

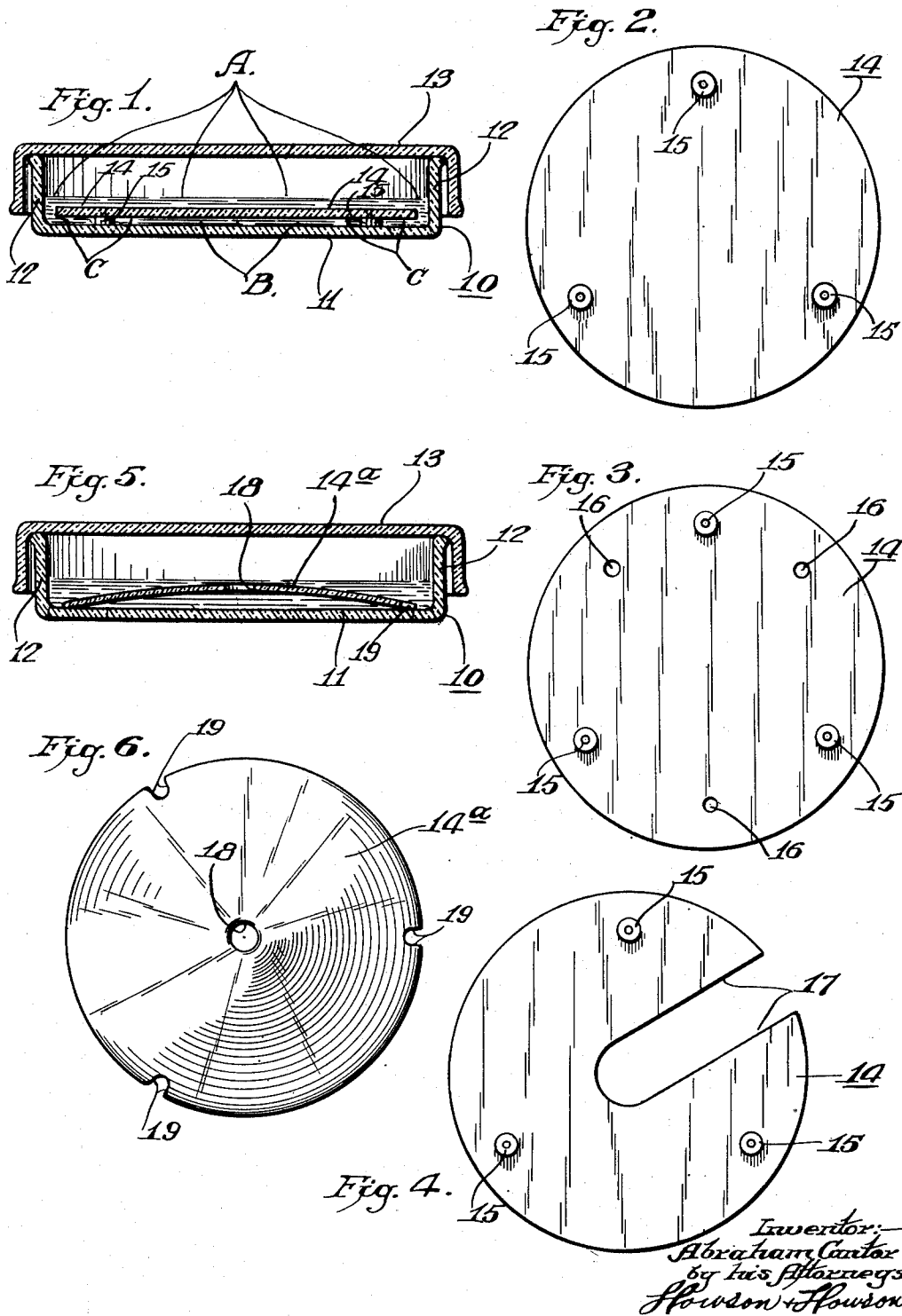
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A. CANTOR

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APPARATUS FOR THE GROWTH OF MICRO-ORGANISMS

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APPARATUS FOR THE GROWTH OF
MICROORGANISMS

Abraham Cantor, Philadelphia, Pa.

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This invention relates to apparatus for the culture of micro-organisms and pertains, particularly, to the production of a single apparatus by means of which all types of micro-organisms may be cultured or studied for either diagnostic purposes or for the preparation of biologicals simultaneously without the necessity of any specific additional apparatus for the culture of any particular type.

Another and more specific object of the invention is the provision of an apparatus whereby the various types of micro-organisms may be simultaneously cultured by plating methods very similar to those now employed in the laboratory culture of aerobic micro-organisms.

Micro-organisms may be generally divided into three types, aerobic, micro-aerophilic, and anaerobic, requiring respectively for their growth free oxygen or a relatively high oxidation-reduction potential, a very limited range of oxidation-reduction potential, and the absence, or almost complete absence, of oxygen.

Laboratory methods heretofore employed in the culture of such micro-organisms required separate and distinct methods for the culture of each of the various types. Ordinarily, the Petri dish is employed, and in culturing aerobes the culture is simply placed in the dish in the presence of a shallow layer of some culture medium such as agar.

In the culture of anaerobes the procedure followed is the same as that above, except for the fact that the dish is placed in a container of such character that the atmospheric oxygen may be readily removed therefrom to provide a uniform low potential in the growth medium. Neither of these methods is satisfactory in the growth of strictly micro-aerophilic organisms since in the former a uniformly high, and in the latter a uniformly low potential is established without in either case providing the intermediate range necessary for micro-aerophilic organisms. Those strictly micro-aerophilic organisms which grow at aerobic or high potential do not grow in the ordinary Petri dish commonly employed in the laboratory if the necessary fortification of the medium with carbon dioxide is not maintained. Accordingly, in the growth of such organisms, the dishes are placed in a container to which a definite volume of carbon dioxide has been or is subsequently added. It will be noted that if a specimen which may bear all three types of organisms is to be tested, three separate sets of plates must be prepared and maintained under

the varying conditions favorable to growth of the organisms of the three various types.

A further and more specific object of the present invention is the provision of a simple and readily useable addition to the ordinary Petri dish which will enable simultaneous growth of all three types of organisms since, by its combination with the dish it reproduces in effect the vertical dimension characteristic of the ordinary test tube method for the production of anaerobic organisms.

Another object of the invention is the provision of an attachment or addition to the Petri dish which is readily modified so that the area favorable to the growth of any particular type of organism may be regulated.

These and other objects I attain by the construction shown in the accompanying drawing wherein, for the purpose of illustration, I have shown preferred embodiments of my invention and wherein:

Fig. 1 is a vertical sectional view through bacterial culture apparatus embodying my invention;

Fig. 2 is a plan view of the baffle shown in Fig. 1;

Fig. 3 is a plan view of a slightly modified form of baffle;

Fig. 4 is a plan view of a further modification of the baffle;

Fig. 5 is a sectional view through a complete apparatus showing a still further modified form of baffle; and

Fig. 6 is a plan view of the baffle illustrated in Fig. 5.

Referring now more particularly to the drawing, the numeral 10 designates a Petri dish which usually has a substantially flat bottom 11 and perpendicular side walls 12. Such dishes are quite shallow and include a cover designated at 13. In accordance with my invention, I arrange within the dish 10 a baffle 14, at present shown as in the form of a disc, of any suitable material having relatively short depending legs 15 engaging the bottom of the dish and holding the baffle in slightly spaced relation thereto. This baffle is placed in the dish in such fashion that it is partially or completely submerged in the culture-containing medium and then maintained at the proper temperature for the growth of bacteria.

It will be obvious that any of the medium arranged above the disc or between the edges of the disc and the side walls of the dish, assuming the dish is maintained in an atmosphere favorable to the growth of aerobic organisms, will

have a potential favorable to the growth of aerobic organisms. It is likewise obvious that those portions of the culture medium which lie beneath the center of the disc and are, accordingly, remote from the source of oxygen, will have a relatively low oxidation-reduction potential and will, therefore, favor the growth of anaerobic organisms. It is further obvious that between the zone A which is favorable to the growth of aerobic and the zone B favorable to the growth of anaerobic organisms there will be a further zone C in which a fortified CO₂ concentration will be maintained and the potential will be graduated and, therefore, favorable to the growth of various types of micro-aerophilic organisms. Not only will these distinct zones be favorable to the growth of the organisms, but colonies of microbes forming in the zones are readily available for study and subculture. It will be clear that the operation is based on the negative potential drift in sterile media and the counteraction of that drift by the restricted diffusion of oxygen into the medium.

The specific areas available for the study of any particular type of organism may be regulated by the formation of the baffle as, for example, by perforating the disc at 16 or notching the same, as indicated at 17, or by employing a combination of these features. The disc itself may, as hereinbefore stated, be made of any suitable material whether this material be chemically or physically active with the culture medium or not. It may, furthermore, have any suitable conformation being either flat as shown in Figure 1, or concave as shown at 14a, Figure 5. Where a concave disc is employed, the high point of the disc is preferably perforated, as indicated at 18, and the periphery thereof may be slightly notched, as indicated at 19. The size and form of the openings employed, or of the notches formed in the edges of the disc may be varied as desired. In many instances, it may be desirable that these openings or notches be made of considerable size whereby to permit the formation of cups in the culture medium, these cups being used for the testing of chemotherapeutics, antiseptics, germicides, or disinfectants.

While the invention has been shown and described as used in combination with the standard Petri dish, it may, of course, be employed with any other suitable laboratory dish without regard to its particular structure or conformation. Where a flat baffle is employed, the supports by means of which the baffle is maintained in spaced relation to the adjacent surface of the dish may be either a part of the baffle itself or a part of the dish, as desired, and in either case may be made either integral with or attached to that portion of the apparatus by which it is borne.

It will be obvious that apparatus constructed in accordance with the foregoing may be conveniently employed not only in the capacities suggested above but likewise in the sterility testing of biologicals and in the determination of micro-organismal flora of various materials such as soil, water, foods, milk and the like.

Since the structure is capable of considerable modification without departing from the spirit of my invention, I do not wish to be understood as limiting myself to the forms here illustrated except as hereinafter claimed.

I claim:

1. Apparatus for simultaneously culturing micro-organisms which require varying ranges of

oxidation-reduction potential, or carbon dioxide tension, a Petri dish comprising a shallow solid-bottomed receptacle and a removable baffle in slightly spaced relation to the bottom of said receptacle, said baffle having a notch extending inwardly from the perimeter thereof.

2. Apparatus for simultaneously culturing micro-organisms which require varying ranges of oxidation-reduction potential, or carbon dioxide tension, a Petri dish comprising a shallow solid-bottomed receptacle and a removable baffle in slightly spaced relation to the bottom of said receptacle, said baffle being concave and having an opening formed therein.

3. Apparatus for simultaneously culturing micro-organisms which require varying ranges of oxidation-reduction potential, or carbon dioxide tension, a Petri dish comprising a shallow solid-bottomed receptacle and a removable baffle in slightly spaced relation to the bottom of said receptacle, said baffle being concave and having an opening formed therein, the periphery of the baffle being seated upon the bottom of the receptacle.

4. Apparatus for simultaneously culturing micro-organisms which require varying ranges of oxidation-reduction potential, or carbon dioxide tension, a Petri dish comprising a shallow solid-bottomed receptacle and a removable baffle in slightly spaced relation to the bottom of said receptacle, said baffle being concave and having an opening formed therein, the periphery of the baffle being seated upon the bottom of the receptacle and having notches formed therein.

5. Apparatus for simultaneously culturing micro-organisms which require varying ranges of oxidation-reduction potential, or carbon dioxide tension, a Petri dish comprising a shallow solid-bottomed receptacle and a removable baffle in slightly spaced relation to the bottom of said receptacle, said baffle being concave and having a central opening formed therein.

6. Apparatus for simultaneously culturing micro-organisms which require varying ranges of oxidation-reduction potential, or carbon dioxide tension, a Petri dish comprising a shallow solid-bottomed receptacle and a removable baffle in slightly spaced relation to the bottom of said receptacle, said baffle being concave and having a central opening formed therein, the periphery of the baffle being seated upon the bottom of the receptacle.

7. Apparatus for simultaneously culturing micro-organisms which require varying ranges of oxidation-reduction potential, or carbon dioxide tension, a Petri dish comprising a shallow solid-bottomed receptacle and a removable baffle in slightly spaced relation to the bottom of said receptacle, said baffle being concave and having a central opening formed therein, the periphery of the baffle being seated upon the bottom of the receptacle and having notches formed therein.

8. In apparatus for simultaneously culturing micro-organisms which require varying ranges of oxidation-reduction potential and carbon dioxide tension, a Petri dish, comprising a shallow solid-bottomed receptacle and a removable horizontal baffle in slightly spaced relation to the bottom of said receptacle and adapted to be submerged in a culturing medium.

9. In apparatus for simultaneously culturing micro-organisms which require varying ranges of oxidation-reduction potential and carbon dioxide tension, a Petri dish, comprising a shallow solid-

bottomed receptacle and a removable horizontal baffle in slightly spaced relation to the bottom of said receptacle, said baffle having openings formed therein and being adapted to be submerged in a culturing medium.

10. In apparatus for simultaneously culturing micro-organisms which require varying ranges of oxidation-reduction potential and carbon dioxide tension, a Petri dish, comprising a shallow solid-

bottomed receptacle and a removable horizontal baffle in slightly spaced relation to the bottom of said receptacle and adapted to be submerged in a culturing medium, one of said baffle and the 5 bottom of said receptacle being provided with portions engaging the other thereof to support said baffle.

ABRAHAM CANTOR.