

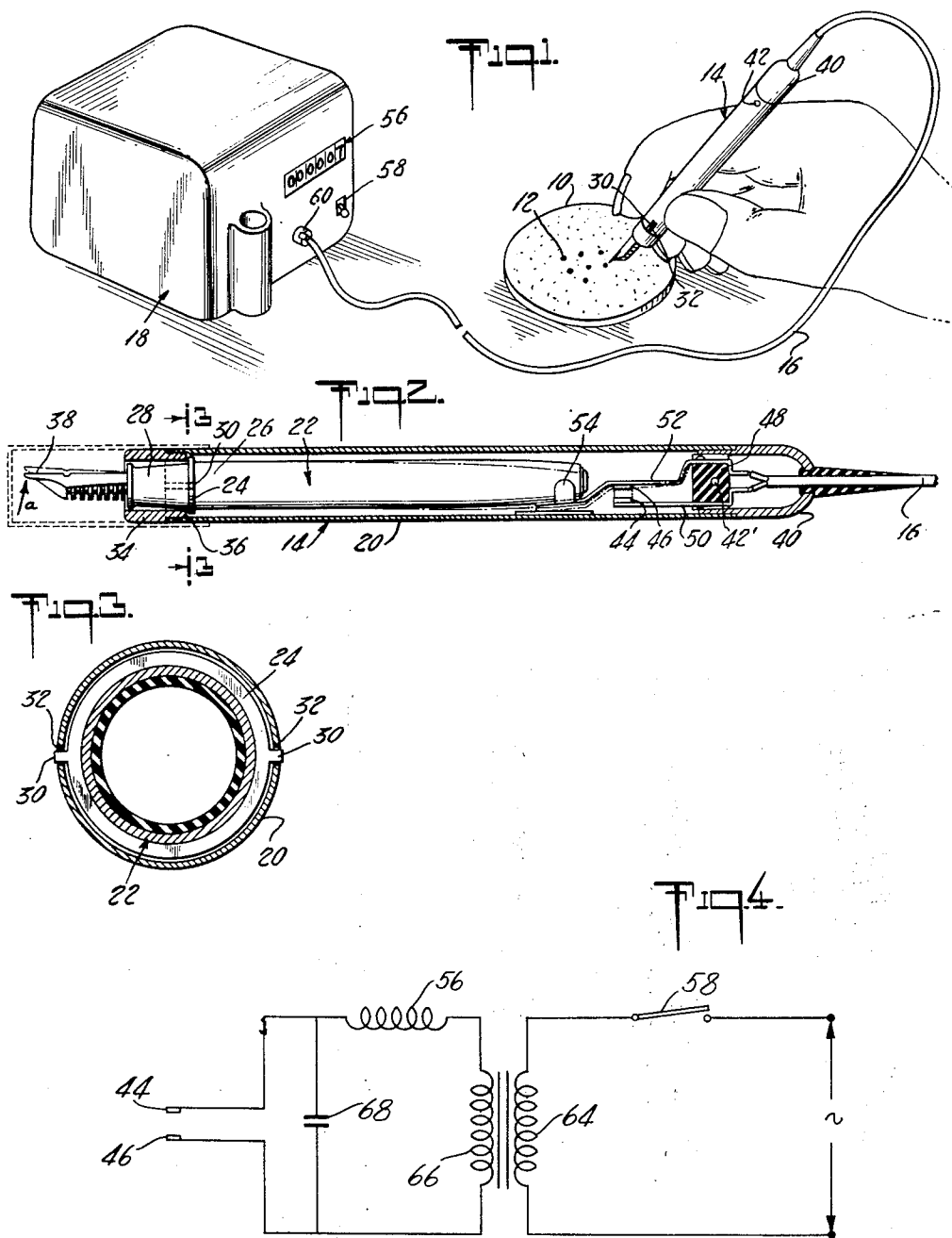
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APPARATUS FOR COUNTING BACTERIAL COLONIES

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APPARATUS FOR COUNTING BACTERIAL COLONIES

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This invention relates to a method of and apparatus for counting that is useful for example for the counting of bacterial colonies as well as for other purposes.

One object of the invention is a new and improved counting device wherein the operator is relieved of mental processes attendant with noting the objects counted as well as the number of the count, thereby reducing error and materially increasing the speed with which the count can be made.

Another object of the invention is to provide a new and improved method for counting objects or things to eliminate the human error encountered in mental processes, and at the same time indicate which objects or things have been counted.

Another object of the invention is a new and improved counting device for counting bacterial colonies characterized by its simplicity, accuracy and low cost of manufacture and which eliminates substantially all human errors in the counting process.

Another object of the invention is a new and improved counting device.

The above and other objects of the invention will become more apparent in the following description and accompanying drawings which illustrate certain embodiments of the invention.

In the drawings:

Fig. 1 is a perspective view of one of the embodiments of the invention;

Fig. 2 is a cross-sectional view of the marking device illustrated in the embodiment shown in Fig. 1;

Fig. 3 is a cross-sectional view along the line 3—3 of Fig. 2; and

Fig. 4 is a diagrammatic view of the electrical circuit employed in the embodiment shown in Fig. 1;

Although this invention is of general utility, the illustrated forms of the invention are particularly useful for the counting of bacterial colonies which grow on the surface or are scattered throughout a layer of transparent agar in a petri dish.

The counting of bacterial colonies is one of the most frequently repeated operations in bacterial laboratories of hospitals, public health agencies, colleges, and in many industries. In the present methods, with which I am familiar, the counting of such colonies is tedious and exacting work.

I have found that with certain methods of counting even a slight distraction of the person making the count, which frequently runs into hundreds and sometimes even thousands, usually means that he loses either his place on the dish or the mental sum of the count made, and must start over. Even without such distraction, the

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errors encountered with present methods of counting are frequent, since the operator must mentally note the particular colonies which have been counted, as well as the number of such colonies.

With my invention, I am able to relieve the operator of the mental tasks of making a sum of the counts as well as noting the particular colonies counted, and have found that by so doing, the results are considerably more accurate than would otherwise be obtained, and that the results can be obtained far more rapidly.

Briefly, the invention as illustrated includes a suitable marking device and means responsive to the marking device for registering the number of marks made by it. Although I have illustrated in my embodiment of the invention a conventional fountain pen as the marking means, because of the facility with which bacterial colonies can be indicated or marked on a glass surface by merely pressing the pen point slightly on the surface to leave a dot of ink, it is apparent that other types of marking implements or devices (such as pencils, wax pencils, or other styli) may be used, depending on the character of the surface to be marked by the device.

Associated with the marking device is a suitable counting means which may be either electric or mechanical, and which is adapted to respond to a slight movement of the marking device during a marking operation, to actuate a tallying or counting means to tally the total number of marks made by the device.

In Figs. 1, 2 and 3 I have illustrated one embodiment of my invention, and for the purposes of this application I have illustrated it in connection with the counting of bacterial colonies.

In Fig. 1, a glass petri dish 10 is shown in an inverted position so that the bottom of the dish can be used for the purpose of placing indicating marks in the form of a small drop of ink over each bacterial colony. These indicating marks are denoted by the numeral 12. The marking means 14 in this embodiment is electrically connected by a suitable cable or lead 16 to a counter 18 adapted to respond to the pressure exerted on the marking device 14 as each mark is made on the back of the petri dish 10. With this device, therefore, the operator merely needs to place a mark on the petri dish over each of the bacterial colonies scattered throughout the layer of agar in the dish, and by so doing a tally is automatically made of the total number of such marks, and at the same time an indication is made of the particular colonies which have been counted. Thus, any distraction on the part of the operator will not cause the count or the operator's place on the dish to be lost.

More particularly, the marking device comprises an outer cylindrical housing 20 having a

conventional fountain pen 22 mounted therein. The mounting for the pen 22 comprises a narrow collar 24 which is frictionally retained on the pen between the body 26 of the pen and the front portion 28. This collar is provided with a pair of opposing lugs 30 which cooperate with corresponding slots 32 in the front end of the body or housing 20. These lugs 30 are loosely retained in the upper or closed end of the slots 32 by means of a collar 34 threadedly fastened to the housing 20, with the inner end 36 loosely contacting the front side of the pen retaining collar 24. In this way, the application of pressure against the pen point 38 of the pen 22 in the direction of the arrow *a* will cause the pen to move from a position shown by the solid lines in Fig. 2 to a dotted line position also illustrated in Fig. 2.

The other end of the housing 20 is enclosed by a suitable cap 40 slidably engaging the housing and held in position thereon by means of a small screw 42 (Fig. 1). This cap 40 carries the pair of contacts 44 and 46 individually mounted in the cap 40 by means of a block of insulating material 48 held within the cap 40 by the screw 42 which passes through the housing and cap walls and threadedly engages the opening 42' in the block of insulating material 48. Contact 44 is supported on the end of a simple flat spring member 50, while contact 46 is supported in cooperative relationship with contact 44 by spring member 52 which extends beyond the contact 46 and engages the back end of the fountain pen housing 22. The spring 52 is also provided with a pair of lug members 54 curved to conform to the fountain pen body so that the end thereof will nest in and be retained by the spring 52. The tension on this spring is adjusted so that it will yield under pressure on the point 38 to effect closure of the contacts 44 and 46, and upon release of the pressure will act to return the fountain pen from the dotted line position to the solid line position, as shown in Fig. 2. The cable or lead 16 is preferably of a two-conductor type and each conductor is connected to one of said contact supporting springs so that the contacts will operate to close the circuit through the cable 16 when the pen is actuated to place a mark on the petri dish 10. The counter 18 is provided with a magnetically operated counting device 56 and an "on-off" switch 58, and plug means 60 for connecting the cable 16 to the counter.

In Fig. 4 I have illustrated the electrical circuit used in the embodiment shown in Fig. 1, and like numerals have been used to designate like components. This circuit includes a transformer 62 having a primary 64 connected in series with the switch 58 to a suitable source of alternating current. The secondary 66 of the transformer 62 is connected in series with the magnetic counting device 56 and in series with the contacts 44 and 46 described in connection with Fig. 2, so that when the contacts are closed, the circuit through the coil 56 and the secondary 66 will be completed to actuate the count. A condenser 68 is preferably connected in parallel with the contacts to reduce arcing and to increase the life of the contacts.

It is apparent from the above that with this invention substantially all human error is eliminated in the counting of bacterial colonies, and I have found that the count can be made far more rapidly than with conventional methods with which I am familiar.

Moreover, the device is simple in structure and will respond quickly and accurately to the mark-

ing operation to tally the number of marks so made.

Furthermore, with my new and improved device, the operator can pause frequently in the middle of a count to rest his eyes, or even encounter numerous distractions, without the necessity of a complete recounting of the colonies. Furthermore, plates having thousands of colonies can be counted whereas with prior methods the counting of colonies on such plates would not be attempted and the complete experiment may have to be repeated. It is apparent, therefore, that not only can the count be accomplished more rapidly by my method and apparatus, but considerable time and money is saved in avoiding the repetition of experiments should the colonies be more numerous than anticipated.

What is claimed is:

1. A device for counting bacterial colonies scattered throughout a layer of transparent material in a shallow dish, comprising an elongated cylindrical housing having a pair of opposed slots formed inwardly from one end thereof, a fountain pen having a pair of oppositely disposed and outwardly extending lugs secured to said pen at a point spaced from the point thereof, said pen being loosely retained within the housing with the lugs cooperating with said slots, a collar removably fastened to the slotted end of said housing to retain the lugs in engagement with the slots, spring means insulatively mounted in the other end of said housing and engaging the inner end of said fountain pen, a contact mounted on said spring means, a fixed contact insulatively mounted in cooperation with the first said contact, said contacts being adapted to open and close in response to pivotal movement of the fountain pen within the housing produced by the application of pressure to the point of said pen, and also being adapted to be connected to an electromagnetic counter responsive to the actuation of said contacts.

2. A counting device for counting bacterial colonies, comprising fountain pen means for marking the colonies as they are counted, a housing for said pen including a pair of opposing slots, a collar fastened to said pen and having a pair of oppositely disposed outwardly extending lugs for cooperation with the slots in said housing, removable means on said housing for retaining said lugs within the slots, a pair of contacts mounted within said housing and adapted to be actuated upon movement of the pen relative to the housing and about the lugs as each colony is marked, said contacts being adapted to be connected to an electromagnetic counter that is responsive to their actuation to register the number of colonies marked.

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