8 and is generally designated by the numeral 66. The material 66 has a plurality of individual light reflecting surfaces 68 which may be substantially flat or slightly curved, the adjacent surfaces 68 all being disposed in slightly different planes. The effect of the facets 68 is to break up light falling thereon and to reflect different intensities of light therefrom depending upon the orientation of the facets 68 with respect to the source of illumination.

In forming the light reflecting member 64, the material 68 is preferably shaped into vertically extending curved vanes 70 which are suitably supported at the upper ends by a disc 72 (see FIGURE 2) and at the lower ends by a pair of annular members 74 and 76. The curved nature of the vanes 70 can be best seen in FIGURE 4. It will also be seen that the vanes 70 are spaced apart although overlapping whereby to provide for circulation of air therebetween for a purpose to be explained more fully hereinafter. A suitable number of the vanes 70 may be provided around the periphery of the light reflecting member 64 to give the desired illuminated and animated effect.

It is desired to move the light reflecting member 64 and to this end it is mounted to rotate as the rotor of a heat motor. More specifically, a harp 78 is provided and is mounted at the lower end on a clamp 80. The clamp 80 is suitably fastened to the socket 40 for mounting thereon. The harp 78 extends upwardly and around the light bulb 42 and carries on the upper end thereof a bearing 82 which rotatably supports the light reflecting member 64 in cooperation with a bearing mounted on the disc 72. Heated air rising upwardly because of the heat issuing from the light bulb 42 will pass between the vanes 70 and will react thereagainst to cause rotation of the light reflecting member 64 upon the bearing 82.

Further to insure continued operation of the heat motor formed by the light bulb 42 and the vanes 70, the upper end 84 of the housing 34 is provided with a plurality of openings 86 therein. The openings 86 permit escape of heated air whereby to insure substantially continuous circulation of air through the housing 34 whereby to drive the rotor of the heat motor in the form of the light reflecting member 64. In order to prevent rain and other unwanted material from falling through the openings 86, a cover or hood 88 is mounted on the wall 84 by means of a bolt 90, the hood 88 being spaced from the openings 86 to permit passage of air therethrough. The outer edge of the hood 88 is provided with a downturned flange 92 which is disposed radially outwardly from the wall 84 whereby to insure that rain and other unwanted materials are excluded from the interior of the housing 34.

In order to operate the animated and illuminated display 20, it is necessary only to mount the parts as shown in FIGURE 2 and energize the light bulb 42. The light bulb 42 will heat the air surrounding it and this air will pass upwardly and outwardly between the vanes 70 to react against the vanes 70 and thus cause rotation of the light reflecting member 64. The heated air passes upwardly through the openings 86 and outwardly under the cover 88 to insure substantially continuous circulation. The light from the bulb 42 will also shine against the faceted surfaces of the vanes 70 and the light will be reflected from the surfaces of the vanes 70 outwardly through the various lenses 44. The light in passing through the lenses 44 will be refracted and the movement of the reflecting facets 68 in cooperation with the action of the lens facets 54 produces an unusual animated lighting effect. There is a continuous change and play of light through the lenses 44, the light rapidly varying in intensity whereby to give a popping and rippling effect.

It has further been found that light shining upon the outer surface of the housing 34 will shine through the lens facets 54, fall upon the reflecting facets 68 and will be reflected and refracted back through the lens 44 to give an unusual lighted and animated display. As a result exterior lighting can be used as well as interior lighting to provide an illuminated display 20. It is contemplated that some means other than the heat motor be utilized to drive the light reflecting member 64. For example a fractional horsepower electrical motor might be used to rotate member 64 or some other source of motive power might be utilized to rotate, vibrate or oscillate the light reflecting member 64.

A further unusual effect is obtained if both exterior lighting and interior lighting are used with the display 20. There is an interplay of light when both light sources are utilized which gives a unique and startling illumination and animation of the display. Other pleasing effects can be achieved by utilizing color in the display. For example the bands 24, 26 and 28 may be colored and formed opaque so that light shines only through the surfaces 30. The surfaces 30 may be colored, as for example, gold or yellow so that light passing therethrough is colored. Alternatively colored light sources may be

used with clear display members or in the alternative the reflecting surfaces of the vanes **70** may be colored whereby to produce a pleasing colored display.

It is believed that the orientation of the lens facets **54** toward the light reflecting member **64** so that the curved surfaces thereof extend toward the member **64** is of importance in the present invention. More specifically, it is believed that the effectiveness of exterior lighting and the interplay achieved when both exterior and interior lighting are utilized result at least in part from such an orientation of the curvature of the lens facets **54**.

There is shown in FIGURES 9 through 11 of the drawings another preferred form of the present invention. More specifically, there is shown a display generally designated by the numeral **100** which is substantially circular as viewed in front elevation and may be considered cylindrical as viewed in perspective. The display **100** includes a housing generally designated by the numeral **102**, a lens **104** mounted in the housing, a central display member **106**, a light reflecting member **108**, a drive motor **110** to drive the member **108** and a light source **112**.

Referring specifically to FIGURE 10, it will be seen that the housing **102** is substantially cylindrical in shape and includes a cylindrical wall **114** which is closed at one end by an integral wall **116**. The other end of the cylindrical wall **114** is substantially closed by the circular shaped lens **104**.

The lens **104** has been shown as being formed solid. The material of construction of the lens **104** is preferably a suitable transparent plastic material and may be for example an acrylic plastic material. The right hand surface **118** of the lens **104** as viewed in FIGURE 10 may be formed substantially planar and the left hand surface is preferably provided with a plurality of concavely formed diamond-shaped lens facets **120**. The shape of the lens facets **120** is best shown in FIGURE 11 of the drawings. Each lens facet **120** is preferably formed as a portion of a sphere and the radius of curvature is such as to provide a focal length equal to the distance to the light reflecting member **108**. As is best seen in FIGURE 9 of the drawings the entire exposed surface of the lens **104** is provided with the lens facets **120**.

There is provided in the center of the lens **120** the central display member **106** which is preferably formed of a translucent material. The member **106** is preferably secured to the lens **104** and covers a cylindrical opening **122** therein. As is best seen in FIGURE 10 the outwardly extending surface **124** of the member **106** may be curved and further may have some advertising indicia **126** either molded therein or provided thereon.

Mounted on the inner wall of the member **106** is the motor **110** which may be for example a fractional horsepower electric motor. The motor **110** is provided with a drive shaft **126** which carries thereon a disc **128** held in position by suitable nuts **130** and washers **132**. Mounted on the surface of the disc **128** disposed toward the lens **104** is a light reflecting material **134** having light reflecting surfaces **136**. The material **154** may be identical to the material **66** described above and functions in the same manner.

Also mounted on the inner wall of the member **106** is the light source **112** in the form of a suitable electric light bulb. The light from source **112** falls upon the light reflecting surface **136** of the light reflecting member **108** and is reflected back toward and through the lens **104**. The presence of the lens facets **120** together with the discrete reflecting surfaces or facets **136** produces an unusual and attractive display of light. The parts can be arranged so that the illusion of bubbles is obtained due to the rapidly changing light intensities at the various facets **120**.

External light falling upon the lens **104** will pass therethrough and be focused upon the light reflecting member **108** by the lens facets **120**. This light will then be reflected and refracted through the lens a second time whereby to give an animated and interesting light display through the lens **104**. If the internal light source **112** is also in operation, there is an interesting interplay of light.

If desired, color may be added to the display. The member **106** may be colored for example red. The lens **104** may be colored a contrasting color or in the alternative the light source **112** or the external light source may be colored. Also if desired, the light reflecting surfaces **136** may be colored to enhance the attractive display.

It will be seen that there has been provided display devices which fulfill all of the objects and advantages set forth above. Although two preferred forms of the invention have been shown and described for purposes of illustration, it is to be understood that various changes and modifications can be made therein without departing from the spirit and scope of the invention. Accordingly, the invention is to be limited only as set forth in the following claims.

We claim:

1. A display device comprising a housing, a light reflecting member mounted within said housing, said housing including a lens member for admitting light into said housing from the exterior thereof and out of said housing from the interior thereof so that light from said light reflecting member reaches a viewer only after passing through said lens member, said lens member including a plurality of individual lens facets having sharp boundaries therebetween and substantially covering the surface of said lens member disposed toward said light reflecting member, said light reflecting member including a plurality of individual light reflecting facets having sharp boundaries therebetween and substantially covering the surface of said light reflecting member disposed toward said lens member, each individual light reflecting facet being substantially planar and adjacent light reflecting facets being arranged so that each light reflecting facet is disposed nonparallel to and at an angle with respect to each adjacent light reflecting facet, and means for moving said lens member and said light reflecting member relative to each other to cause light from the interior of said housing to be reflected from said light reflecting facets through said lens facets to the exterior of said housing and to cause light shining from the exterior of said housing through said lens facets to be reflected from said light reflecting facets out again through said lens facets to the exterior of said housing, whereby upon relative movement of said lens member and said light reflecting member said display device is effective to provide a striking interplay of light when lighted by interior lighting and when lighted by exterior lighting and when lighted by both interior and exterior lighting.

2. A display device comprising a housing, a light reflecting member mounted within said housing, said housing including a lens member for admitting light into said housing from the exterior thereof and out of said housing from the interior thereof, said lens member including a plurality of individual lens facets having sharp boundaries therebetween and substantially covering the surface of said lens member disposed toward said light reflecting member, said lens facets being formed convex and adjacent lens facets having different centers of curvature, said light reflecting member including a plurality of individual light reflecting facets having sharp boundaries therebetween and substantially covering the surface of said light reflecting member disposed toward said lens member, each individual light reflecting facet being substantially planar and adjacent light reflecting facets being arranged so that each light reflecting facet is disposed nonparallel to and at an angle with respect to each adjacent light reflecting facet, the distance between each lens facet and the nearest light reflecting facet being equal substantially to the focal length of said lens facets, and means for moving said

lens member and said light reflecting member relative to each other to cause light from the interior of said housing to be reflected from said light reflecting facets to the exterior of said housing and to cause light shining from the exterior of said housing through said lens facets to be reflected from said light reflecting facets out again through said lens facets to the exterior of said housing, whereby upon relative movement of said lens member and said light reflecting member said display device is effective to provide a striking interplay of light when lighted by interior lighting and when lighted by exterior lighting and when lighted by both interior and exterior lighting.

3. A display device comprising a base, a housing mounted on said base and formed substantially as a hollow globe extending upwardly from said base, a light reflecting member mounted within said housing and shaped substantially complementary to said housing and spaced therefrom, said housing including a lens member for admitting light into said housing from the exterior thereof and out of said housing from the interior thereof, said lens member including a plurality of individual lens facets having sharp boundaries therebetween and substantially covering the surface of said lens member disposed toward said light reflecting member, said light reflecting member including a plurality of vanes overlapping circumferentially and spaced radially from each other to provide space therebetween, each of said vanes having a plurality of individual light reflecting facets on both surfaces thereof, said light reflecting facets having sharp boundaries therebetween and substantially covering both surfaces of each of said vanes, a light source mounted within said light reflecting member so that light can be reflected from facing surfaces of said vanes to be reflected from the interior of said light reflecting member to the exterior thereof and through said lens member while said light source is completely covered and hidden from view by said vanes, and means for moving said light reflecting member and said lens reflecting member with respect to each other to cause light from said light source to be reflected outwardly by said vanes and from said light reflecting facets visible from the exterior thereof through said lens facets to the exterior of said housing and to cause light shining from the exterior of said housing through said lens facets to be reflected from said light reflecting facets out again through said lens facets to the exterior of said housing, whereby said display device is effective upon relative movement of said lens member and said light reflecting member to provide a striking interplay of light when lighted by said lighting source and when lighted by exterior lighting and when lighted by both said lighting source and exterior lighting.

4. A display device comprising a base, a housing mounted on said base and formed substantially as a hollow globe extending upwardly from said base, a light reflecting member rotatably mounted within said housing for rotation with respect thereto and shaped subtanstially complementary thereto and spaced therefrom, said housing including a plurality of lens members disposed therearound to admit light into said housing from the exterior thereof around substantially the entire circumference thereof and out of said housing from the interior thereof around substantially the entire circumference thereof, each of said lens members being formed substantially as a segment of a sphere and including a plurality of individual lens facets having sharp boundaries therebetween and substantially covering the surface of said lens members disposed toward said light reflecting member, said light reflecting member including a plurality of vanes overlapping circumferentially and spaced radially from each other to provide space therebetween, each of said vanes having a plurality of individual light reflecting facets on both surfaces thereof, said light reflecting facets having sharp boundaries therebetween and substantially covering both surfaces of each of said vanes, a light source mounted within said light reflecting member so

that light can be reflected from facing surfaces of said vanes to be reflected from the interior of said light reflecting member to the exterior thereof and through said lens members while said light source is completely covered and hidden from view by said vanes, and means for moving said light reflecting member with respect to said lens members to cause light from said light source to be reflected outwardly by said vanes and from said light reflecting facets visible from the exterior thereof through said lens facets to the exterior of said housing to cause light shining from the exterior of said housing through said lens facets to be reflected from said light reflecting facets out again through said lens facets to the exterior of said housing, whereby said display device is effective upon rotation of said light reflecting member to provide a striking interplay of light when lighted by said lighting source and when lighted by exterior lighting and when lighted by both said lighting source and exterior lighting.

5. A display device comprising a base, a housing mounted on said base and formed substantially as a hollow globe extending upwardly from said base, a light reflecting member rotatably mounted within said housing for rotation with respect thereto and shaped substantially complementary thereto and spaced therefrom, said housing including a plurality of lens members disposed therearound to admit light into said housing from the exterior thereof around substantially the entire circumference thereof and out of said housing from the interior thereof around substantially the entire circumference thereof, each of said lens members being formed substantially as a segment of a sphere and including a plurality of individual lens facets having sharp boundaries therebetween and substantially covering the surface of said lens members disposed toward said light reflecting member, said light reflecting member including a plurality of vanes overlapping circumferentially and spaced radially from each other to provide space therebetween, each of said vanes having a plurality of individual light reflecting facets on both surfaces thereof, said light reflecting facets having sharp boundaries therebetween and substantially covering both surfaces of each of said vanes, a light source mounted within said light reflecting member so that light can be reflected from facing surfaces of said vanes to be reflected from the interior of said light reflecting member to the exterior thereof and through said lens member while said light source is completely covered and hidden from view by said vanes, said housing having openings in the upper end thereof to receive therethrough air heated by said light source, the air heated by said light source moving from the vicinity of said light source through and against said vanes and through said openings to cause said light reflecting member to rotate with respect to said housing, rotation of said light reflecting member with respect to said housing causing light from said light source to be reflected outwardly by said vanes and from said light reflecting facets visible from the exterior thereof through said lens facets to the exterior of said housing and to cause light shining from the exterior of said housing through said lens facets to be reflected from said light reflecting facets out again through said lens facets to the exterior of said housing, whereby said display device is effective upon rotation of said light reflecting member to provide a striking interplay of light when lighted by said lighting source and when lighted by exterior lighting and when lighted by both said lighting source and exterior lighting.

6. The display device set forth in claim 5, wherein the lens members are formed solid with the lens facets on the surface thereof disposed toward said light reflecting member.

7. The display device set forth in claim 5, wherein said lens members are formed from two spaced apart walls defining a liquid tight volume having a light transmitting liquid therebetween, the one of said walls disposed toward said light reflecting member having the lens facets formed therein.

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