

June 19, 1923.

1,459,325

W. A. DOREY

ILLUMINATING APPLIANCE

Filed July 6, 1921

2 Sheets-Sheet 1

Fig. 1.

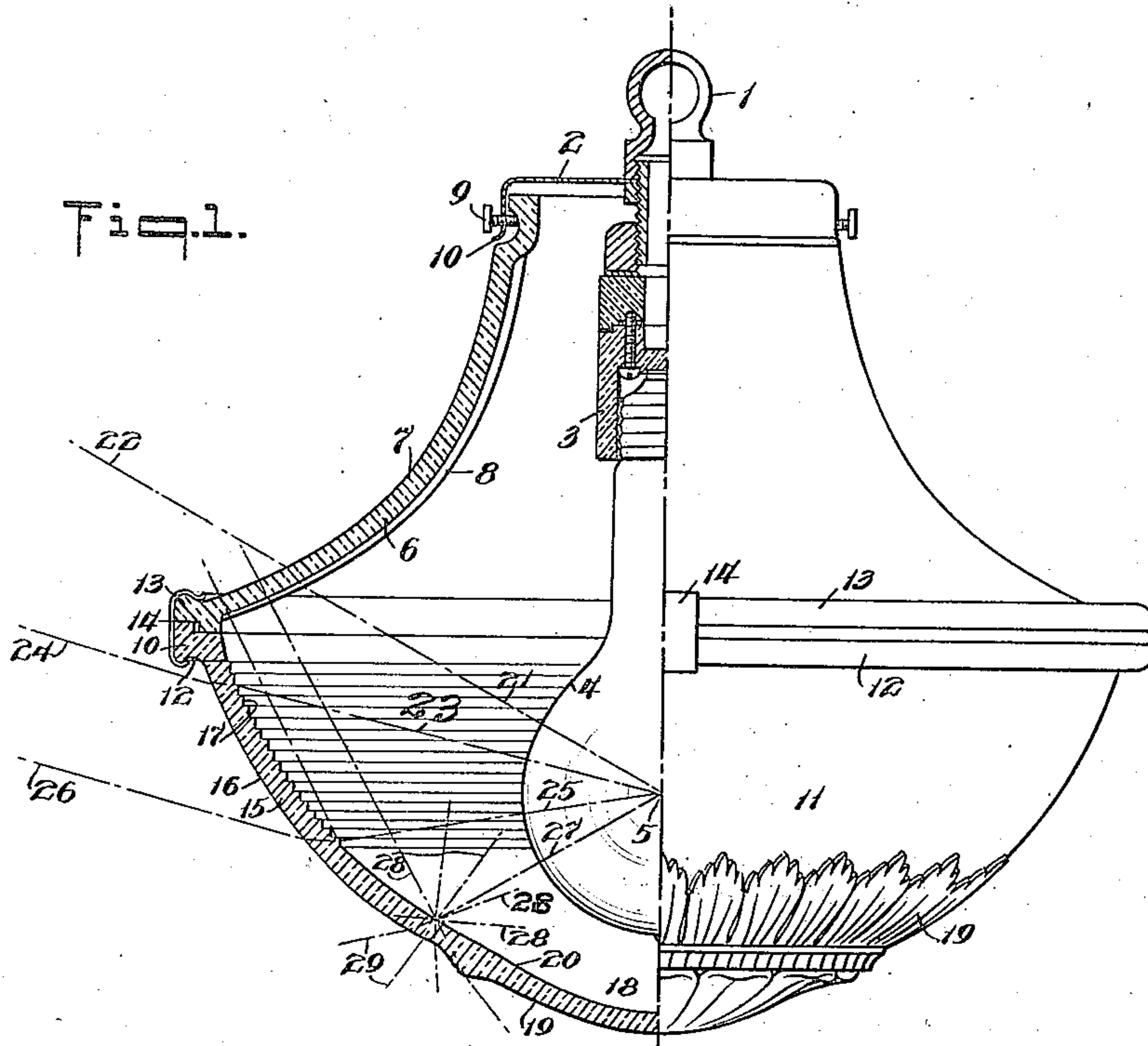
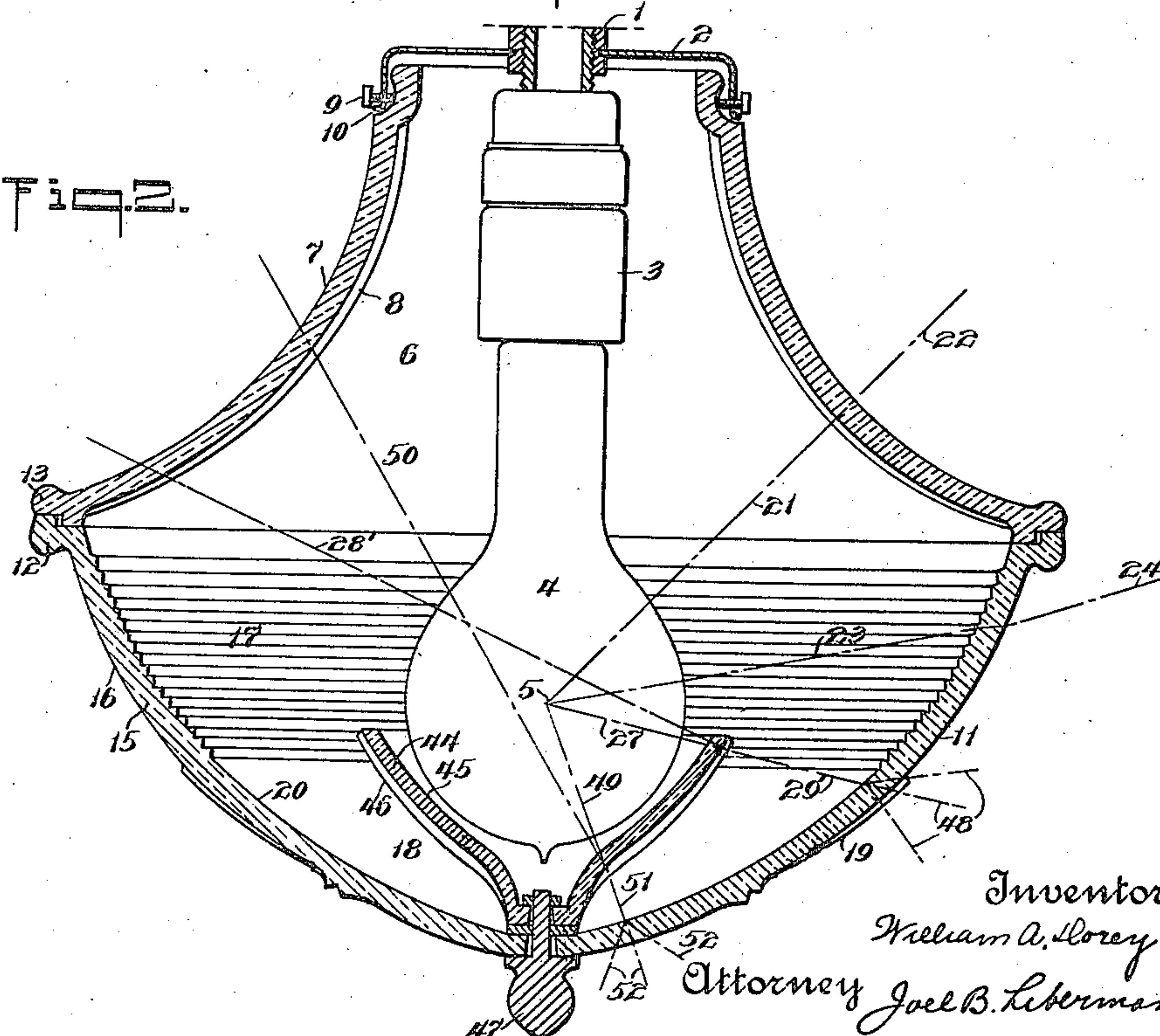


Fig. 2.



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Fig. 3.

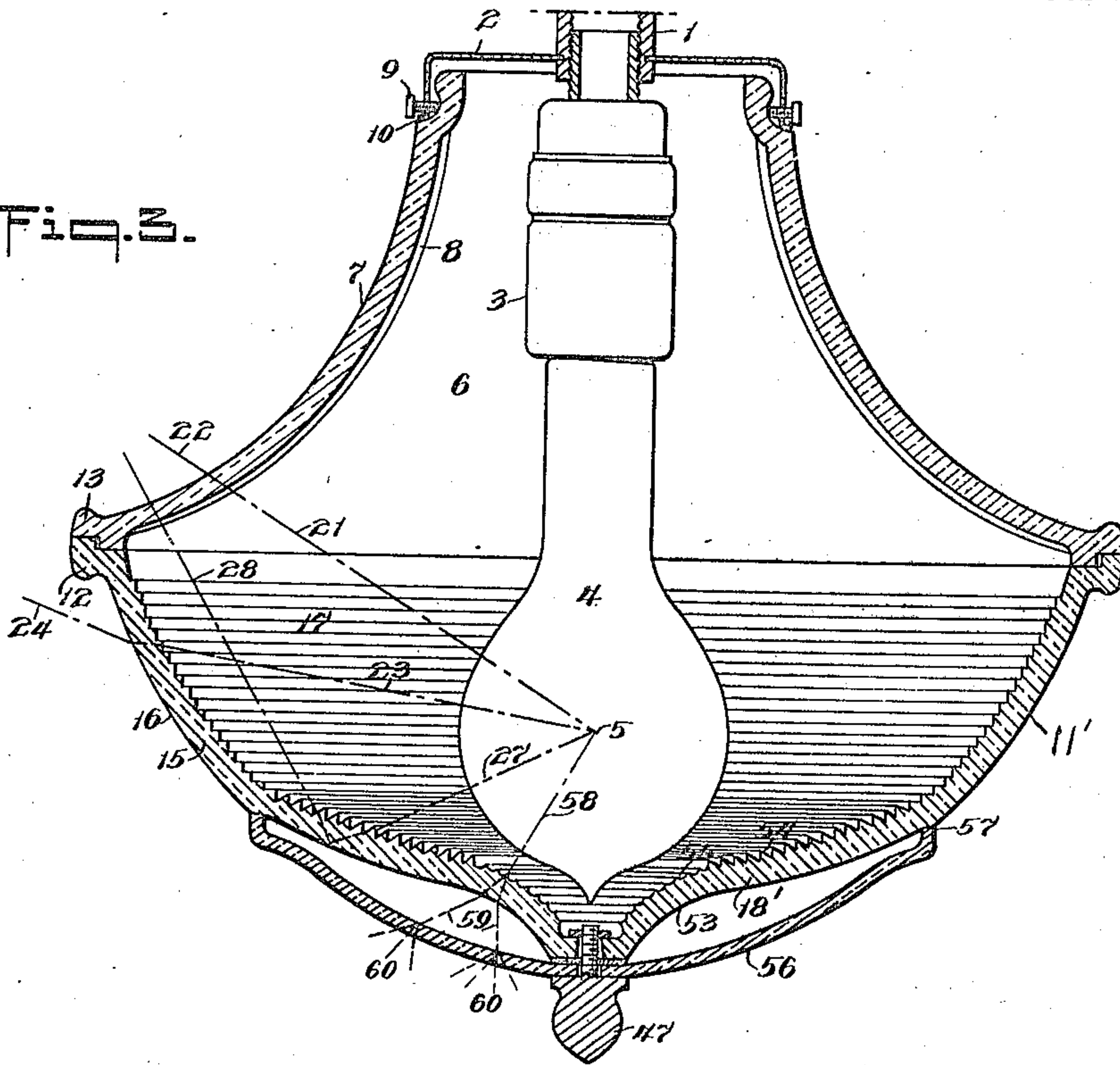
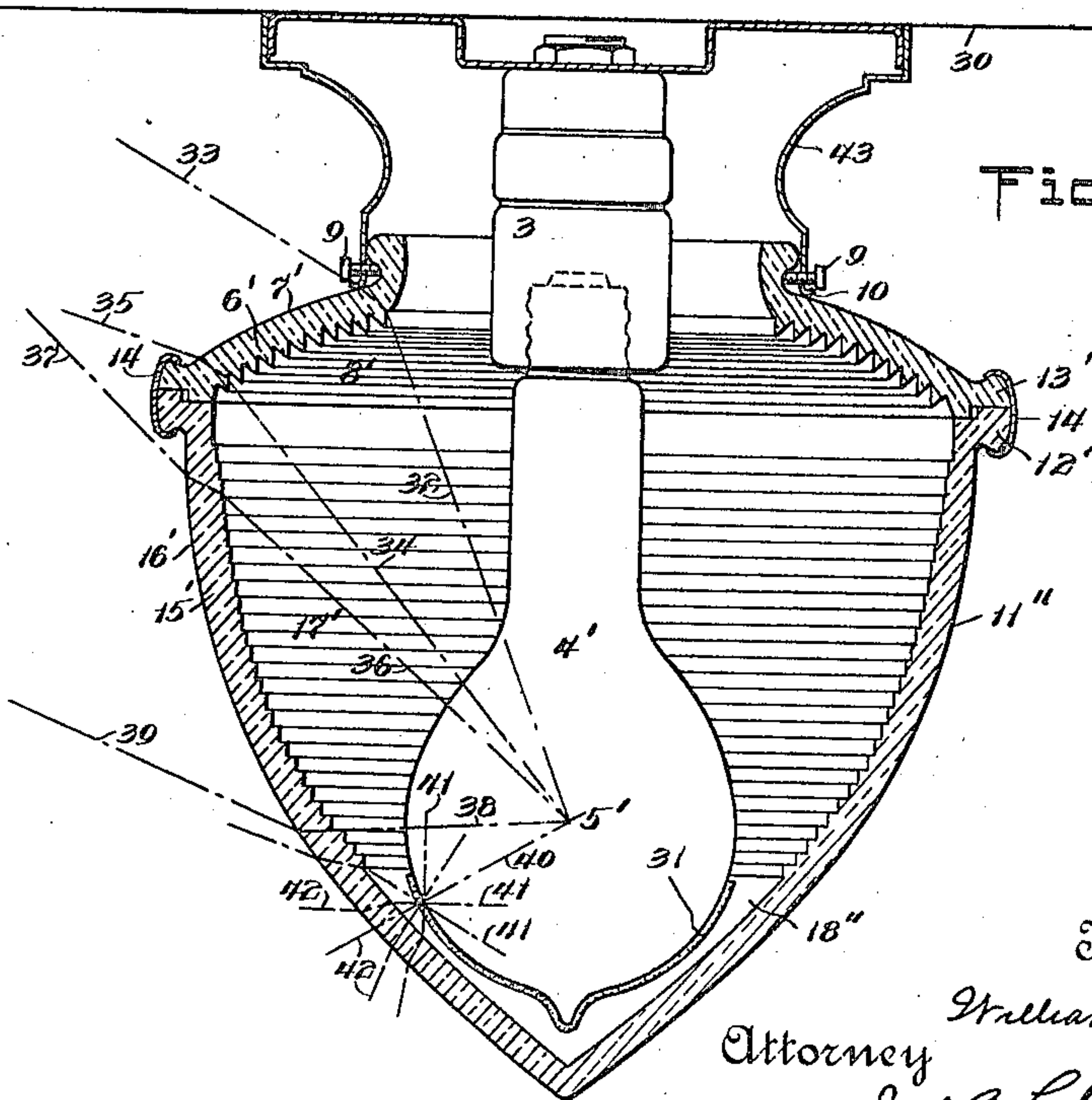


Fig. 4.



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Patented June 19, 1923.

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# UNITED STATES PATENT OFFICE.

WILLIAM A. DOREY, OF NEWARK, OHIO, ASSIGNOR TO HOLOPHANE GLASS CO. INC.,  
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## ILLUMINATING APPLIANCE.

Application filed July 6, 1921. Serial No. 482,794.

*To all whom it may concern:*

Be it known that I, WILLIAM A. DOREY, a citizen of the United States, and a resident of Newark, in the county of Licking and State of Ohio, have invented certain new and useful Improvements in Illuminating Appliances, of which the following is a specification.

The object of this invention is the construction of a prismatic glass enclosing globe, having an upper and a lower light transmitting area and an intermediate area provided with light refracting prisms adapted to refract the light upwardly. The construction has the advantages of being dust proof, giving a minimum of glare, giving a wide distribution of light on the ceiling and since the refracting area acts almost entirely by transmission rather than reflection, the light it handles suffers no diminution due to interference by the unit.

Fig. 1 is a side elevation of the unit bisected to show one-half of the unit in cross-section operating in connection with a lamp. Typical light rays are shown.

Fig. 2 is a vertical cross-section of a modification of the unit, employing an additional reflector and showing the lamp in position with typical light rays traced therefrom.

Fig. 3 is a similar vertical cross-section of a further modification.

Fig. 4 is similar vertical cross-section of a further modification.

The units in all cases will be described by similar numbering except where extreme modifications of such parts are used. They consist essentially of three parts, the uppermost part consisting of a transmitting cover 6 with a smooth outer surface 7, preferably furnished with radial diffusing prisms 8 on the inner surface. The second portion 15 is designed to refract the light toward the ceiling and is smooth on the outer surface 16 with horizontal prisms 17 on the inner surface. The third or lower portion 18 in the main reflects light back through the interior of the unit for transmission by the upper portions and also diffuses or redirects that portion of the light which is not reflected.

These are the necessary parts for constructing the unit and will be found in all of the views. The central portion refracting light toward the ceiling is the fixed and definite portion of the appliance. Its shape is definitely determined by the type of dis-

tribution desired and the angle of light it includes is also definitely determined by the fact that none of the main beam coming from it should pass below the horizontal.

The top portion may vary in shape with the limitations that it should not be so flat as to allow any considerable portion of the direct or reflected light to pass into the fitter opening and be lost, or so steep sided that an undue amount of the light striking its inner surface is lost by surface reflection. I prefer to give the inner surface of this portion a finish which will give a slight spreading or diffusion of the light so as to do away with the possibility of sharp specular reflection from the ceiling and the possibility of shadows on the ceiling surface or the surface of the unit. This finish may be obtained by the use of radial diffusing flutes or light etching or a combination of the two.

The lowermost portion is subject to variations and these have been shown in the figures. In Fig. 1, 1 is a fixture loop supporting holder 2 and socket 3. 4 is an incandescent electric lamp fastened in socket 3 and having the center of its light source at 5. 6 is a transmitting glass cover having a smooth outside surface 7 and radial diffusing prisms 8 on its inner surface. The glass cover 6 is supported in holder 2 by means of set screws 9 so as to make a substantially dust proof joint at 10. Bowl 11 has a flange 12 which is ground to a substantially dust tight seat against flange 13 of the cover glass and is held tightly against the cover glass by the metal clamps 14. The bowl is divided into two portions, the upper portion 15 having a smooth outside surface 16 and refracting prisms 17 on its inner surface. The lower part of the bowl 18 has an ornamented outside surface 19 and a translucent diffuse reflecting surface 20 on the inside. The action of the light from the source is illustrated by typical rays. Ray 21 emitted by light source 5 and striking the cover 6 will be spread laterally by the flute 8 and emitted toward the ceiling in the general direction 22. Light ray 23 emitted by light source 5 and striking portion 15 of the bowl will be refracted upward toward the ceiling by the combined action of prisms 17 and outer surface 16 and will be emitted in the general direction 24. Typical ray 22, emitted through the extreme lower part of upper cover 6 and typical ray



24 emitted from the extreme upper part of the intermediate zone serve to eliminate any possibility of shadow from the flange portions 12 and 13. Ray 25 emitted by light source 5 is acted upon by prisms 17 and surface 16 in a manner entirely similar to the action of ray 23 except that emerging ray 26 is directed toward the ceiling at a slightly wider angle than emerging ray 24. Ray 27 emitted by the light source 5 and striking portion of the bowl 18, will in part be diffusely reflected by surface 20 in directions 28 and partly diffusely transmitted in directions 29.

Fig. 2 shows a modification in vertical cross-section in which the lower portion consists of a prismatic reflector cup surrounded and supported by a transmitting diffusing glass. 1 is a fixture fitting supporting holder 2 and socket 3. 4 is an incandescent electric lamp fastened in socket 3 and having the center of its light source at 5. 6 is a transmitting glass cover having a smooth outer surface 7, and radial diffusing prisms 8 on its inner surface. The glass cover 6 is supported in holder 2 by means of set screws 9 so as to make a substantially dust proof joint at 10. Bowl 11 has a flange 12 which is ground to a substantially dust tight seat against flange 13. It is held tightly against the cover glass by metal clamps such as are shown in Fig. 1. The bowl is divided into two portions, the upper portion 15 having a smooth outside surface 16 and refracting prisms 17 on its inner surface. The lower part of the bowl 18 has an ornamented surface 19 and an etched surface 20. 44 is a prismatic reflector cup having a smooth interior surface 45 and radial double reflecting prisms 46 on its outer surface. This reflector cup is attached to bowl 11 by means of the lock nut 47. The action of the light from the source is illustrated by typical rays. Ray 21 emitted by light source 5 and striking cover 6 will be spread laterally by flute 8 and emitted toward the ceiling in general direction 22. Light ray 23 emitted by light source 5 and striking portion 15 of the bowl will be refracted upward toward the ceiling by the combined action of prism 17 and outer surface 16 and will be emitted in general direction 24. The rays of which 22 is typical, and other rays of which 24 is typical will be emitted in the general manner of the similar rays in Fig. 1. Ray 27 emitted by the light source and striking the reflector 44 will in part be reflected by prisms 46 in the direction 28' and partly transmitted in direction 29'. The transmitted ray 29' striking portion of the bowl 18 will be transmitted diffusely in directions 48. Ray 49 emitted by light source 5 and striking the reflector 44 will in part be reflected by prism 46 in direction 50 and partially transmitted in direction 51. Trans-

mitted ray 51 striking portion of the bowl 18 will be transmitted diffusely in directions 52. Light rays emitted by the lamp at angles intermediate to those of ray 27 and ray 49 will be in part reflected at angles intermediate to those of reflected rays 28' and 50.

Fig. 3 shows a modification in vertical cross-section in which the lower portion of the bowl is a prismatic reflector supporting a diffusing glass cover. 1 is a fixture fitting supporting holder 2 and socket 3. 4 is an incandescent electric lamp fastened in socket 3 and having the center of its light source 5. 6 is a transmitting glass cover having a smooth outside surface 7 and radial diffusing prisms 8 on its inner surface. The glass cover 6 is supported in holder 2 by means of set screws 9 so as to make a substantially dust proof joint at 10. Bowl 11' has a flange 12 which is ground to a substantially dust tight seat against flange 13 of the cover glass. Bowl 11' is held tightly against the cover glass by metal clamps such as are shown and described in Figure 1. The bowl is divided into two portions the upper portion 15 having a smooth outer surface 16 and refracting prisms 17 on its inner surface. The lower part of the bowl 18' has a smooth outside surface 53 and horizontal reflecting prisms 54 on its upper portion and horizontal spreading flutes 55 on its lower portion. 56 is a diffusing glass cover set against the bowl 11' at 57 which is the division point between central portion 15 and lower portion 18. This diffusing cover 56 is attached to the bowl by means of lock nut 47. The action of the light from the source is illustrated by typical rays. Ray 21 emitted by light source and striking the cover 6 will be spread laterally by the flute 8 and transmitted toward the ceiling in the general direction 22. Light ray 23 emitted by the light source and striking portion 15 of the bowl will be refracted upward toward the ceiling by the combined action of prism 17 and outer surface 16 and will be emitted in the general direction 24. Ray 27 emitted by light source 5 and striking portion of the bowl 18 will be internally reflected by the combined action of prisms 54 and surface 53 in the direction 28. Light ray 58 emitted by light source 5 and striking the diffusing flutes 55 will be transmitted and spread in directions 59. The transmitted rays 59 striking the cover 56 will be transmitted and diffused in directions 60.

The upper glass cover has the advantage of furnishing a support for the bowl, keeping dust from settling on the inside thereof and on the lamp, spreading the light transmitted through it so as to do away with shadows and hiding the lamp and socket from view. The refracting portion 15 of the bowl is of advantage compared with similar bowls of etched glass in that it redirects the



light toward the ceiling which would otherwise strike to the side walls. The refracting portion is always of advantage as compared with a translucent diffuse reflecting surface, in that it gives a wider distribution of light on the ceiling and since it acts almost entirely by transmission, the light it handles suffers no diminution due to the holder parts. By limiting this refracting screen to the zone indicated no undue brightness due to scattered light or slight variations in construction is produced at any ordinary point of view. The advantage of the diffuse reflecting portion 18' is that ornamental designs may be applied without affecting its action, and by varying the density of the diffuse reflecting coating, the brightness in this portion of the bowl can be reduced or increased as desired. If prismatic means were used for redirecting the light in this portion of the bowl, the size of commercial light sources and variations in manufacture would tend to cause excessive brightness, and no ornaments could be applied. The prismatic reflectors with diffusing envelopes shown in Figures 2 and 3 reduce the brightness to a proper degree.

The unit is preferably given a matt finish on the inside surfaces so as to spread the light slightly.

Fig. 4 shows a modification in vertical cross-section in which the unit is reduced to the smallest possible size, employs a bowl-enamelled lamp and is especially satisfactory for mounting close to the ceiling. 30 is a ceiling surface supporting a holder 43, which in turn supports lamp socket 3. 4' is an incandescent lamp fastened in socket 3 and having the center of its light source at 5'. The lower part of the bulb is covered with a coating of translucent white diffuse reflecting enamel 31. 6' is a transmitting glass cover having a smooth outer surface 7' and horizontal refracting prisms 8' on its inner surface. The glass cover 6' is supported in holder 43 by means of set screws 9 so as to make a substantially dust proof joint at 10. Bow 11'' has a flange 12' which is ground to a substantially dust tight seat against flange 13' of the cover glass. It is held tightly against the cover by the metal clamps 14.

The bowl is divided into two portions, the upper portion 15' having a smooth outer surface 16' and refracting prisms 17' on its inner surface. The lower part of the bowl 18'' is etched on its inner surface and may be etched or ornamented on its outer surface. The action of the light from the light source is illustrated by typical rays. Rays 32 emitted by light source 5' and striking the cover 6' will be refracted outward by the combined action of prisms 8' and outer surface 7' and will be emitted in the general direction 33. Ray 34 emitted by source 5' is acted upon by the prismatic surface 8' and smooth

surface 7' in a manner entirely similar to the action on ray 32 except that emerging ray 35 is directed toward the ceiling at a slightly wider angle than emerging ray 33. Light ray 36 emitted by light source 5' and striking portion 15' of the bowl will be refracted upward to the ceiling by the combined action of the prisms 17' and the outer surface 16' will be emitted in general direction 37. Ray 38 emitted by light source 5' is acted upon by prismatic surface 17' and surface 16' in a manner entirely similar to the action on ray 36 except that emerging ray 39 is directed toward the ceiling at a wider angle than emerging ray 37. Ray 40 emitted by light source 5' and striking the enamelled surface 31 of the bulb will be in part diffusely reflected in directions 41 and partly diffusely transmitted in directions 42.

The advantage of making the cover refracting outward consists in getting the light out far enough from the unit so that when diffusely reflected from the ceiling, very little of it will be interfered with by the unit itself. In the case of ray 32 for instance, if this should go in a direct line to the ceiling and was there diffusely reflected, at least half of the reflected light would strike the unit on its return and probably be lost. The bowl enamelling on the lamp provides for reducing the brightness from ordinary points of view. It is evident of course that if a diffuse reflecting surface be put on the inside of portion 18, that a clear lamp could be used in this design.

I claim:

1. An illuminating appliance consisting of a light source and an enclosing glass bowl completely surrounding the same, such bowl being horizontally divided into three zones, an upper and a lower light transmitting zone, and an intermediate zone provided with light refracting prisms adapted to receive light rays directly from the source and to refract such rays outwardly and upwardly.
2. An illuminating appliance consisting of an enclosing glass bowl, horizontally divided into three zones, an upper light transmitting zone, an intermediate zone provided with light transmitting prisms adapted to refract the light upwardly and a lower translucent reflector zone adapted to reflect part of the light rays incident thereon into the unit for transmission by the upper zone and to diffuse the rays not so reflected.
3. A glass enclosing bowl for light sources having an upper light transmitting and diffusing zone, a lower light reflecting and diffusing zone and an intermediate zone provided with horizontal light refracting prisms on its inner surface adapted to receive the light rays directly from the source and to refract such rays outwardly and upwardly.
4. An illuminating appliance consisting



of an enclosing glass bowl divided into zones, an upper zone provided with a slightly diffusing medium, an intermediate zone provided with light transmitting prisms adapted to receive light rays directly from the source and to refract such rays outwardly and upwardly and a lower zone provided with a denser diffusing medium adapted to reflect part of the light rays upwardly into the unit for transmission by the upper zone. 5. An illuminating appliance consisting of an enclosing glass bowl, horizontally divided into three zones, an upper light transmitting and diffusing zone, an intermediate zone having light refracting prisms thereon adapted to refract the light outwardly and upwardly, and a lower zone provided with an interior reflecting cap adapted to reflect part of the light rays incident thereon upwardly into the unit for diffusion by the upper zone.

Signed at Newark, in the county of Licking and State of Ohio, this 1st day of July, 1921.

WILLIAM A. DOREY.