March 3, 1959 H. B. THORNE 2,876,339

ILLUMINATED DISPLAY DEVICES

Filed July 17, 1956

Fig. 3.

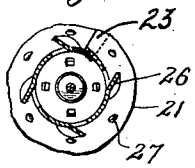


Fig. 1.

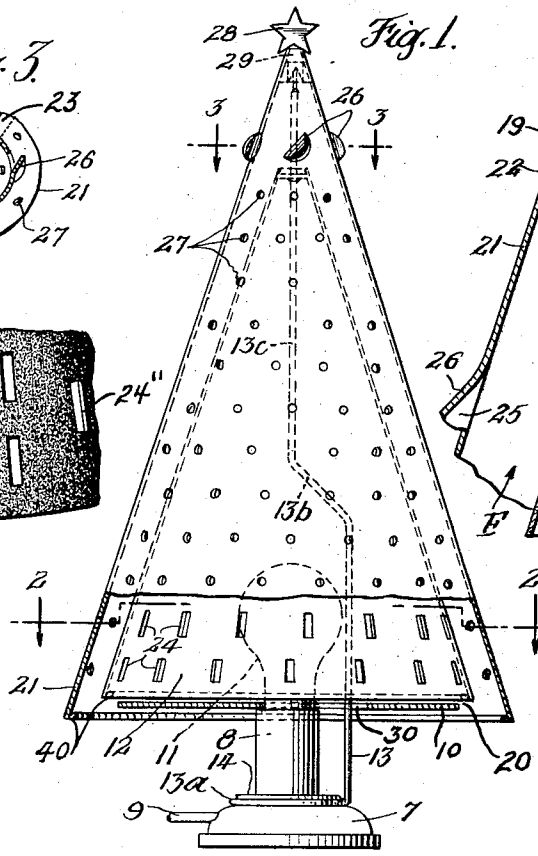


Fig. 4.

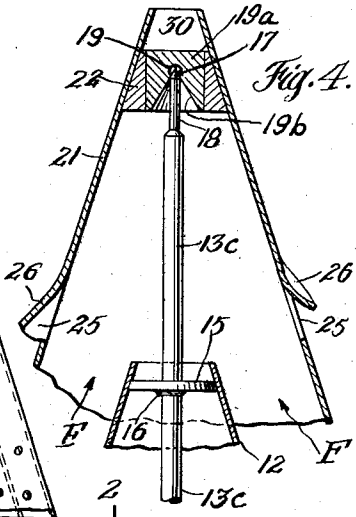


Fig 7

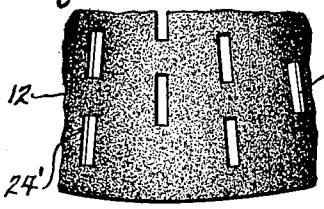


Fig. 5.

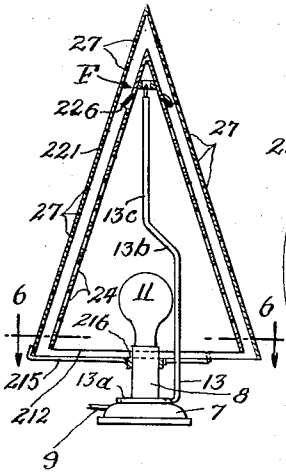


Fig. 2.

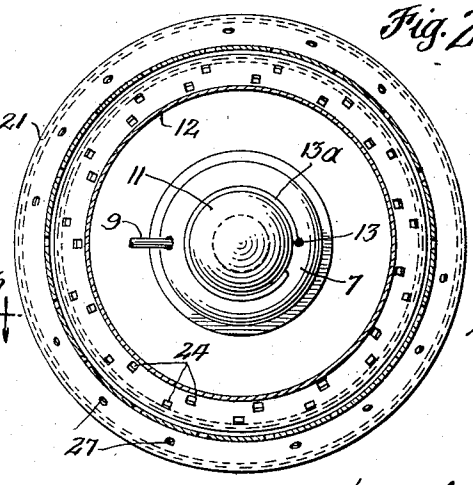
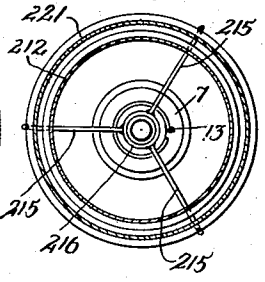


Fig. 6.



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ILLUMINATED DISPLAY DEVICES

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6 Claims. (Cl. 240—10.1)

This invention relates to illuminated display devices, and more particularly to display devices which catch the attention and please the eye of the observer, not only because of the artistic appearance of the device but also by virtue of one or more features which cause changes in the appearance, for example, by variations in the lighting of the device (as by changes in duration, intensity, direction and color of one or more light beams emanating therefrom), or by movement of a part of the device (as by the rotation of a major element thereof), or by combinations of these features.

The invention contemplates the provision of an illuminated display device, of the character mentioned, which is readily adaptable for various uses, for example as an ornamental Christmas display, as an attractive toy, as an animated lamp, or as a medium of advertising.

The invention further contemplates a display device, of the character mentioned, which shall be attractive and pleasing to the eye, from the standpoint of general shape, color, design, lighting effects, and/or motion; the preferred embodiment having a plurality of these desirable characteristics.

Additionally, the invention contemplates a device, of the character mentioned, which may be readily and inexpensively made, which at the same time will be sufficiently sturdy, which in use will be reliable, and which is extremely simple from the standpoint of construction, operation, maintenance and repair, and also renewal of parts, e. g., the light source.

More specifically, the invention contemplates a display device, of the character mentioned, comprising a plurality of spaced-apart nested shells, one substantially housed by another, the innermost shell being configured to form a space to receive a source of illumination, each shell having light transmitting areas at intervals, so that upon relative rotation there are intermittent flashes of light appearing at an external point of view, as certain areas of the shells register with each other.

Still more specifically, the invention contemplates a display device, of the character mentioned, wherein improved display effects are secured by features of the shells themselves, as by utilizing two shells, the inner one being of opaque material, desirably of a light color or white on its inner surface and of a dark color or black on its outer surface, and the outer one preferably being of a dark color or black on its inner surface and being on its outer surface of any desired color or colors and any desired pattern thereof, whereby, when one shade is rotated relative to the other, twinkling light effects of high intensity, and of such color tones as are desired, may be secured, even from a small light source, such as an ordinary incandescent light bulb (of, for example, 40 watts to 75 watts), while at the same time the external appearance of the outside shell may be designed to cooperate with the twinkling light effects to produce desirable effects in combination. As an advantageous example, the invention has in view such a display device, wherein the shells are made conical, the external shell is

configured to appear like a Christmas tree, and the twinkling light effects through the apertures of the shells appear like lights, stars, balls and/or other Christmas tree ornaments.

Still further, the invention contemplates a display device, of the character mentioned, wherein the transparent or translucent areas of one or more of the shells may be provided by apertures formed or cut therein, in which case they may be left open (and may, if desired, serve the additional function of circulating openings for the air warmed by the light source), or when not used as air openings, they may be covered with variously tinted translucent filming, of cellophane or other suitable materials. Alternatively, one or more of the light transmitting areas of one or more of the shells may be provided by utilizing a generally transparent or translucent material for all or part of the shell itself, and coating or otherwise rendering opaque those portions of the shell adjacent to said light transmitting areas—the latter being left plain or being tinted in such manner as to still be able to transmit light.

Still further, the invention contemplates a display device, of the character mentioned, wherein the scintillating effect in the eye of the beholder will be present whether his point of view is level with the device or is above or below the center of the same, so that he views the device at an oblique angle, and in the preferred embodiment I accomplish this by the provision of a pair of shells, one of which has light transmitting areas of any desired shape (for example, small disc-like areas), while the other shell has light transmitting areas which are elongated axially of the device, and most preferably wherein said elongated areas are arranged in staggered relationship in adjacent rows peripherally of the shell, and being so arranged as to length and position that said areas in one peripheral row will interleave with said areas in the next peripheral row—in other words, the rotational pathway of a slit or slot in one row will overlap the rotational pathway of a slit or slot in the next adjacent row.

The invention further contemplates increasing the intensity of the scintillating beams emanating from the device and/or minimizing the required power of the light source, by mounting a white or very light disc or other form of reflector below the light source, adjacent the bottom of the innermost shell, said disc being preferably supported from the same base as the shells, for example from the socket of the lamp, and/or being so positioned with relation to the innermost shell as to leave a peripheral opening therebetween for the passage of an air current, and/or being apertured for a similar purpose; and in the preferred embodiment, one of such apertures is so made as to pass a supporting element for one or more of the shells.

Still further, the invention contemplates the provision of a supporting device for one or more of the shells which extends upwardly from the base and is so shaped or configured as to permit the ready screwing and unscrewing of a light bulb for the device, while at the same time being so configured and located as to impose a practical limit upon the diameter (and hence upon the size) of the light bulb which may be employed in the device, whereby to serve as a safety feature, preventing inadvertent use of too large a light source, with the possible danger of overheating of the device.

The invention also contemplates various novel features of construction and operation, as disclosed in the following description and/or the drawings, and/or as set out in the appended claims.

Figure 1 is an elevational view, partly in section, of an illuminated display device embodying the invention in its present preferred form, adapted for use in the configuration of a Christmas tree;

Figure 2 is a cross-sectional plan view on the line 2—2 of Figure 1 but omitting the bottom reflector plate shown in Figure 1;

Figure 3 is a cross-sectional view on the line 3—3 of Figure 1, at the level of the rotational propelling vanes of the outer shell, which level in this embodiment, is between the seats or supports for the inner and outer shells;

Figure 4 is a vertical section through the upper portion of the device of Figure 1, omitting the ornament at the top of the device, showing the fixed support for the inner shell, the rotatable bearing for the outer shell, and the propelling fins adjacent the top of the outer shell;

Figure 5 is a vertical section through an alternative embodiment of my invention, being on a smaller scale than Figures 1 to 4, and illustrating an arrangement wherein the outer shell is fixed by means of a support or seat at the bottom, and the inner shell is rotatably mounted;

Figure 6 is a plan section on the line 6—6 of Figure 5, omitting the light bulb shown in Figure 5;

Figure 7 is a fragmentary view of a portion of the surface of the inner shell, illustrating the staggered relationship of light transmitting apertures in adjacent rows thereof, configured and arranged to have overlapping rotational paths.

The construction of the first embodiment, as seen in Figures 1 to 4 comprises a base **7**, a light socket **8** (which at the same time serves as the trunk of the Christmas tree in this embodiment), an electric cord or the like **9** adapted to be coupled with a source of current in the usual way, and extending through the base into the socket and having a switch (not shown) if desired. An ordinary household lighting bulb **11** (which in a typical unit is of 60 watts) stands vertically in the socket **8** and is housed within the inner conical shell **12**. This shell in the present embodiment is fixed relative to the light source **11**, with its vertical axis coinciding with the vertical axis of the light source, and the support of the shell in that position is provided by a bracket which may consist simply of a stiff upstanding wire **13**, which at the bottom has an integral spring-like loop **13***a*, either resting upon the base **7**, or (as here shown) seated in a shallow groove formed in the periphery of the shoulder **14** of the base (as by being "sprung" over the edge of shoulder **14**); said wire further comprising a radially inwardly extending portion **14***b* and a second vertically extending portion **13***c*, which latter is coaxial with the cones and the light bulb.

At a point somewhat spaced from the upper end of the portion **13***c*, a disc or button-like member **15** (Figure 4) is provided, this disc being punch-apertured at **16** to form a tight friction joint with the upper portion **13***c* of the wire. The disc **15** is preferably tapered to fit the taper of the cone **12**, its diameter being slightly greater than the minimum diameter of the cone at its upper end, so that the cone hangs fixedly therefrom, in the position shown. Radial portion **13***b* of wire is so located as to height, and the radial distance between wire portions **13** and **13***c* is such that the maximum-bulb for which the unit is designed can just comfortably be screwed into the socket **8**—this arrangement preventing insertion of too large a bulb—which is a feature conducive to economy and safety, as hereinbefore mentioned.

At the extreme upper end of the axle extension **13***c* of the wire, the same is tapered off to a sharp pointed bearing **17**, and in order to reduce this bearing to a very small size, the wire itself may be turned down at **18**, as shown.

The uppermost extension **13***c* of the wire, with its pointed bearing **17**, constitutes the support for the outer shade. The tapered point **17** is preferably hardened. Alternatively, it may comprise a separate jewel or other hardened element mounted on top of the wire rod. If the point **17** is of hard metal, the cooperating bearing for the rotating outer shell may comprise a sapphire or other jewel **19**, or other suitable hard and smooth member mounted in a block **19***a* (of brass, for example) which in turn has a tapered guide at its under-face for facilitating

the registry of bearing elements **17** and **19** when the outer conical shell **21** is slipped down into place. The jewel mount **19***a* may in turn be configured at its outer face to fit within the upper end of the shell **21**, or may be secured therein by an intermediate tapered collar **22**, the parts **19***a* and **22** being secured either by a frictional grip or by an adhesive.

The outer shell **21** is thus supported by the same rod as is the inner shell **12**, but is rotatable relative thereto, in a position where it substantially houses the inner shell, although in a spaced-apart nested relationship, which spacing should be such as to serve two functions, first the function that it serves as a factor in determining the diameter of the beam of light which will be visible to an observer, at a given external point of view, when light transmitting areas of the two shells are in registry with each other and with the eye of an observer; and second to provide an adequate conical flow passageway for heated air from the light source, as indicated by the arrows F in Figure 4. The heated air from the light source passes from the inner cone to the conical passageway F, by means of the light transmitting slots **24** of the inner cone, and it passes out of the outer cone through apertures **25** which are preferably formed by cutting substantially semi-circular slits (the base of each semicircle being at an angle to the vertical—as seen in Figure 1) and pushing out of the conical surface the resultant semi-discs **26** (Figs. 1, 3 and 4), the elements **26** thus forming vanes or fins, disposed at such angles as to act as impellers, causing a rotation of the outer shell **21**, which in the instance here shown will be a clockwise rotation when viewed from above.

The apertures in the outer cone **21** are here shown as a multiplicity of small round holes **27**, so as to simulate Christmas tree lights, but they may be formed as small stars, or in various shapes as of animals, figurines, or other Christmas tree ornaments. The completion of the Christmas tree effect may be secured by mounting at the very top of the outer cone a star **28** which may desirably be of plastic, having an integral conical extension or base **29** at the bottom, which fits within the space **30** at the very top of the cone. This portion of the assembly may be readily completed, by making the cone **21** of paper, plastic, or other suitable sheet material, cut originally in the flat, and rolling up to form the cone (holding the element **29** within the space **30** as the rolling is done) and then gluing or otherwise sealing the joint which preferably extends axially of the conical shell, for example as shown at **23** in Figure 3. Both cones may be reinforced at either or both ends, for example by the inner peripheral wires **40**.

Besides making the interior of the inner cone white or of some light tint, the light reflecting and power saving features hereinbefore mentioned may be improved by mounting the white cardboard or other light reflecting disc **10** adjacent the bottom of the inner shell. This disc may seat upon the socket **8** and be centrally apertured (as shown) to pass the neck of the light bulb **11**. The disc **10** may be flat or dished, and is preferably spaced somewhat from the inner periphery of the inner conical shell, as shown at **20**, to form an air passageway (particularly in a construction where the light transmitting areas of inner cone **12**—in the lower portion of the cone—are not made as slits but as transparencies) which may be the case when forming the cone of vinyl, plastic, acetate, or other transparent or translucent material and coating or rendering the same opaque except for the desired light transmitting areas. Alternative or supplementary air passages may be formed by apertures in disc **20**, for example slotted apertures **30**, one of which is shown as being cut to pass the bracket structure **13**, **13***b*, **13***c*, during assembly.

It will be observed that the slots **24** of the inner shell **12** are arranged in peripheral rows and those of one row are preferably staggered with relation to those of an

adjacent row. The rows may thus be brought fairly close together (while maintaining the strength of the shell) with the result that some light transmitting areas will register with the line of sight through an aperture **27** of the outer shell, whether such line of sight be directly horizontal or upward or downward at an oblique angle. To further assure this result, so that a twinkling effect will be obtained from practically any point of view, the light transmitting areas of one peripheral row may be interleaved with said areas of the next adjacent row, and this may be particularly desirable in the upper portion of the conical shell, where the diameter of the cone is smaller. Such upper portion (not visible in Figure 1) is shown in Figure 7, with the staggered and interleaved arrangement of slots, those in one row being shown at **24'** and those in a superjacent row at **24''**.

In the alternative embodiment shown in Figures 5 and 6, the parts **7**, **8**, **9**, **11**, **13**, **13***a*, **13***b*, **13***c*, **17**, **18**, **19**, **19***a*, **19***b* and **22** may be substantially identical with those hereinbefore described.

The inner cone **212**, however, in this embodiment serves as the rotating cone. It has the light transmitting slots **24** (as in the first embodiment). The rotating fins however are not placed on the outer cone but are provided at **226** near the upper end of the inner cone, just below the rotating bearing, which is mounted in this cone instead of in the outer cone. The inner cone **226** may come right to a point (as shown) or the upper end of it may be truncated just as in the case of the cones shown in Figure 4, so long as the bearing assembly closes off the upper end of the cone, so that substantial airflow must pass out over the vanes **226**. The air from the intercone passageway F, must be free to escape through the outer cone, and for this purpose, if necessary, the light transmitting areas **27** of the outer cone **221** may be carried right up into the tip end of the outer cone, in the region above the vanes **226** of the inner cone. The outer cone may, as before, be finished off with a star, or may (as here shown) be brought to a closed point.

In this embodiment, the fixed support of the outer cone is accomplished by a bracket which may consist of three stiff wire arms **215**, having a common central ring **216** engaging the socket member **8**, the arms **215** having upturned tip portions, to hold the cone in place, as shown. The ring **216** may frictionally engage the socket **8**, just as the disc aperture **16** frictionally engages the wire **13***c* in Figure 4. By this means—in either embodiment—the height of the fixed cone may be altered relative to the assembly as a whole, and this may also be used to adjust the volume of the passageway between the two cones, and also to adjust the light transmitting characteristics of the display device.

In either embodiment of the device, the present preferred shell finish is: white or lightly tinted on the inside of the innermost shell, black or darkly colored on the outer surface of said shell, black or alternating dark and light on the inner surface of the outermost shell, and a light decorative color on the outer surface of the latter.

In either embodiment, it is not only feasible but desirable—particularly when the device is used to give a Christmas tree effect—to tint different vertically extending segments of the inner surface of the innermost cone with different light colors, so that they will throw different colored beams out through the registering light transmitting areas. Likewise it is desirable in such a device to decorate the outermost cone, either by placing colored pictures of figurines, toys, ornaments, tinsel and the like thereon (to simulate Christmas tree decorations) or by producing such effects by leaving the desired decorative areas transparent or translucent, which may further be tinted in various colors, while retaining their translucency. In the latter instance, the lighting will show forth through said decorative areas, varying in intensity as the cones have relative rotation, and at the same time the clear light transmitting areas (if used) typified by the small

disc-like apertures **27**, will scintillate as the device operates.

In a typical device (when used as a table-decorating Christmas tree), the inner cone may be 7½" high, 7½" in diameter at its base, and 1" in diameter at its truncated upper end. The slots therein may be about ½" long in the axial direction and about ⅛" in width. There may preferably be eight or ten peripheral rows of these, those in the bottom row being spaced on approximately 1" centers, and those nearer to the top being on approximately ½" centers. In the same unit, the outer conical shell, from its truncated upper end to the bottom may be about 10 or 12" in height, its base may be about 9" in diameter and its upper end about ¾" in diameter. The peripheral rows of apertures **27** therein may equal in number the rows of slots **24** of the inner cone, and each row may be generally located at the same horizontal plane as the center of a row of slots. The apertures **27** may typically be ⅛" or less in diameter, and they may be placed on varying centers from row to row, or varying centers within a row. With slots and apertures configured and spaced in the preferred way, as above described, the duration of the visible flashes of light through the registering light-transmitting areas is short in comparison with the periods of non-registration of said areas.

The proportions and locations of the slots **24** and apertures **27** may be varied a good deal (as may be the size and shape of the two shells and the unit as a whole), but when used as a Christmas tree device, there is an advantage in irregular spacing and an irregular pattern of the apertures **27**, as this produces an extremely variegated scintillating effect over the Christmas tree.

All dimensions listed in the example here given are to be taken merely as typical and not by way of limitation. They are intended to aid the designer and constructer in producing the most attractive and effective device.

While I have illustrated my invention in its use as an ornamental Christmas display, with conical shells especially suited to that purpose, it will be understood that the device may be put to a variety of uses, and for its various uses (for instance, as a toy, a lamp, or an advertising medium) the shells may be made wholly or partly spherical, hour-glass shaped, cylindrical, and in other forms wherein the inner and outer shells may have relative rotation; and for the different purposes, I may employ different decorations, different coloring and different lighting characteristics.

Variations may of course be made in features of construction, form, size, shape, materials, color and decoration, within the spirit and scope of the invention as defined in the appended claims.

I claim:

1. An illuminated display device comprising spaced-apart nested shells, one substantially housed by another, the innermost shell being configured to form a space to receive a source of light, a mounting whereby one of said shells has rotation relative to the device in general, each shell having at intervals areas adapted to transmit light, the major portion of the inner face of the innermost shell being pigmented to be very light in its inherent appearance and the major portion of the inner face of the outermost shell being pigmented to be relatively dark in comparison therewith, whereby, upon relative rotation between the shells, intermittent flashes of light are passed through from the inner face of said innermost shell and from the source of light to an external point of view, upon registry of one such area of one shell with passing light-transmitting areas of another shell, the light being reflected and accentuated by said inner face of the innermost shell but not appreciably reflected by the inner face of the outermost shell, and the said light transmitting areas of each shell, at a plurality of given transverse sectional planes thereof, being of lesser peripheral dimension at each such plane than are the said intervals between said areas, so that the duration of the visible flashes

of light through the registering areas is short in comparison with the periods of non-registration of said areas.

2. The construction of claim 1 wherein the major portion of the outer face of the innermost shell is pigmented to be relatively dark in comparison with its inner face.

3. The construction of claim 1 wherein certain of said areas of the inner shell, individually, are substantially elongated in the general direction of the axis of rotation and wherein such areas of the outer shell are individually of about equal dimensions in directions axially and peripherally of the shell and are but a fraction of the said axial dimension of said areas of the inner shell, so that a scintillating effect is assured at points of view through a wide range of angles in a vertical plane.

4. The construction of claim 1 wherein said shells are conical and there is an internal reflector over most of the base area of the innermost conical shell and a light source is disposed near the bottom of the said innermost shell, so as to further accentuate the light transmitted periodically through the registering areas to the external point of view and to increase the vertical range of angles through which a bright scintillating effect may be seen.

5. The construction of claim 1 wherein the said light-transmitting areas in the innermost of said shells are axially elongated and wherein the so elongated areas are arranged in a plurality of peripheral groups which are staggered relative to one another.

6. The construction of claim 5 wherein at least certain of said staggered areas are so positioned that the rotational paths of adjacent areas overlap.

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