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US ARMY MEDICAL RESEARCH LABORATORY

FORT KNOX, KENTUCKY

REPORT NO. 561

A PLASTIC TEST TUBE RACK FOR TISSUE CULTURES

Ward R. Richter, D. V. M.
Sfc B. F. Kimball

UNITED STATES ARMY
MEDICAL RESEARCH AND DEVELOPMENT COMMAND 21 March 1963

Report Submitted 15 January 1963

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Project No. 3A012501B813, Unclassified Report

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2. Virology
3. Laboratory Equipment

A plastic test tube rack for tissue cultures was developed. This rack will hold 16 by 150 mm test tubes in removable trays. Each tray holds 22 tubes and provides a convenient means of working with small numbers of tubes for virus titrations.

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ABSTRACT

A PLASTIC TEST TUBE RACK FOR TISSUE CULTURES

BACKGROUND

Our laboratory is producing tissue cultures in test tubes for titration of vaccinia virus which has been exposed to RF energy. There were no racks available which were satisfactory for handling 10 to 20 tubes at a time.

RESULTS

A plastic test tube rack was developed and it was found to be very satisfactory for handling small numbers of test tube tissue cultures. The rack contains nine trays of 22 tubes. Each tray can be withdrawn to carry the 22 tubes to a work area for ease of examination, inoculation, or media change.

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A PLASTIC TEST TUBE RACK FOR TISSUE CULTURE

Virus laboratories utilize tissue cultures grown in test tubes for virus titrations. Such cultures are routinely grown in 16 x 150 mm test tubes and stored in racks on trays at an angle of 5° from horizontal. Thus the cells grow on the lower inner surfaces near the bottom of the tube. A variety of racks and trays are available commercially and many of these are satisfactory. However, the requirements for storage and handling of tissue cultures vary from one laboratory to another depending on the numbers of cultures utilized, the type of work carried on, and space requirements imposed by the incubators available.

We set out to develop a test tube rack to meet our special requirements as well as to be a generally useful unit for the handling of inoculated cultures. Our rack is constructed of acrylic plastic and contains 9 trays, each of which holds 22 tubes. Because of this, a tray of 22 tubes can be removed from the incubator for media changes, inoculations, and examinations without disturbing the other cells. We use large 90-tube aluminum racks for growing our cells but then transfer tubes to the plastic trays after inoculation with virus because we do not use more than one or two trays of tubes for a series of inoculations.

The trays are designed in such a way that the tubes do not turn while the tray is being moved. There is enough contact between the plastic and test tube to prevent this. Rotation of tubes during handling of racks is an annoying feature of most metal racks. The trays do not have a bottom (Fig. 3) and allow free circulation of air between the tubes. This helps maintain uniform temperatures in the incubator because convection currents are not interrupted.

The size and capacity of our trays was determined by the size of our incubator. Three complete units of 9 trays fit side by side in our standard incubator. They could be built to any dimensions with the trays wider or narrower to hold more or fewer tubes for other incubators or applications.

Construction of this rack does not present any special problems. The plastic can be cut and machined accurately, and individual components can be welded or fused together using an acrylic solvent such as chloroform. The sides of the unit are of solid sheets of plastic with grooves cut for the trays as seen in Figure 2. These sides are joined by crosspieces on the top and bottom as seen in Figures 1 and 2.

The details of the tray itself are seen in Figure 3. The bottoms of the tubes fit in a groove 1 centimeter deep which extends the entire width of the tray. The stopper end of the tubes rest in a depression in a crosspiece. This crosspiece is 12 millimeters wide at the surface exposed to the tubes. The depressions for each individual tube are semicircles about 16 millimeters wide and 8 millimeters deep. The size is just large enough to allow easy removal of the tubes but fits the tubes closely enough to prevent lateral movement or pivoting of tubes. This is necessary because the lower ends of the tubes are in a groove which prevents up or down movement but not lateral movement. Each side of the tray has a projection which fits into the grooved sides of the holder. If machining of trays and the groove are accurate the trays are interchangeable. Metal handles are provided for ease of handling.

This test tube tray has proven to be very useful in our laboratory. It provides easy access to small numbers of tubes or a single series of inoculations. A single tray of 22 tubes is easily pulled from the rack and carried to a work area for media changes or examination. The tray provides adequate support for the tubes to prevent rotation during handling of the tray. In addition, several trays can be removed at one time and stacked on top of each other while working with them or carrying them from the work area to the incubator. All tubes in a tray can be examined grossly for pH changes when partially or completely withdrawn from the rack.

ACKNOWLEDGMENT

The authors thank Mr. John Szekeres, Engineering Branch, USAMRL, for his aid in designing and drafting of the rack.

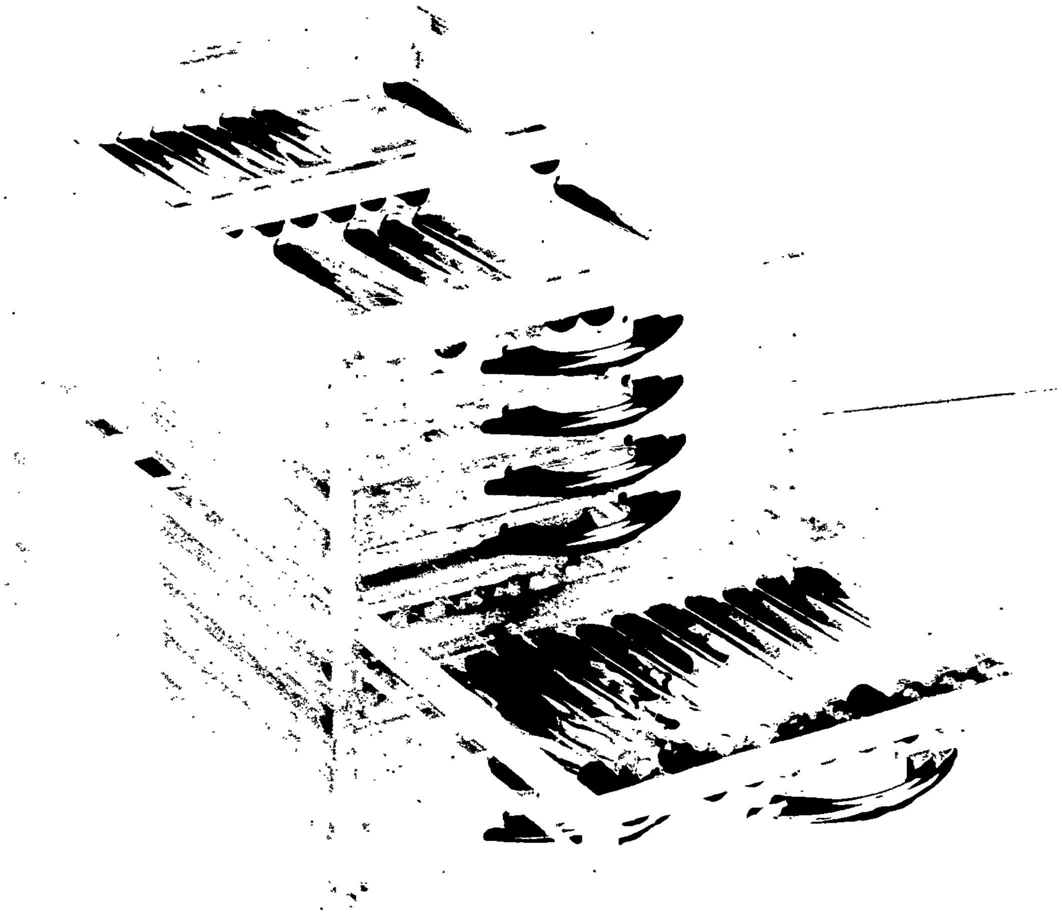

Fig. 1. An over-all view of the rack of 9 trays.

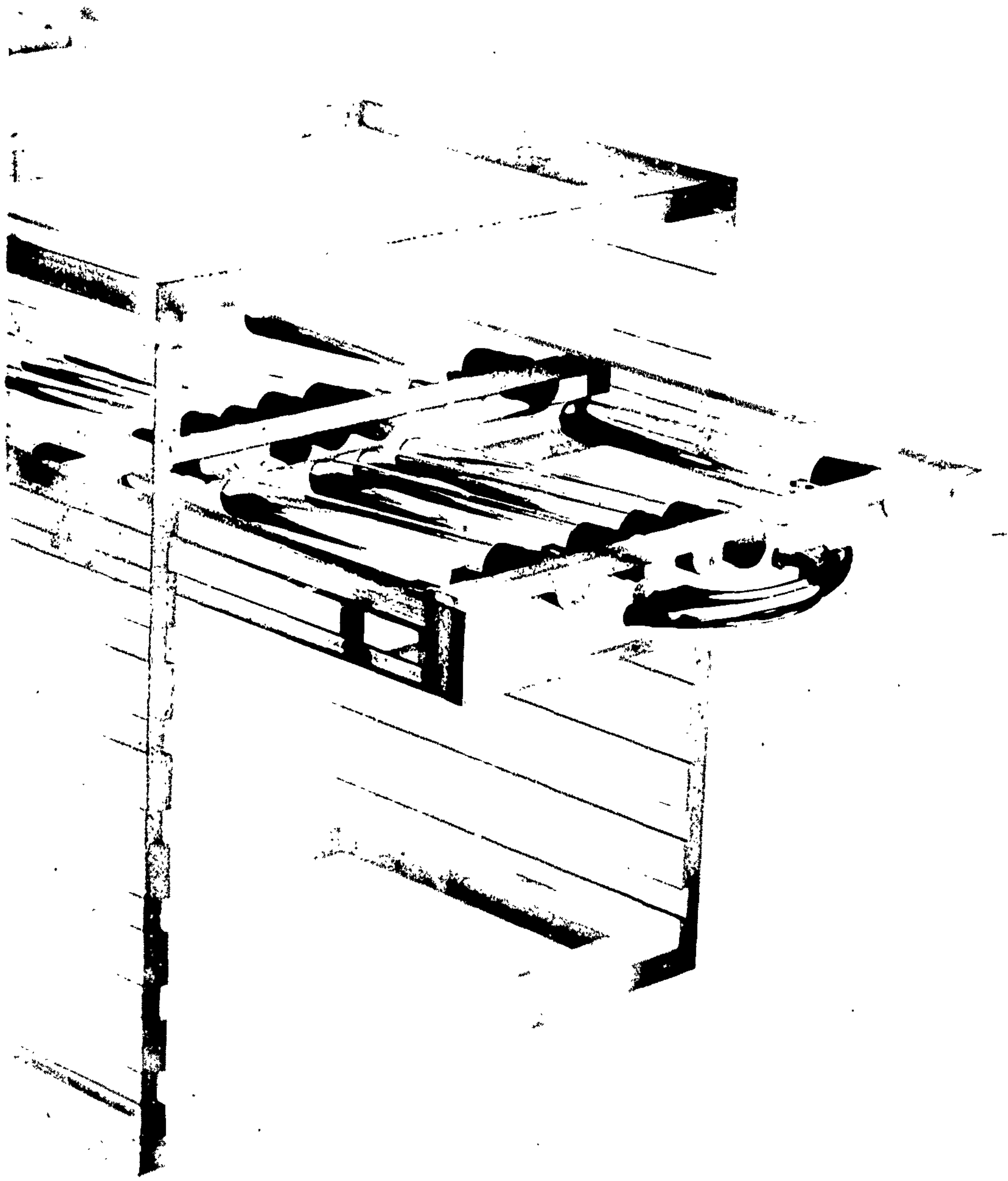

Fig. 2. Each tray fits into a groove cut in the plastic sides of the tray holder.

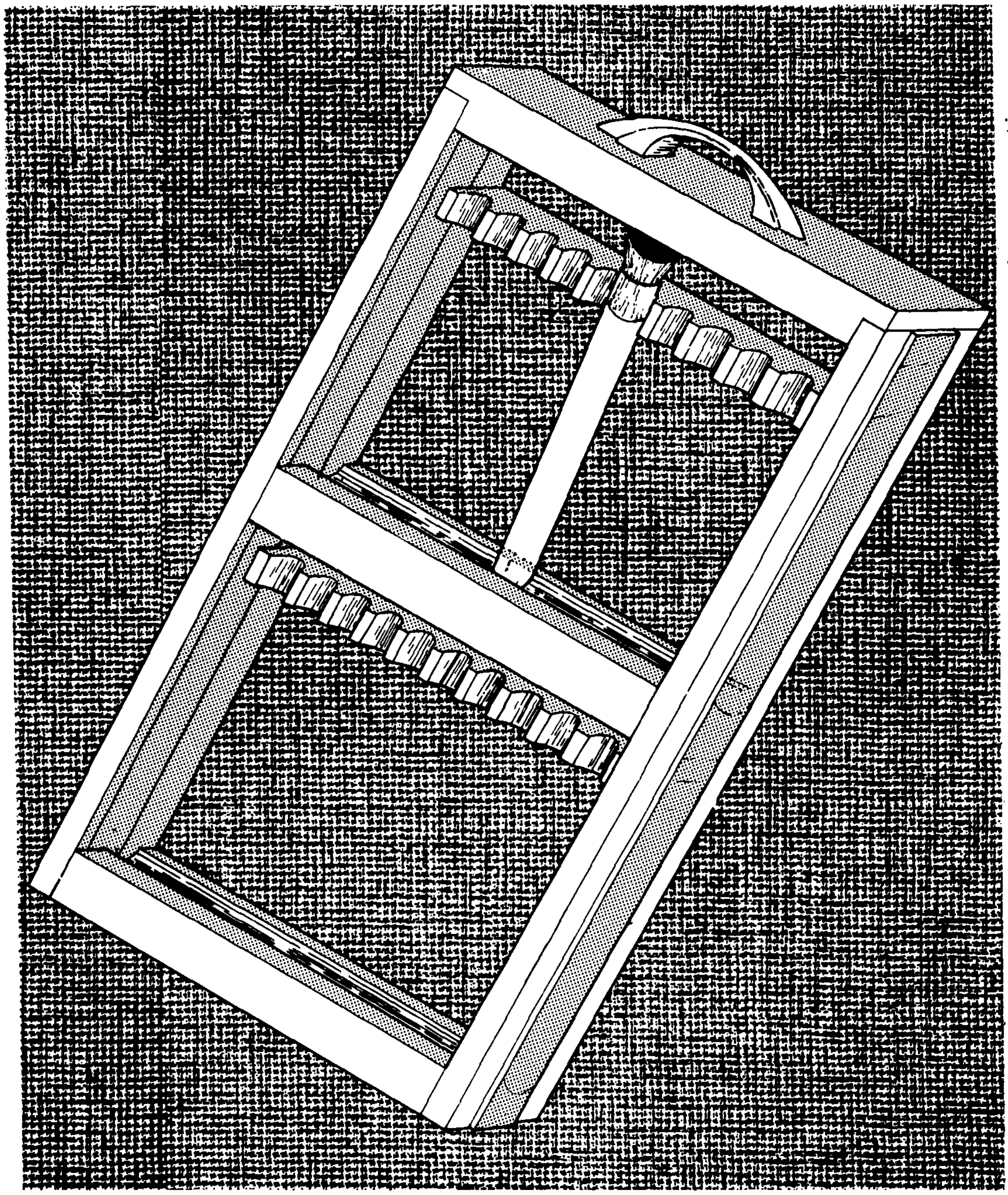

Fig. 3. A drawing of a single tray illustrating the features of construction.

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