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3,036,703

DISC DISPENSER AND ELEMENT THEREOF

Filed May 11, 1959

Fig. 1

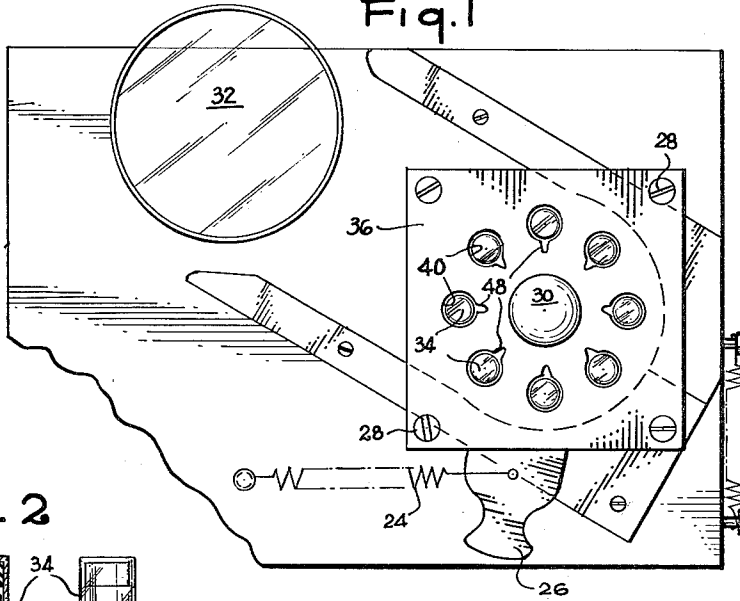


Fig. 2

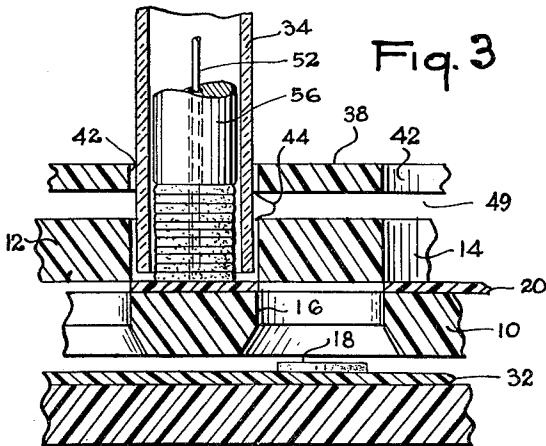
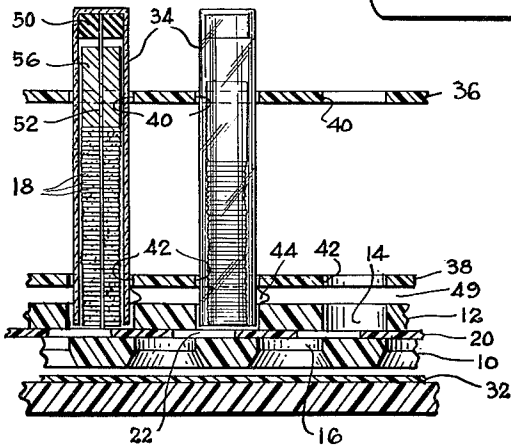


Fig. 3

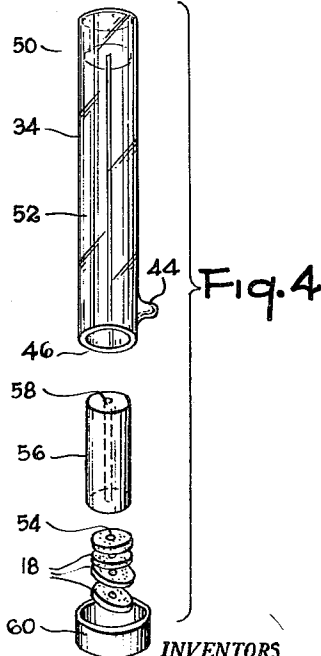


Fig. 4

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DISC DISPENSER AND ELEMENT THEREOF

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This invention relates to a device for dispensing thin discs of a flexible material in a predetermined pattern into a receiver and it relates more particularly to an element thereof wherein the discs are retained in position to be dispensed.

In the copending application of Menolasino et al., Serial No. 728,415, filed April 14, 1958, description is made of a device of the type described for dispensing a plurality of discs of paper impregnated or otherwise treated with an antibiotic or other chemical compound known to have curative effects on certain diseases or distinctive effects on virus or bacteria. In order to determine which of the many antibiotics or which of the chemical compounds is effective against the particular bacteria or virus and the most effective concentration thereof, a culture thereof is provided in a suitable receiver such as in a Petri dish. The various treated discs are displaced from vials into the Petri dish in a predetermined spaced apart relation. The area in the immediate vicinity of the disc or discs having an effective antibiotic or chemical will remain clear by comparison with the remainder, thus indicating the antibiotic or chemical which might be used effectively in the treatment of the particular disease.

All of the discs in one vial are treated in the same way with the same antibiotic or chemical while the discs in other vials are treated with others of the chemical compounds or antibiotics. A large number of each of such discs are provided in each vial for dispensing as desired into the receiver.

The dispenser comprises spaced top and bottom plates having a plurality of openings with the openings in the bottom plate offset slightly from the openings in the top plate. Mounted between the top and bottom plates, and occupying the space in between, is a dispenser plate having openings corresponding in number and in dimension with the openings in the top and bottom plates. The dispenser plate is mounted for shifting movement between normal and dispensing position. In normal position, the openings of the plate are aligned beneath the openings of the top plate to permit the lowermost disc from the stack to be displaced into the path of the dispenser plate. In the operative position, the openings of the dispenser plate are aligned above the openings through the bottom plate to enable the disc member to be displaced from the vial to the opening of the bottom plate to pass therethrough into the underlined Petri dish or other receiver.

The dispenser plate is dimensioned to have a thickness corresponding to or less than the thickness of the paper disc so as to engage only the lowermost disc of the stack for displacement from the vial to the delivery opening in the bottom plate. It will be understood that the dispenser plate may constitute only arms movable between the two positions to displace the disc members in advance of each of the arms from normal position to the delivery openings in the bottom plate responsive to movement of the dispensing plate from normal position to dispensing position. Upon return to normal position, as the dispenser plate clears the area beneath the stack of disc members in the vials, the lowermost disc member drops through the opening in the top plate into position in advance of the dispenser plate for actuation thereby.

Each vial of discs is adapted removably to be secured in an inverted position with the opening end of the vial

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in registry with the opening of the top plate to enable the discs to pass downwardly therethrough into position to be engaged by the dispenser plate. The disc members are relatively light in weight and of insufficient strength or stiffness to resist deformation or folding. As a result, discs within the stack sometime shift in position during passage through the vial when inverted into position of use or otherwise. Difficulties are encountered most often when one of the vials is to be removed or inserted into position of use in the device, at which time the device is inverted to enable removal of the vial. Such rocking movement often leads to up-and-down movements of the disc members within the vials remaining in the device such that some of the discs become mis-aligned with the axis. When such disposition or deviation from a flattened position occurs, the normal passage of disc members through the vial is interfered with such that disc members do not enter the opening in advance of the dispenser plate for delivery. This often leads to the necessity to prepare further specimens for testing and it becomes necessary to remove the vials for replacement by another in which the discs are properly located or for the removal of the disc members to a level where interference is eliminated.

For positive and uniform displacement of the test discs from the vials into position for dispensing, it is desirable to restrict the movement of the disc members so that passage through the vials occurs while the disc members are in a flattened state extending crosswise of the central axis of the vial.

Thus, it is an object of this invention to produce a dispensing device of the type described wherein a plurality of disc members can be displaced simultaneously from each of the vials and it is a related object to produce a vial for use in a disc dispensing device of the type described which insures movement of the disc members therein in a desired flattened state.

These and other objects and advantages of this invention will hereinafter appear and, for purposes of illustration, but not of limitation, an embodiment of the invention is shown in the accompanying drawings, in which—

FIGURE 1 is a top plan view of a dispensing device embodying the features of this invention;

FIGURE 2 is a sectional elevational view of a fragmentary portion of the dispensing device shown in FIGURE 1 illustrating the vial embodying the features of this invention in position of use;

FIGURE 3 is a sectional view similar to that of FIGURE 2 showing the position of the dispensing plate in dispensing position; and

FIGURE 4 is a perspective elevational view of a vial embodying the features of this invention with the elements thereof in a separated relation.

Referring now to the drawings, the disc dispenser is constructed with a bottom plate 10 and a top plate 12 with a plurality of openings 14 and 16 in the top and bottom plates respectively. The openings are dimensioned to correspond with the dimension of disc members 18 adapted to be dispensed. The openings 14 in the top plate 12 are offset to one side of the openings 16 in the bottom plate 10. Slidably received between the top and bottom plates is a dispensing plate 20 also having openings 22 corresponding in dimension and number with the openings 14 and 16 in the top and bottom plates. The slide plate 20 is mounted for movement between a normal position in which the openings 22 are in registry with the openings 14 of the top plate and dispensing position in which the openings 22 are in registry with the openings 16 in the bottom plate. The spaced relationship between the top and bottom plates in which the slide plate is received corresponds to the thickness of a disc member 18 and more specifically is dimensioned to be

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slightly greater than the thickness of one but less than the thickness of two so that only the lowermost disc in the stack can be received between the top and bottom plates for displacement by the slide plate from the opening 14 to the opening 16 for delivery.

The slide plate 20 is provided with abutments in position to be engaged by stops when the plate is in normal and in dispensing position. The slide plate is constantly urged for return towards normal position, as by means of a coil spring 24, and a handle 26 is provided for positive displacement of the slide plate from normal to dispensing position.

The assembly is mounted for vertical displacement as a unit on vertically disposed guideposts 28 to between raised and lowered positions. When the unit is raised by the knob 30 to a raised position, a Petri dish 32 or the like can be inserted into position beneath the bottom plate to receive the discs and upon which the unit rests when in lowered position.

The vials 34 containing a plurality of stacked disc members 18 are removably secured in position of use between upper and lower plates 36 and 38 respectively, fixed for movement with the top and bottom plates 10 and 12 and each of which is provided with aligned openings 40 and 42 respectively to enable the vials to be inserted axially or endwise therethrough. The openings 40 and 42 of the upper and lower plates are in axial alignment with the openings 14 in the top plate. The upper plate 36 is spaced from the lower plate 38 to engage the vials in spaced apart portions. The lower plate 38 is spaced from the top plate 12 by a small amount to enable an offset 44 adjacent the open end 46 of the vial 34 to be received therebetween. The lower and upper plates are each provided with slots 48 continuous with the openings 40 and 42 and dimensioned to correspond with the offset 44 to enable the offset to pass endwise therethrough into the space 49 between the top plate 12 and the lower plate 38. Thus the vials can be inverted and inserted through the aligned openings to bring the open end 46, at the bottom, in registry with the openings 14 through the top plate. By turning the vial 34 through an angle less than 360°, the offset 44 can be locked in position between the plates to enable the entire assembly to be inverted, as for the removal of one vial without disturbing the others.

It is in this operation that many of the difficulties have been encountered with respect to the misalignment of the disc members in the vial since the disc members will tend to shift towards the closed end of the vial, when the unit is inverted, and then to shift back to the open end of the vial when righted to position of use. The disc members, being light in weight, tend to flutter during such movement to the end that not all of the disc members return to a flattened state when in position of use.

To obviate this difficulty, each vial 34 is constructed as before with a central bore dimensioned to correspond with the crosswise dimension and shape of the disc members 18. Fitted within each vial is a base block 50 preferably formed of a resilient material and which is dimensioned to be received in fitting relationship within the bore of the vial so as to be retained frictionally in position to which it is placed. The base block 50 is provided with an elongate shaft 52 extending axially from a central portion thereof through the length of the vial when the block is located adjacent the closed end at the bottom of the vial. The disc members 18 are formed with a central opening 54 dimensioned slidably to receive the shaft 52 so that the shaft can be threaded through the aligned openings in the stack of disc members.

Means are provided constantly to urge the stack of disc members for displacement endwise along the shaft 52 in the direction away from the base block 50 and toward the open end when the vial is inverted in position of use in the device. For this purpose, as illustrated in FIGURE 4,

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use can be made of a weight 56 having a central opening 58 extending axially therethrough to enable the shaft 52 slidably to be received therein. The weight 56 is located between the base block 50 and the outermost of the disc plates 18 in the stack so that it will rest on the top of the stack when in position of use. Thus the weight operates gravitationally to provide positive displacement of the stack towards the bottom plate 10 to bring the lowermost disc member in the stack into the dispensing opening in advance of the dispenser plate. The base block 50 serves to cushion the movements of the weight 56 to minimize impacts which might otherwise cause breakage of the vial. It will be understood that other means may be employed to provide the force constantly urging the stack of disc members towards dispensing position. For example, use can be made of a coil spring located about the shaft 52 between the block 50 and the stack of disc members.

The centrally located shaft 52, which extends through the vial and is operatively engaged by each of the disc members, prevents angular movements of the disc members as would otherwise permit failure of some of the disc members to return to the desired flattened position. As a result, the disc members 18 stacked within the vials are constantly maintained in a flattened position independent of the movements of the vials or dispensing device for purposes of removal or replacement of other vials or responsive to movements otherwise taking place.

The vials can be separately supplied with the predetermined treated discs for use as refills in replacement of expended vials in the device. When separated from the device, each vial is provided with a suitable closure 60 to hold the disc members therein and to prevent contamination of the disc members, as will be well understood. The cap or closure is adapted to be removed from the vial before the latter is inserted or reinserted into position of use.

It will be apparent from the foregoing that I have provided an improvement in an element employed in a disc dispensing device of the type described whereby the disc members are maintained in a proper position for dispensing independently of the movement to which it is subjected. As a result, disc members are always available in each of the openings in which stacks of disc members are present to insure that a disc member will be dispensed from each stack into the receiver or test material.

It will be understood that changes may be made in the details of construction, arrangement and operation without departing from the spirit of the invention, especially as defined in the following claims.

We claim:

1. A vial for use in a disc dispenser of the type adapted to hold and dispense a plurality of thin, flexible discs of absorbent material which have been treated with a medicament, said vial having an opening extending lengthwise therethrough from an open end at the top to the base and dimensioned to be slightly greater in cross section than the cross section of the disc members to be received therein, a block of resilient cushioning material anchored within the vial at the base, a plurality of disc members stacked within the vial, each of which has an opening extending centrally therethrough in alignment one with another in the stack to define a bore therebetween extending through the stack, a shaft anchored at one end to the block and extending centrally lengthwise through the remainder of the vial and through the central bore defined by the disc members stacked therein, and a weight between the block and the uppermost of the disc members in the vial dimensioned to be slidable within the vial under the influence of gravity and having an opening extending lengthwise therethrough through which the shaft extends for threading the weight thereon, said weight constantly urging the disc members in the direction away from the base toward the open end of the vial when the vial is inverted in position of use with the base uppermost in the disc dispenser.

2. A vial as claimed in claim 1 in which the block is

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dimensioned to have a length corresponding to a small fraction of the length of the vial and a cross section corresponding to the cross section of the opening through the vial for frictional attachment to the walls of the vial when inserted in position of use at the base.

3. A vial as claimed in claim 1 in which the shaft is dimensioned in cross section to be slightly less than the cross sections of the opening through the disc members to enable the disc members to be received slidably on the shaft.

4. A vial as claimed in claim 1 in which the shaft con-

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stitutes a rigid member dimensioned to have a length which reaches to the open end of the vial.

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