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3,375,934

DISPOSABLE TEST TUBE RACK

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2 Sheets-Sheet 1

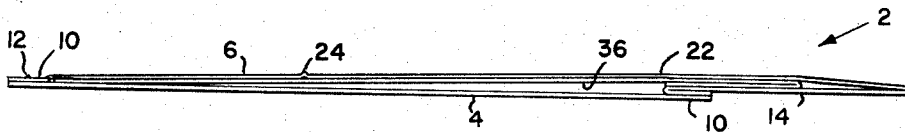


FIG. 1.

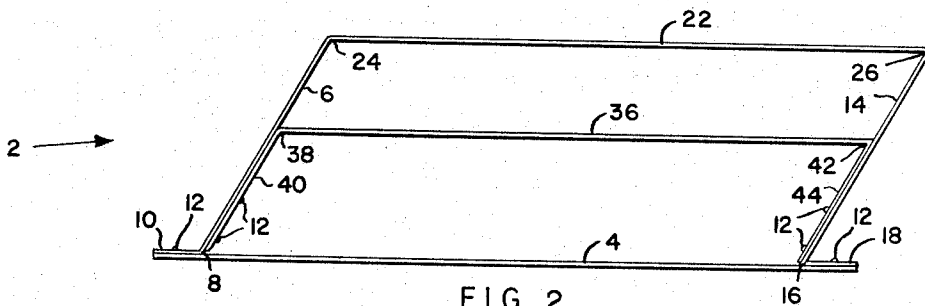


FIG. 2.

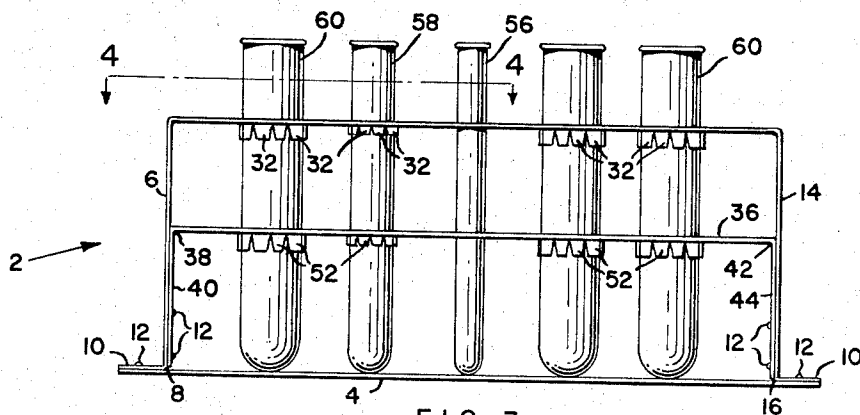


FIG. 3.

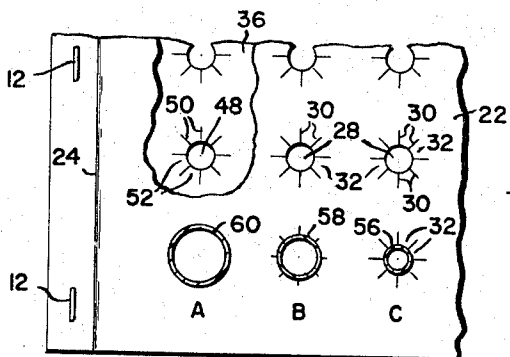


FIG. 4.

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2 Sheets-Sheet 2

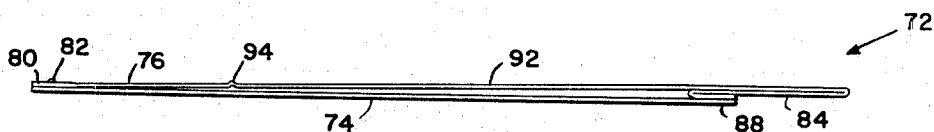


FIG. 5.

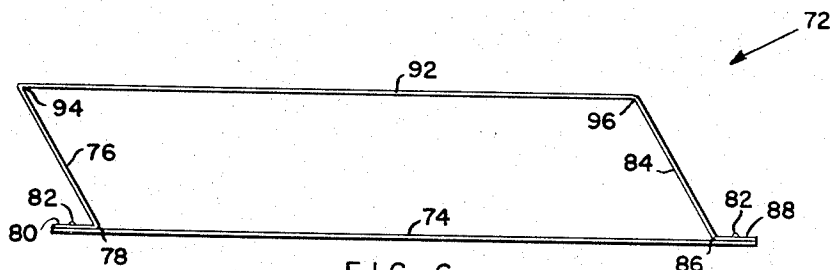


FIG. 6.

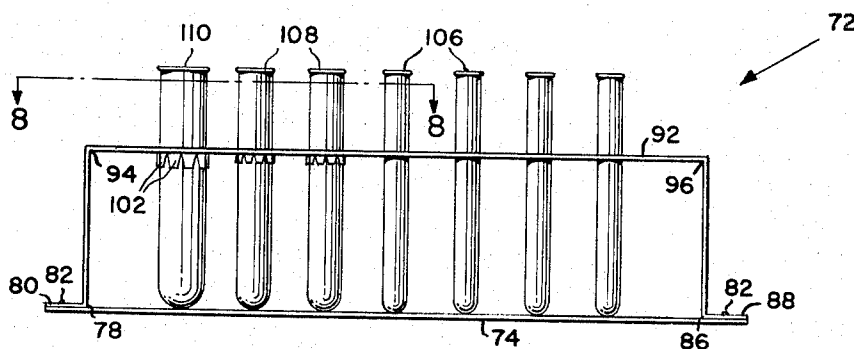


FIG. 7.

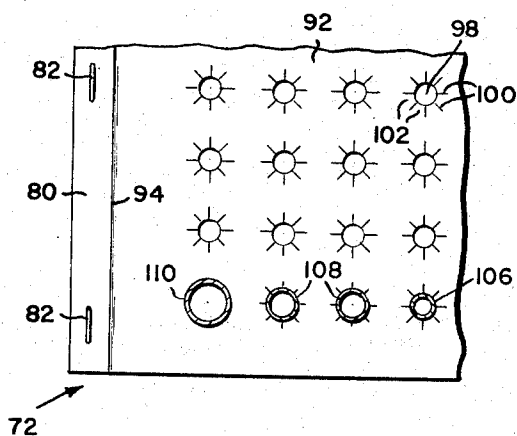


FIG. 8.

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## DISPOSABLE TEST TUBE RACK

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1 Claim. (Cl. 211-72)

### ABSTRACT OF THE DISCLOSURE

A test tube rack has top, bottom and side panels with a panel intermediate the top and bottom panel, the panels being hinged to provide for the collapsing of the rack for shipment and storage. Aligned openings in the top and intermediate panels receive test tubes, the openings advantageously being bordered by tabs to provide for enlargement of the openings by a test tube of a diameter greater than that of the opening.

This invention relates to a collapsible test tube rack formed from sheet material and disposable. Further, the test tube rack of the invention is capable of securely supporting a variety of different sizes of test tubes.

Test tube racks are employed in a wide number of applications, for example, in the virology field, where they must be carefully cleaned and sometimes sterilized after each use. This is an expensive procedure. Further, in many applications conventional test tube racks are unsatisfactory since they are designed to accommodate only one particular size of test tube whereas a number of different sizes of test tubes may be employed simultaneously. This invention solves both of these problems by providing a test tube rack which is so inexpensive it can be disposed of after only one use and which is capable of securely holding a wide variety of different sizes of test tubes.

The test tube rack of the invention is further advantageous in that it is collapsible into a substantially flat form for economic shipment and handling prior to use.

In addition the test tube rack of the invention is advantageous since it can readily be made of material which can be written on with ordinary writing implements such as a ballpoint pen or a lead pencil.

The test tube rack of the invention is formed of sheet material such as, for example, cardboard and fiberboard and the like. The various types of plastic sheeting available in the trade also are suitable. Preferably at least ten point board is employed. The rack has a base panel hingedly connected to side panels which are hingedly connected to a top panel in order that the rack can be collapsed into a substantially flat posture. An intermediate panel is hingedly connected to the side panels between the base and top panels. Where relatively short test tubes are employed the intermediate panel may be eliminated. The top panel and the intermediate panel are provided with openings in registry for the reception of test tubes. A plurality of tabs extend from each opening substantially in the plane of the panel containing the opening to provide for enlargement of the opening by a test tube of a diameter greater than the opening.

The invention and its objects will be clarified by the following description read in conjunction with the drawings in which:

FIGURE 1 is a front elevation of a test tube rack in accordance with the invention in the collapsed condition;

FIGURE 2 is a front elevation of the test tube rack of FIGURE 1 in a partially erected condition;

FIGURE 3 is a front elevation of the test tube rack of FIGURE 1 in a fully erected position and supporting test tubes of different sizes;

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FIGURE 4 is a horizontal section taken on the plane indicated by the line 4-4 in FIGURE 3 and partially broken away;

FIGURE 5 is a front elevation of an alternative embodiment of a test tube rack in accordance with the invention;

FIGURE 6 is a front elevation of the test tube rack of FIGURE 5 showing it in a partially erected condition;

FIGURE 7 is a front elevation of the test tube rack of FIGURE 5 showing the rack in a fully elevated condition and supporting test tubes of various sizes; and

FIGURE 8 is a horizontal section taken on the plane indicated by the line 8-8 in FIGURE 7 and partially broken away.

Referring first to FIGURES 1 through 3, the test tube rack 2 in accordance with the invention and formed from sheet material has a base panel 4. A side panel 6 is hingedly connected along a hinge line indicated at 8 to a flange portion 10 which is secured to base panel 4 by staples 12. The hinge line 8 and subsequently referred to hinge lines can be formed by any suitable means available in the art such as, for example, scoring by crease scoring or cut scoring.

Similarly, a side panel 14 is hingedly connected along a fold line 16 to a flange portion 18 which is secured to base panel 4 by staples 12.

A top panel 22 is hingedly connected to side panel 6 along a fold line indicated at 24 and hingedly connected to side panel 14 along a fold line indicated at 26. Top panel 22 is provided with a plurality of test tube receiving openings 28 of a diameter substantially equal to the diameter of the smallest test tube to be employed to provide for a snug engagement of said test tube. A plurality of slits 30 extend radially from each opening 28 to form a plurality of tabs 32 surrounding the openings.

An intermediate panel 36 is connected along a hinge line indicated at 38 to a side panel 40 which is secured to side panel 6 by staples 12. Panel 36 is hingedly connected along a hinge line indicated at 42 to a side panel 44 which is secured to side panel 14 by staples 12. Intermediate panel 36 is provided with test tube receiving openings 48 which are in registry with openings 28 in top panel 22 and of the same diameter. Radial slits 50 extending from each opening 48 form a plurality of tabs 52 surrounding each opening 48.

### Operation

Assuming the test tube rack 2 to be in the collapsed shipping and storing position shown in FIGURE 1, the rack is placed in use by elevating side panel 14 to place the rack in approximately the position shown in FIGURE 2. When it is desired to insert a test tube, for example, test tube 56 which is the smallest test tube contemplated for use with the rack the sides 14 and 6 are squared up and test tube 56 is inserted through openings 28 and 48 until it rests on base panel 4. While the rack can be erected by carrying side panels 6 and 14 beyond the perpendicular so as to set the sheet material to cause the side panels to remain in a substantially vertical position, it is somewhat advantageous to leave a tendency for the side panels to return to the position shown in FIGURE 2 as this results in panels 22 and 36 exerting opposite forces on a test tube held in the rack which provides for a still stronger holding grip on the test tube by the rack.

When a test tube 58 of a diameter greater than the diameter of openings 28 and 48 is employed, it is centered over the said openings and forced downwardly causing tabs 32 and 52 to move downwardly but to remain in tight engagement with test tube 58. Again, if a test tube 60 of a still greater diameter is employed tabs

32 and 52 will be pivoted still further downwardly to provide for the entrance and secure holding of test tube 60.

As against conventional test tube racks, the test tube rack 2 can be written on with conventional writing instruments as indicated by the letters A, B, and C shown on top panel 22 in FIGURE 4.

When all of the test tubes have been withdrawn from the rack 2, it can be thrown away if the rack has been contaminated in any way as, for example, when the test tubes contain viruses. Of course rack 2 can be reused many times when it is not contaminated in some manner making it unfit for further use.

It is to be noted that a marked advantage of the rack 2 is that it will not scratch test tubes as is the case with metal racks which are conventionally employed when sterilization of the racks after use is necessary.

#### Alternative embodiments

Referring now to FIGURES 5, 6 and 7 an alternative test tube rack 72 in accordance with the invention is provided with a base panel 74. A side panel 76 is hingedly connected along a hinge line indicated at 78 to a flange portion 80 which is secured to base panel 74 by staples 82. A side panel 84 is hingedly connected along a hinge line indicated at 86 to a flange portion 88 which is secured to base panel 74 by staples 82.

A top panel 92 is hingedly connected along a hinge line indicated at 94 to side panel 76 and hingedly connected along a hinge line indicated at 96 to side panel 84. Top panel 92 is provided with openings 98 of a diameter to receive the smallest diameter test tubes to be employed. Radial slits 100 extend outwardly from each opening 98 to form a plurality of tabs 102 surrounding openings.

#### Operation

The operation of test tube rack 72 will obviously be essentially the same as that of test tube rack 2 and hence need not be detailed. Suffice it to say, rack 72 is particularly suitable for use with test tubes such as test tubes 106, 108 and 110 which are relatively short test tubes. It also should be noted that with the test tube rack 72 it is desirable to erect the side panels 76 and 84 upwardly and beyond the vertical in order that they will tend to remain substantially vertical after erecting.

It will be understood that the above-described embodiments of the invention are simply by way of illustration and are not intended to be limited.

What is claimed is:

1. A test tube rack formed from sheet material comprising a base panel, a pair of side panels, a flange hingedly connected to each side panel and secured to the base panel, a top panel hingedly secured to the side panels, said top panel having openings for the reception of test tubes and a plurality of tabs formed in the top panel and extending from each opening substantially in the plane of the top panel to provide for enlargement of the opening by a test tube of a diameter greater than that of the opening, an intermediate panel between the base and top panels, said intermediate panel having openings in registry with the openings in the top panel and a plurality of tabs formed in the intermediate panel and extending outwardly from each opening substantially in the plane of the intermediate panel to provide for enlargement of the opening by a test tube of a diameter greater than that of the opening, and a second pair of side panels hingedly connected to the intermediate panel and secured to the first mentioned side panels which are connected to the top panel.

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