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BACTERIOLOGICAL COLONY COUNTING DEVICE HAVING A LIGHT-CONDUCTING MEMBER FOR TRANSVERSE ILLUMINATION

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FIG. 1.

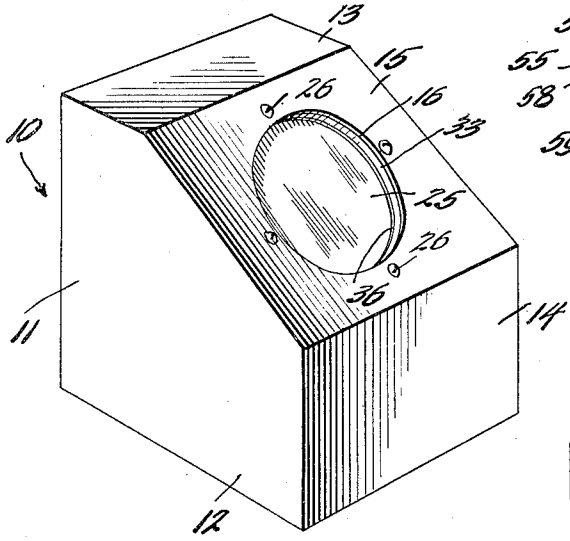


FIG. 3.

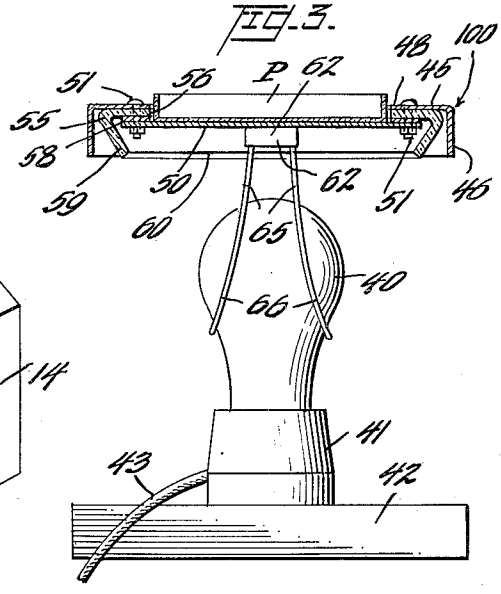


FIG. 2.

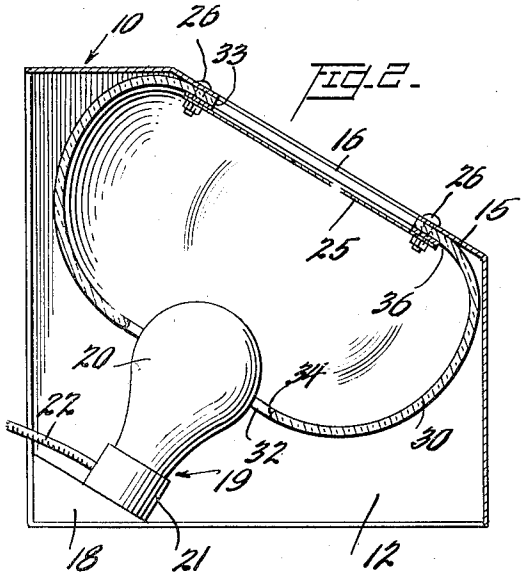
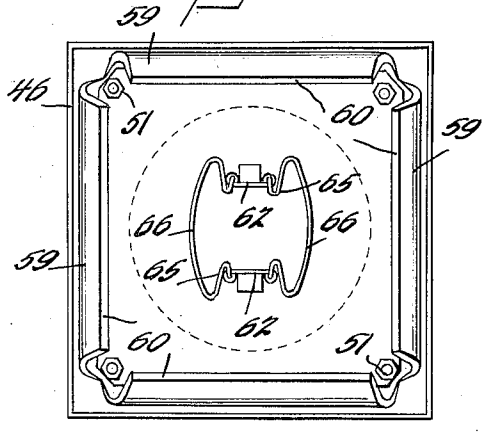


FIG. 4.



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BACTERIOLOGICAL COLONY COUNTING DEVICE HAVING A LIGHT-CONDUCTING MEMBER FOR TRANSVERSE ILLUMINATION

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6 Claims. (Cl. 88—14)

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This invention relates to bacteriological colony counting devices and more particularly to colony counting devices or illuminators which are adapted to function according to the darkfield principle.

The general object of the invention is the provision of a novel and improved darkfield colony illuminator which is of much simpler and less expensive construction than illuminators or counters now on the market, and which at the same time is adapted to give a more uniform and satisfactory illumination of the culture dish without glare or unnecessary diffusion of light.

One important feature of the invention is the provision of a plastic structure for transmitting the light from the source of illumination to the periphery of the Petri dish or culture holder, the plastic composition being of the class which has the property of transmitting or "piping" light around curves or corners. Examples of such compositions are polystyrenes and acrylic resins, the latter group including those manufactured under the trade names "Lucite" and "Plexiglas."

The invention in its preferred embodiments contemplates the provision of a frame having a depressed seat for the Petri dish or similar culture support, and a source of illumination such as an ordinary electric lamp bulb adjacent the frame. The seat upon which the dish is disposed may be made of metal, plastic or any suitable durable material and is of a dark color, preferably black. The upper surface of the frames in which the dish is seated is also preferably dark or non-reflective for the most effective use.

The side walls of the recess within which the Petri dish is seated are comprised by a circular opening cut or otherwise formed in a plate of the light transmitting plastic material, the radially outwardly extending portions of the plate being bent or curved toward the light source, presenting either flat or lenticular edges to the source to receive the light.

With this improved illuminator, the light is conducted from the source and directed transversely of the Petri dish, radially inwardly of the lower portion thereof, and the colonies stand out clearly against the dark background so that pinpoint colonies are easily distinguished from any small particles in the culture medium.

Other objects and features of novelty, including a novel arrangement whereby the illuminator is provided as an attachment for an ordinary light bulb, will be apparent from the following specification when read in connection with the

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accompanying drawings in which certain embodiments of the invention are illustrated by way of example.

In the drawings:

Figure 1 is a view in perspective of a colony counter embodying the principles of the invention;

Figure 2 is a vertical sectional view through the counter shown in Figure 1;

Figure 3 is a view in vertical section through a counter comprising another form of the invention, this embodiment being a readily portable attachment for an electric light bulb; and

Figure 4 is a bottom plan view of the attachment removed from the bulb.

In the form illustrated in Figures 1 and 2 of the drawings, the counter 10 comprises a box-like housing or frame 11 which has a pair of side walls 12, a short horizontal top wall portion 13 and a forward lower front wall 14. Arranged at a convenient inclination between the portions 13 and 14 is a sloping wall or working surface 15 which is provided with a preferably circular opening 16 in the center thereof.

Suitably supported as upon a bracket or block 18, which may be secured to the opposite side walls 12 if desired, is a source of illumination 19 which comprises the electric lamp bulb 20, the base 21, and the wires 22.

Beneath the opening 16 in the working surface 15 and spaced below the margins of the opening a distance preferably somewhat less than the height of a Petri dish, is a backing plate 25. This plate is disposed in a plane parallel to the surface 15 and may be secured by means of the bolts 26. The plate 25 may be made of metal, plastic, or any other suitable material but is preferably provided upon its upper surface with a coating of a dark or non-reflecting color, preferably black, so as to provide an appropriate darkfield background for viewing the colony in the Petri dish.

For the purpose of transmitting the light from the bulb 20 transversely of the dish received within the opening 16 and so that the light is directed radially inwardly of the dish, the following novel arrangement is provided. A globular or bowl-like member 30 is provided, this member being made of a material which has the property of "piping" light around curves or corners, examples of this type of material being certain plastics of the polystyrene or acrylic resin class, for example Lucite or Plexiglas. The term "light-conducting" as used in the claims forming a part of the application, is intended to refer

to the property just described. The globe 30 is provided with diametrically opposite openings 32 and 33, the margins of the opening 32 surrounding the center of the source of light comprised by the bulb 20. The edges 34 of the opening may be either straight or convexly curved as shown in Figure 2. The opening 33 at the opposite side of the bowl or globe registers substantially with the opening 16 in the working surface 15, and the margins of the opening 33 are preferably made planar and are secured to the surface 15 by the same bolts 26 which serve to support the darkfield plate 25. If desired, a washer or gasket 36 may be interposed between the darkfield plate and the margins of the opening 33 and the globe 30 and a similar gasket may be provided between these margins and the inside of the surface 15.

It will thus be seen that when a Petri dish or other receptacle containing the culture medium and the bacteria colonies is disposed above the darkfield 25 the rays of light picked up by the transmitter 30 from the bulb 20 will be piped around the curvature of the globular or bowl-like transmitter and projected inwardly from all directions at the edge 33 so as to give transverse illumination to the Petri dish, especially in its lower portions wherein is disposed the culture.

The convex rounding 34 of the inlet opening 32 of the light transmitter tends to cause the rays emitted at the discharge edge 33 to follow a substantially parallel path, rather than diverge and diffuse at the point of emission.

If desired, a magnifying glass and a suitable adjustable support therefor may be provided as in the case of the conventional colony counters, but this is not shown in the drawings, since it forms no part of the present invention.

The embodiment illustrated in Figures 3 and 4 of the drawings comprises a somewhat lighter, more readily portable device in which the counter 100 is in the form of a separable attachment adapted to be clipped to the bulb 40 carried in the socket 41 mounted upon the base 42 and fed with current by means of the leads 43.

The counter in this instance comprises an outer plate 45 having flanges 46 at the margins thereof and provided with a central opening 48 of a slightly greater diameter than that of the Petri dish P which is seated within the opening. The darkfield bottom plate is shown at 50 and it will be seen that this is secured in spaced relation to the underside of the outer plate 45 as by means of the bolts 51. Between the margins of the opening 48 in the outer plate 45 and the overlapping margins of the darkfield bottom plate 50, there is clamped the transmitter plate 55 which is made of a light piece of resinous plastic or other material of similar properties, just as in the case of the globe transmitter 30 in the previously described embodiment. This transmitter plate is provided with an opening 56 registering substantially with the opening 48 in the outer frame plate 45 and a gasket 58 may be interposed in order to protect the margins of the transmitter plate. In this case the transmitter plate 55 is approximately square and is provided with four inwardly directed curved flanges 59 these flanges being directed toward the center of illumination afforded by the bulb 40, so that the inlet or pickup edges 60 of the plate 55 may be exposed to as much light from the bulb 40 as possible. The configuration of the edges 60 may be either rectangular or lenticular as desired.

On the underside of the darkfield plate 50, which is preferably of metal, there is secured, as by welding or soldering, the angle flanges 62. The ends of the outstanding flanges of the members 62 are curled around the ends of the looped wire clamping elements 65, these elements being preferably welded or soldered into the sockets formed by the curved ends of the flange of the member 62 and having their looped or bight portions 66 substantially circular, so that they may fit around the spherical portion of the lamp bulb 40 when sprung into position thereon. The spring tension of the clamp or clip member 65 is sufficient to frictionally support the counter 100 upon the bulb 40 in any suitable position to which it may be tilted. While the inlet edges 60 of the flanges 59 of the transmitter plate are disposed further from the light source than in the earlier described embodiment, this modification comprises a very convenient portable and easily set up apparatus, and may be preferred in many circumstances.

Various changes and modifications may be made in the embodiments illustrated and described without departing from the scope of the invention as defined in the following claims.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent is:

1. A bacteriological colony counter or the like comprising, in combination, a supporting frame having a working surface which is substantially impervious to light, a source of light disposed substantially centrally of said frame, an opening in said surface of the size and configuration to receive a Petri dish or the like, a bottom plate supported by said frame beneath said opening at a distance less than the depth of a dish, said bottom plate adapted to support the dish and to intervene between said dish and said source of light, a plate of light conducting material occupying a plane intermediate the planes of the working surface and the bottom plate, outer portions of said plate being return-bent and directed toward the centrally disposed light source to pick up light therefrom, an opening in said plate of light conducting material in approximate registry with the opening in said surface, whereby the light picked up by the outer edge of said last named plate is discharged radially inwardly through the dish.

2. A bacteriological colony counter or the like comprising, in combination, an electric light bulb, a supporting frame for a Petri dish or the like, comprising a light impervious sheet upon which said dish is adapted to rest, a spring clip on said frame for adjustably gripping said bulb and supporting said frame thereon so that said bulb is maintained substantially centrally of said frame, a plate of light conducting material carried by said frame and having an opening centrally thereof within which said dish is received, and outwardly disposed marginal flanges of said plate being return-bent at a reflex angle to the plate of its central portion, and having their terminal edges directed inwardly toward the bulb, whereby the light is received by said edges and discharged from the margins of the opening in its central portion radially inwardly toward said dish.

3. A bacteriological colony counter or the like comprising, in combination, a source of light, a support for a Petri dish or the like, a globe made of light conducting material and having openings therein at approximately diametrically opposite points, one of said openings adapted to receive said source of light and the other to receive said Petri dish, means for positioning said light source

within its opening and said Petri dish within the other, whereby light from said source is received by the edges of the former opening and discharged from the edges of the latter opening transversely of the dish.

4. A bacteriological colony counter or the like comprising, in combination, a source of light, a darkfield support for a Petri dish or the like, a hollow approximately spherical member made of light conducting plastic material and having openings therein at approximately diametrically opposite points, one of said openings adapted to receive said source of light and the other to receive said Petri dish, means for positioning said light source within its opening and said Petri dish within the other, whereby light from said source is received by the edges of the former opening and discharged from the edges of the latter opening transversely of the dish.

5. A bacteriological colony counter or the like comprising, in combination, a frame for the support of a Petri dish or the like, a light-conducting member supported by said frame and having an opening within which said dish is adapted to be disposed, a source of light disposed substantially in alignment with the axis of said opening, a light-impervious mask disposed between said dish and said light source, the margins of said opening constituting light-emitting edge surfaces directed radially inwardly toward the dish, symmetrically disposed radially outward portions of the light-conducting member being return-bent, directed radially inwardly toward the axially located source of light, and terminating in light-inlet edge surfaces.

6. A bacteriological colony counter or the like comprising, in combination, a frame for the support of a Petri dish or the like, a light-conducting member supported by said frame and having an opening within which said dish is adapted to be disposed, a source of light disposed substantially in alignment with the axis of said opening, the margins of said opening constituting light-emitting edge surfaces directed radially inwardly toward the dish, symmetrically disposed radially outward portions of the light-conducting member being return-bent, directed radially inwardly toward the axially located source of light, and terminating in light-inlet edge surfaces, said source of light being an ordinary electric lamp bulb, and a spring clip on said frame for snapping the frame onto said bulb, whereby it may be supported upon the latter.

RONALD M. WOOD.

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