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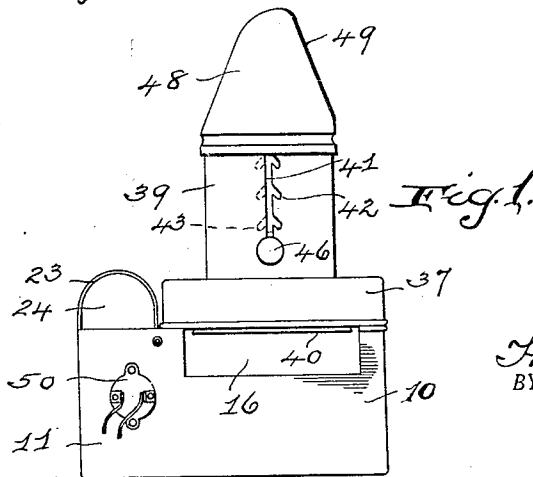
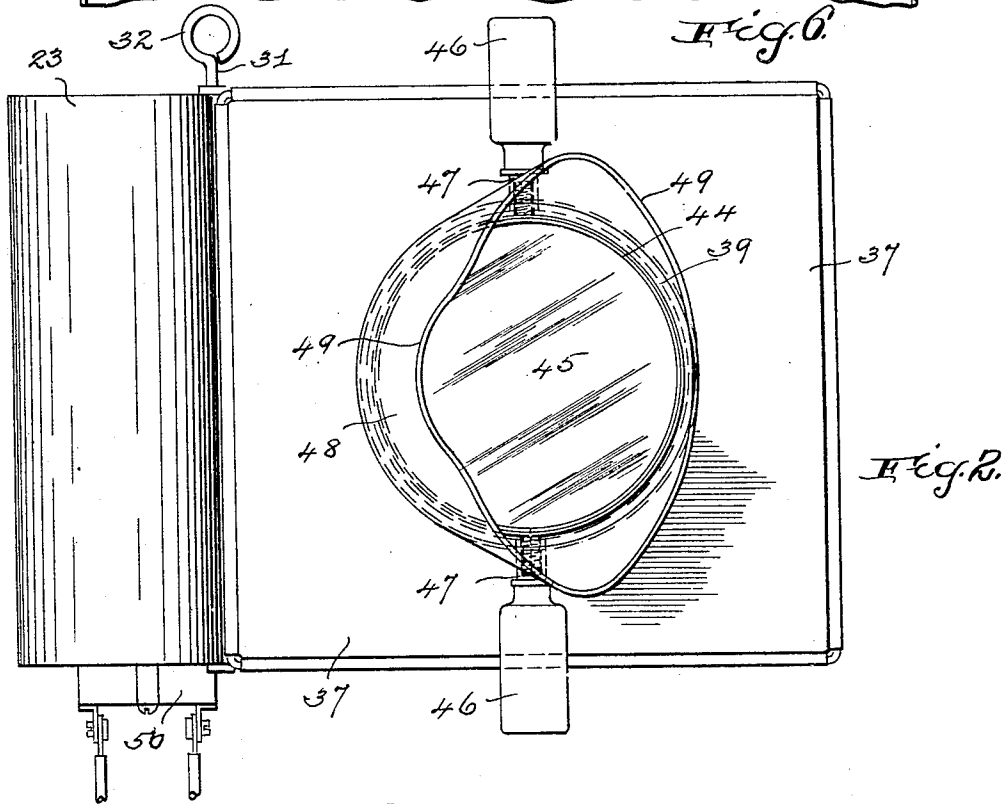
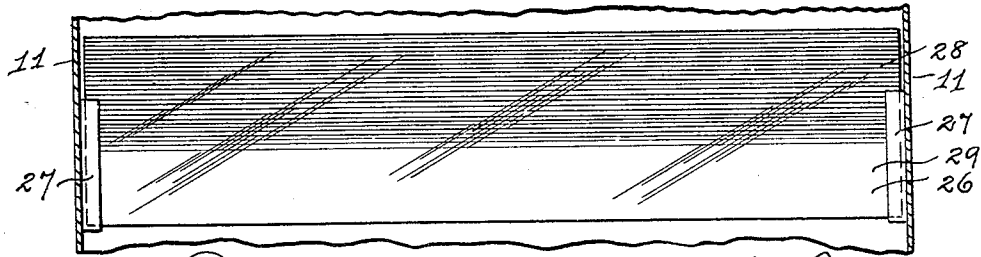
T. C. BUCK, JR

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COLONY COUNTING APPARATUS FOR LABORATORY USE

Filed Feb. 23, 1927

3 Sheets-Sheet 1



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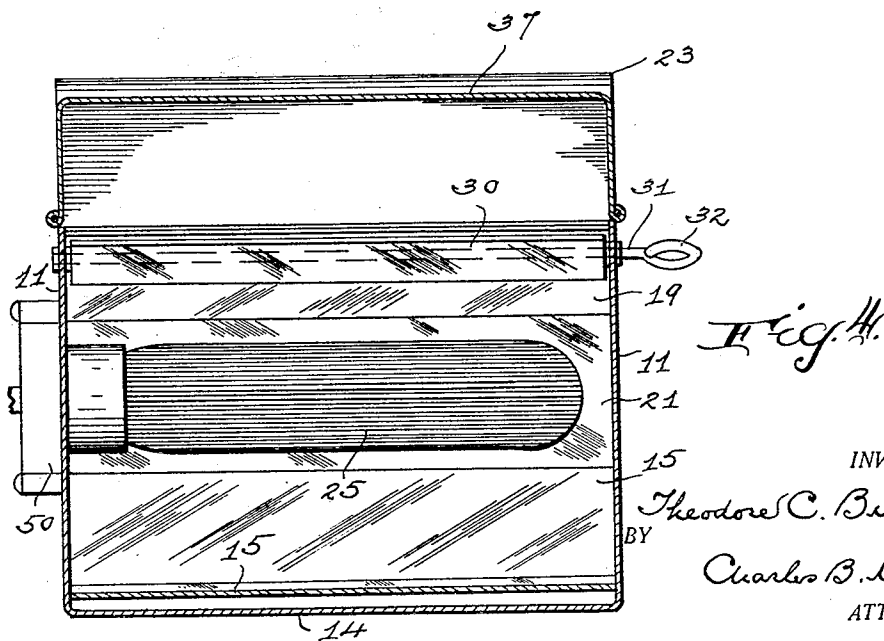
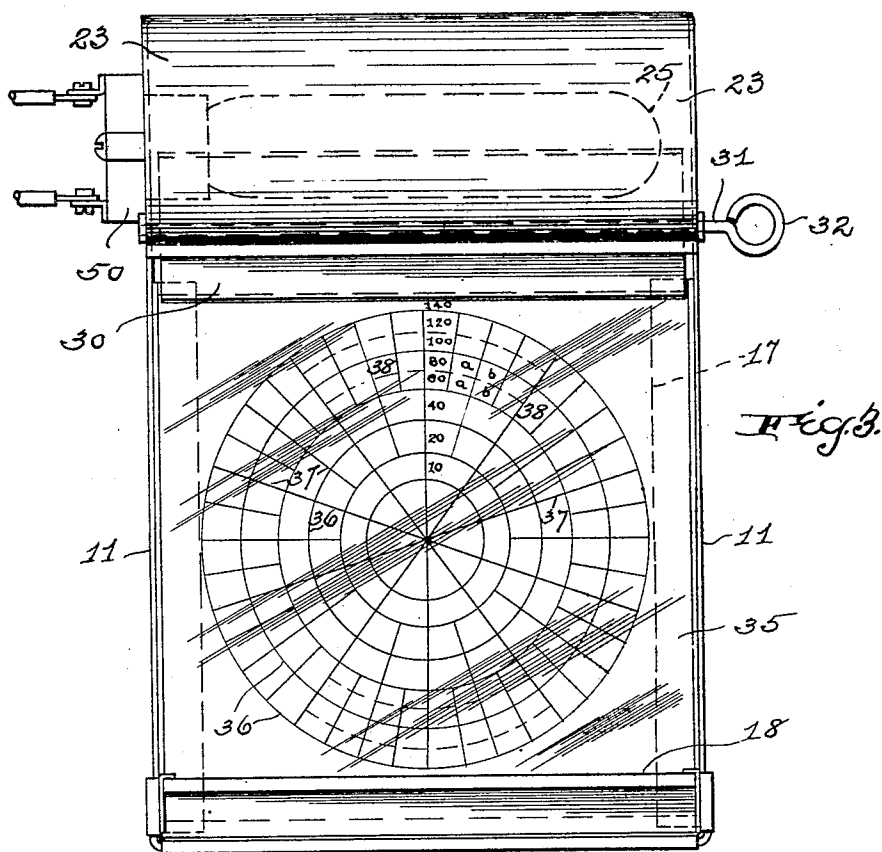
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3 Sheets-Sheet 2



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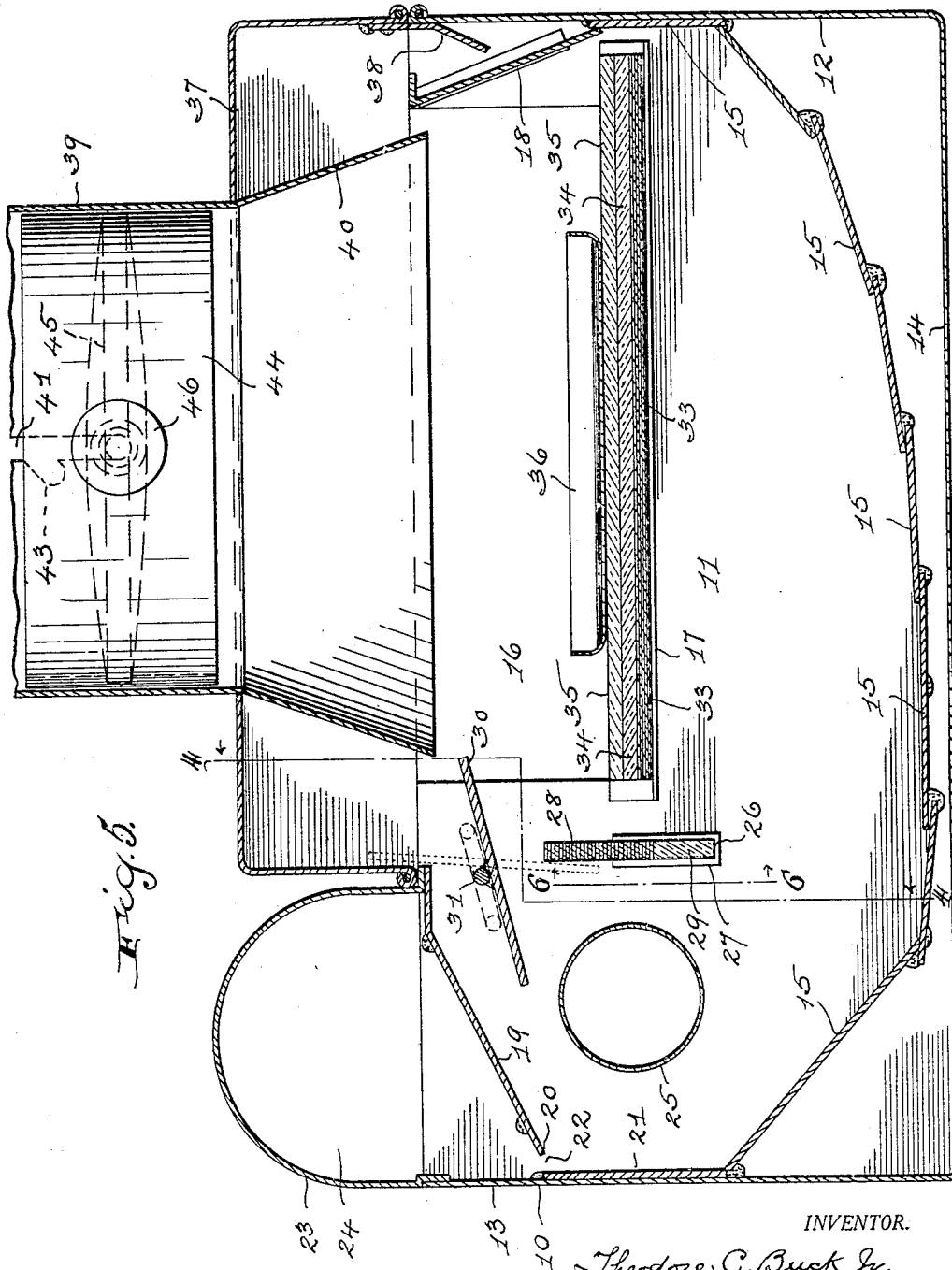
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COLONY COUNTING APPARATUS FOR LABORATORY USE

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3 Sheets-Sheet 3



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COLONY COUNTING APPARATUS FOR LABORATORY USE

Application filed February 23, 1927. Serial No. 170,404.

This invention relates to improved colony counting apparatus for laboratory use for testing various substances, particularly foods and fluids.

Colony counting devices usually employ what are known as Jeffer plates which are ruled and laid off to form divisions so that the substance under test may more readily be subdivided and the testing more accurately conducted.

It is also common in using apparatus of this kind to employ what are known as Petri dishes of a transparent glass upon which the substance to be tested is placed and these dishes are placed over the Jeffer plates during the testing operation.

The purpose of my invention is to provide an apparatus for facilitating these colony counting tests by properly illuminating the Petri dishes and the Jeffer plate with respect to the magnifying elements through which the substances to be tested are viewed.

With these, and other objects in view, the invention is illustrated in the accompanying drawings, wherein,—

Fig. 1 shows the complete apparatus, on a small scale and in side elevation.

Fig. 2 illustrates the same on a larger scale and in top or plan view.

Fig. 3 shows the same in top view but with the cover and its magnifying elements removed.

Fig. 4 illustrates a vertical sectional detail through the device as viewed on the line 4—4 of Fig. 5.

Fig. 5 shows a central longitudinal section through the apparatus, and

Fig. 6 illustrates a vertical sectional detail on the line 6—6 of Fig. 5.

Referring to the drawings, the numeral 10 designates a casing or housing with vertical side walls 11; vertical front and rear walls 12 and 13 and a bottom 14.

On the interior of this casing and extending from one side wall to the other are a series of cross-wise reflector plates 15. These plates are arranged to varying angles and extend from the said front wall all the way to and partly up at the rear wall as shown in Fig. 5 of the drawings.

The interior vertical surfaces of the side walls 11 are polished or otherwise treated to produce reflecting surfaces.

The two side walls 11 have side cut-outs 16 in their top edges and immediately below the edges of these cut-outs each wall has a supporting structure 17 along its inner side which in this instance has the form of a horizontal angle-plate.

The angle-plates on the inner sides of the two opposite side walls are located in the same horizontal plane so they may support a plurality of glass plates which will presently be explained.

Adjacent to the front wall 12, I provide an inclined reflector plate 18 which extends upwardly above the front ends of the angle-plates 17 and at the rear of the casing I provide a rearwardly and downwardly-inclined reflector-plate 19, whose lower rear edge terminates adjacent to but spaced from a vertical reflector-plate 21, thus providing a space 22 between said plates 19 and 21 for a purpose that will also presently be explained.

Above the rear inclined reflector-plate 19, I have the casing open at the upper edges of the side walls but I provide a curved or arched cover-plate 23 thereover, which latter however is open at opposite sides 24. The purpose of this will also presently be explained.

At the rear end of the casing beneath the inclined reflector-plate 19 and the rear vertical reflector-plate 21, I provide a long horizontally-extending lamp 25 which projects from a socket located on the side wall 11. This electric lamp 25 has a pale blue glass as indicated by the horizontal shading in Fig. 4, and when this lamp is burning, the heat generated thereby passes up through the gap or space 22 and escapes through the opposite side openings 24 of the arched cover-plate 23.

Between the blue lamp and the rear ends of the angle-plates 17, I locate a glass plate 26, which latter is supported in vertical brackets 27 on the inner sides of each side wall. This glass plate 26 therefore has a vertical position in front of the lamp 25.

I have found in practice that best results are obtained if the vertical glass plate 26 is

ground and if the upper portion 28 thereof is colored a pale blue like the color of the lamp, and the lower portion 29 thereof is left plain but opaque as the result of the grinding.

5 Above the lamp 25 and the vertical glass plate 26, there is provided a pivoted reflector-plate 30, which is carried on a rod 31 that is mounted in the opposite side walls 11,—the
10 outer end 32 of the rod being shaped to enable it to be readily engaged by the fingers and turned more or less in either direction whereby to give the proper inclination to the reflector-plate 30 to produce the best results. The rod and reflector are so mounted as to remain
15 in the adjusted position.

The position of the pivoted reflector-plate 30 is such that it may be swung to assume practically a vertical position so as to be interposed between the lamp 25 and the upper
20 blue portion 28 of the vertical glass plate 26.

On the horizontal angle-plates 17, I provide, in this instance, three glass plates 33, 34 and 35 respectively.

25 The lowermost glass plate 33, as indicated in Fig. 5, is blue glass; the uppermost glass plate 35, is plain plate glass while the interposed glass plate 34 is plain but has a series of concentric circles 36, that are intersected by a
30 series of diametric lines 37, whereby to form a plurality of spaces or divisions 38.

The lined plate 34, is not in itself new with me and is well-known as Jeffer plate, but so far as I am aware no one has used a Jeffer
35 plate as I do in the present apparatus and in combination with the other plates.

The Jeffer plate is interposed between the upper plain glass plate 35 and the lower blue plate 33, but lines and divisions on such Jeffer
40 plate may readily be seen through the upper clear plate.

Attention is directed to the fact that the horizontal axis of the lamp 26 is substantially in the same plane as the horizontal interposed Jeffer plate 34 and that the blue colored portion 28 of the vertical glass plate 26
45 extends up above the Jeffer plate and to the upper most horizontal surface of the blue lamp.

50 The object in this is to intercept direct light from the lamp to the glass plates 33, 34, 35.

The substance to be tested is contained on a Petri dish 36 which is inserted through one of the cut-outs or side openings 16 and laid on
55 top of the uppermost plain glass plate 35.

This dish 36 is of plain glass so that when looking down from above, with the casing illuminated from beneath the blue glass 33, the division lines on the Jeffer plate 34, may
60 be readily seen through the Petri dish and the upper plain glass 35 and the colonies on the dish over any one or more of the Jeffer plate subdivision may be distinguished from those over other sub-divisions.

65 I provide the case with a cover 37 which

has position directly over the glass plates 33, 34 and 35 and this cover has a depending flange 38 at its front wall which projects down inside of the casing at the rear of the front wall 12, whereby to prevent the shifting
70 of the cover on the casing.

A tube 39 extends upwardly from the cover directly over the glass plates and the lower end of this tube is open and has a depending
75 flared annular flange 40 at the under side of the cover. The purpose of the flared flange is to cut off direct light rays from the lamp up into the tube and the under side of the cover and the surfaces of the flange and tube are all black to prevent reflections of light.
80

In the present instance, I provide vertical slots 41, in diametrically-opposite sides of the tube 39 and the slot at one side has off-sets or notches 42 at one side edge while the slot at the opposite side has off-sets or
85 notches 43 at the opposite side edge, as indicated by full and broken lines in Fig. 1 of the drawings.

In the tube 39, I provide a collar or ring 44 in which is mounted a magnifying lens 45
90 and handles 46, at opposite sides of the ring project through the slots 41, whereby the horizontal position of the lens in the tube may be varied by raising or lowering the
95 same in the tube.

The handles 46 have reduced sockets 47 at their inner ends which pass through the slots 41; and by a slight rotation of the collar, these handle-sockets may be seated in any pair of
100 offset notches 42—43 in the tube to hold the lens in the desired adjusted position in the tube.

The upper end of the tube 39, carries a head-piece 48, which has an opening whose marginal edge 49, is shaped to fit the face and
105 forehead of an observer during the testing operation.

The lamp 25, is sustained from a socket 50 on one of the side walls 11 and electric current is supplied to this socket in the usual
110 way.

In operation, the substance to be tested is placed on the Petri dish in the usual way and the dish is then moved through the side cut-out 16 in the side wall and seated on the
115 top plain glass plate 35.

The lamp 25 being illuminated produces the light, and this light is reflected by the plates 21 and 15 against the under side of the lowermost colored glass plate 33, so as
120 to uniformly light that plate.

When viewed from above, the colored plate produces a dark background beneath the Jeffer plate 34 and the lines on the latter stand
125 out very prominently.

Light from the lamp to the upper side of the top glass plate 35, is intercepted by the vertical colored glass plate 26—28 so that none of the plates 33—34 or 35 will be sub-
130 ject to direct light from the lamp.

The inclined reflector plate 18 at the front is so arranged that light from the rear end is reflected back so that there is practically a uniformity of light over the top plate 35.

5 The adjustable reflector plate 30 directs the light across the Petri dish from one side and causes slight shadows to be produced at one side of the colonies and renders the latter more perceptible.

10 The adjustable reflector 30 may also be operated to cut off light from above and thus permit only reflected light beneath the glass plates.

15 The lower plate 33 while in most instance is blue in color, may be of other colors, particularly when the substance being tested has colored organisms therein.

20 It has been found in practice that the structure herein set forth and illustrated produces transmitted light to illuminate the substances on the Petri dish and reflected light to illuminate the colonies so that the colonies can be readily distinguished without eye-strains.

25 Having described my invention, I claim.—

1. In a colony counting device the combination with a casing, of a transparent ruled plate having divisions thereon and supported in the case so that external light shall be excluded from the under side thereof and so the substance to be tested may be sustained above said divisions, illuminating means enclosed in the case beyond the end of the ruled plate and a translucent plate between the end of the ruled plate and the illuminating means and extending at an angle with respect to said ruled plate said translucent plate having its upper portion colored and its lower portion white.

40 2. In a colony counter the combination with a casing, of a transparent plate having lines thereon to produce a series of divisions said transparent plate being arranged in the case so that external light shall be excluded from the under side thereof and so the substance to be tested may be carried above said lines, a colored translucent plate beneath the lined plate, an illuminating means in the casing and means for directing reflected light from the illuminating means against the under side of the colored translucent plate.

55 3. In a colony counter the combination with a casing, of a transparent plate having lines thereon to produce a series of divisions said transparent plate being arranged in the case so that external light shall be excluded from the under side thereof and so the substance to be tested may be carried above said lines, a translucent plate in the casing beneath the lined plate, an illuminating means also in the casing, means in the casing for directing reflected light from the illuminating means against the under side of the translucent plate and means also in the casing for di-

recting light from the illuminating means across the case above the lined plate.

4. In a colony counting apparatus the combination with a casing, of a translucent plate supported in the casing, a ruled transparent plate also in the casing above the translucent plate, a plain transparent plate in the casing above the ruled plate, reflector devices in the casing and arranged at angles with respect to and beneath the translucent plate and illuminating means in the casing to provide light to be directed by the reflector devices against the under side of the translucent plate.

5. In a colony counting apparatus the combination with a casing, of a colored translucent plate supported in said casing, a ruled transparent plate in the casing above the colored translucent plate, reflector devices arranged in the casing at angles with respect to and beneath the colored translucent plate, a structure above the ruled transparent plate and said structure carrying a magnifying lens directly over the ruled plate and illuminating means in the casing.

6. In a colony counting apparatus the combination with a casing, of a plate having lines thereon to produce divisions on the plate said plate being arranged in the casing so the substance to be tested may be located over said divisions, illuminating means in the casing and a movable plate in the casing above the lined plate and located between the illuminating means therein and the lined plate also therein said movable plate being arranged to direct the light projected from the illuminating means over the said lined plate.

7. In a colony counter the combination with a casing, of a plate sustained in the casing in spaced relation beneath the upper side of the casing on which the substance to be tested may be placed and also enclosed in the casing so that external light may be excluded from both the plate and the substance under test, means forming an enclosed passage to exclude external light said means extending from the interior of the casing over the said plate on which the substance to be tested is placed, to the outer upper side of the casing, a magnifying means in the said enclosed passage and illuminating means in the case.

8. In a colony counter the combination with a casing of a plate sustained in the casing in spaced relation beneath the upper side of the casing on which the substance to be tested may be placed and also enclosed in the casing so that external light may be excluded from both the plate and the substance under test, means forming an enclosed passage to exclude external light said means extending from the interior of the casing over the said plate on which the substance to be tested is placed, to the outer upper side of the casing, a magnifying means in the

said enclosed passage, illuminating means in the casing to illuminate the under side of the said plate and the substance thereon and means for controlling the passage of light from the interior illuminating means to the upper side of said plate below the top of the casing.

9. In a colony counting device the combination with a casing closed to exclude external light and having a sight opening at its upper side, of a transparent plate supported in the closed casing beneath the sight opening and on which the substance to be tested may be supported, magnifying means above the transparent plate, illuminating means in the casing and adjustable reflector means also in the closed casing between the illuminating means and the plate to regulate the light directed about the plate.

10. In a colony counting device the combination with a casing closed to exclude external light and having a sight opening at its upper side, of a transparent plate supported in the closed casing beneath the sight opening and on which the substance to be tested may be supported, magnifying means above the transparent plate, illuminating means in the closed casing, reflector means in the casing above and below said plate and between the illuminating means and the plate and said upper reflector means being adjustable to vary the rays of light about the plate.

In testimony whereof I affix my signature.

THEODORE C. BUCK, JR.