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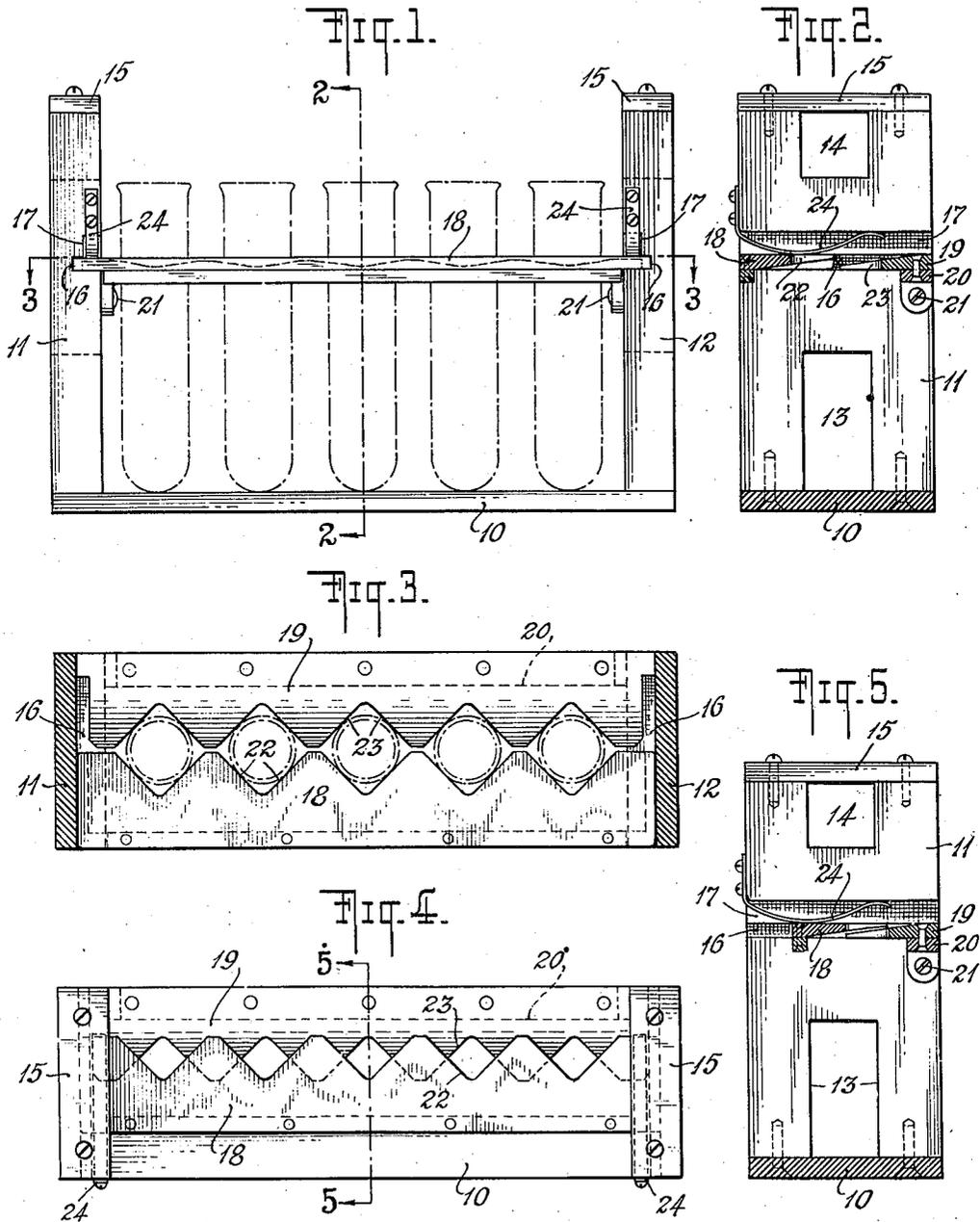
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2,360,978

RACK FOR TEST TUBES AND THE LIKE

Filed Oct. 17, 1941

2 Sheets-Sheet 1



WITNESS

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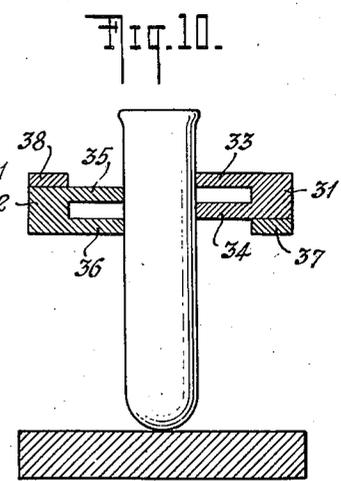
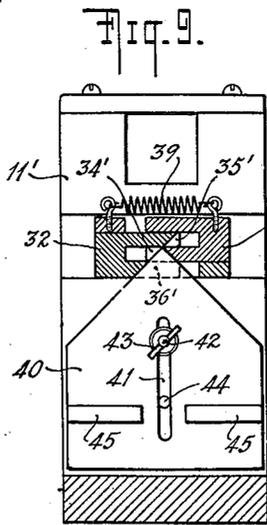
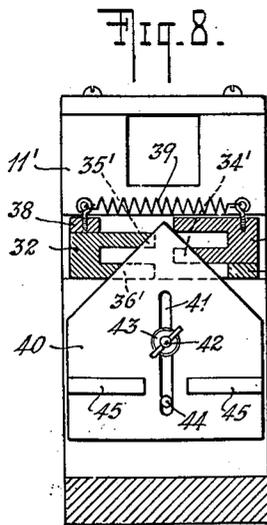
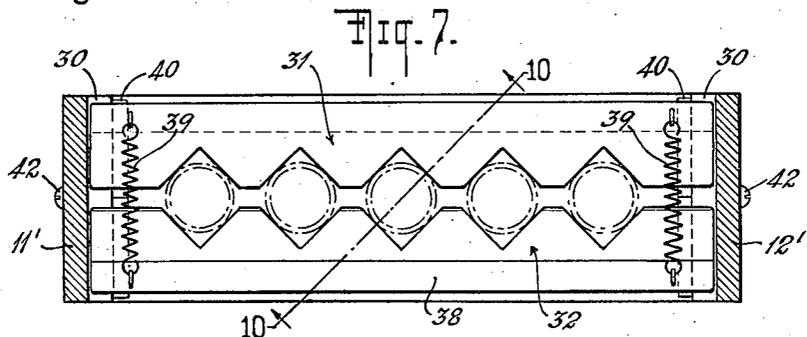
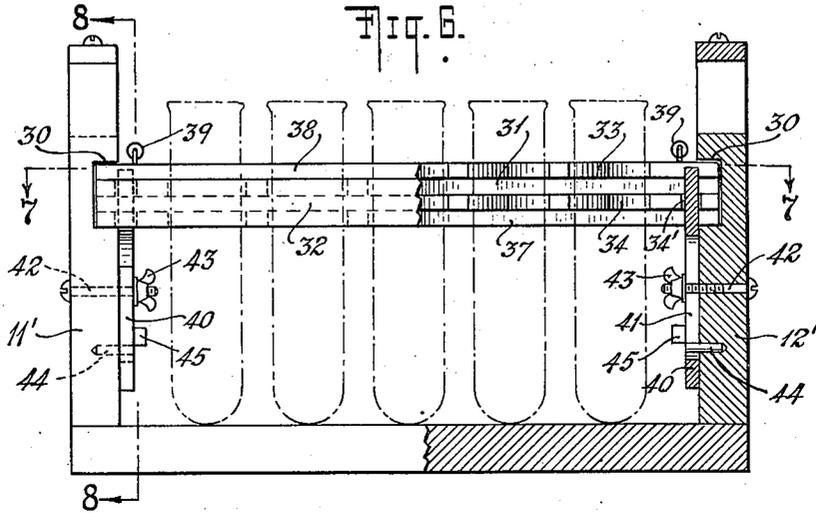
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RACK FOR TEST TUBES AND THE LIKE

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10 Claims. (Cl. 211—74)

This invention relates to devices for holding a plurality of test tubes and the like.

The object of this invention is to provide laboratory workers with a device which can be speedily and readily adjusted to hold test tubes of different sizes. The laboratory worker uses tubes of different diameters, ranging generally from one-quarter of an inch upwardly, and has heretofore been required to use stands of different sizes. Therefore it was necessary that each laboratory kept in stock a varied amount of test tube stands for different types of test tubes, because it was not possible heretofore to use a small test tube stand for large tubes and vice versa. It will readily be understood from these objections that it is desirable that means be provided to the laboratory worker to get a test tube stand which can be used for any type test tube. Such a device is provided by this invention.

The outstanding features of this invention provide an adjustable rack which can quickly be set to accommodate tubes of different diameters.

Fig. 1 is a front elevation of my improved test tube rack illustrating in dotted lines a series of test tubes supported therein; Fig. 2 is a vertical section taken on the line 2—2 of Fig. 1; Fig. 3 is a sectional plan view taken on the line 3—3 of Fig. 1; Fig. 4 is a top plan view of the rack in an adjusted position to receive a series of smaller size tubes; Fig. 5 is a vertical section thereof taken on the line 5—5 of Fig. 4; Fig. 6 is a front elevation, partly in section, of a modified form of rack provided with a pair of adjustable plate members and illustrating in dotted lines a series of test tubes supported therein; Fig. 7 is a sectional plan view taken on the line 7—7 of Fig. 6; Fig. 8 is a vertical section taken on the line 8—8 of Fig. 6; Fig. 9 is a view similar to Fig. 8 and illustrating the adjustability of the device for test tubes of smaller sizes; and Fig. 10 is a cross-sectional elevation taken along the lines 10—10 of Fig. 7 and showing how the test tubes are held in vertical position by the jaws of the holding plates.

Referring more particularly to the drawings, my improved rack, which may be made of wood, fibre, or metal, comprises a base 10 having secured thereto upstanding end members 11 and 12.

The end members are provided with rectangular openings 13—13 at their lower ends and rectangular openings 14—14 at their upper ends. Cross bars 15—15 are secured to the upper ends, forming handles for the convenience of carrying the rack. These end members are also provided on their inner faces, intermediate the tops and

bottoms thereof, with offset grooves or slots 16 and 17 running crosswise of said members.

The rack further comprises a movable front plate 18 and a stationary rear plate 19, horizontally supported within the grooves 16 of the end members. The rear stationary plate 19 is fixedly secured to a crossbar 20, said crossbar being secured by screws 21—21 to the end members 11 and 12. The movable front plate 18 is supported at its ends within the grooves 16 and is slidably arranged to move toward and away from the fixed or stationary plate 19. Each of the plates 18 and 19 has on one side thereof a series of V-shaped recesses 22 and 23, so arranged with respect to one another so as to form a series of square holes of a predetermined size for the insertion of test tubes of corresponding sizes. These plates are also beveled on their opposite faces, tapering from their outer edges to their inner edges so as to permit the movable front plate 18 to be slidably moved within the grooves 16 in a straight alignment toward and away from the stationary plate 19 for adjustment to accommodate various sized tubes.

The adjustable front plate 18 is securely and frictionally held in its adjusted position by leaf springs 24, 24 which are secured to the front ends of the standards having their free ends confined within the grooves 17 which bear against the top ends of the movable plate 18. It will be understood from the foregoing that when it is desirable to adjust the rack for larger or smaller sized tubes it will be only necessary to move the adjustable plate toward or away from the stationary plate.

The adjustable feature of the rack hereinabove described has the advantage of accommodating a wide range of various sized tubes, for practical purposes from one-quarter of an inch or even less in diameter up to one and one-quarter inches in diameter and to securely hold the same for such period of time as required by the laboratory worker.

In the drawings, Fig. 4 shows the plates 18 and 19 overlapping and providing openings for the accommodation of a tube of small diameter, whereas Fig. 3 shows the plates slightly spread apart to accommodate tubes of larger diameter. The height of the plates 18 and 19, from the base plate 10, may be fixed at such distance to encircle the tubes at the upper edges thereof without regard to their length, it being only necessary that the tubes be supported well above their middle lines. The V-shaped contour of the openings 22 and 23 may be varied, but it is desirable not to form them of exact arcs of a circle inasmuch as

the configuration of the opening as the plates more closely approach one another will become oval or elongated, which is not desirable because of the inability of an oval or elongated opening to accommodate a round tube. The size of the opening may be adjusted either by eye or by placing a tube of the particular type which is to be used in the opening and then adjusting the movable plate to a size slightly larger than the diameter of the tube. Consequently, when it is desirous of introducing the tube into the opening in the rack, it can be readily slipped thereinto, even if it has previously been heated and is handled with the aid of an instrument. The rack with the partially filled tubes may be moved from place to place without danger of spilling the material contained in the tube, and the material in the tubes may be readily examined while the tubes are in an upright position.

While I have shown the rack to accommodate a series of five tubes, it will be understood that a larger rack may be employed to accommodate a larger number of tubes, or a double-sided rack may be made within the scope of the claims without departing from the spirit of the invention. In this case the fixed plate must be in the center of the stand and on both sides one movable plate must be provided. The fixed plate should have the above-described series of V-shaped recesses, 22 and 23 on both sides. Also, instead of a single slidable plate 18, a slidable member having a pair of spaced plates, such as, for example, the members 31 or 32 shown in Figs. 6 to 10 of the drawings, may be provided. In such a construction, the fixed plate 19 will enter between the spaced plates of the slidable member. The advantage of this construction is that the three spaced plates will function to maintain the test tubes in upright position without any danger of their tilting and the beveling of the serrated sides of the plates can be dispensed with. Furthermore, instead of the springs 24, 24, coiled springs may be attached to the fixed plate 19 and the movable plate 18 so as to normally urge said plates towards one another as is illustrated, for example, in the embodiment illustrated in Figs. 6 to 10 of the drawings.

Referring now more particularly to Figs. 6 to 10 of the drawings, in this embodiment of the invention the end members 11', 12' are each provided with a single groove or slot 30 disposed transversely of such members. Slidably mounted in the slots 30, 30 are a pair of movable members 31 and 32, each of which comprises a pair of spaced plates, the plates of member 31 being designated 33 and 34, and the plates of member 32 being designated 35 and 36. The members 31 and 32 are similar in construction in that the plates of both members are of similar construction and are equally spaced apart, the spacings between the plates of each member being at the very least sufficient to enable a plate of the other member to slide readily therebetween and preferably being greater so as to minimize any tendency of the test tubes to tilt when they are positioned therebetween. Like the plates 18 and 19, previously described, the plates 33 and 34 of the member 31 and the plates 35 and 36 of the member 32 are provided with a series of V-shaped recesses on their opposed edges to form square-shaped openings for the reception of the test tubes. In order that the members 31 and 32 may be maintained in proper relation to each other, the slots 30, 30 are made wider than the thickness of the members and a spacing member 37 is

provided on the underside of the member 31 and a spacing member 38 is provided on the upper side of the member 32.

The two movable members 31 and 32 are normally urged towards one another by a pair of coiled springs 39, 39 disposed transversely of the members at their ends. One end of the springs 39, 39 is attached to anchoring members of any suitable type secured to the spacing strip 38 and the other end of the springs 39, 39 are attached to anchoring members secured to the body of the movable member 31.

The members 31 and 32 are maintained in proper relation for the reception of test tubes of predetermined sizes by means of a pair of adjusting members 40, 40 mounted on the inner faces of the end members 11' and 12'. Each of the members 40 is in the nature of a plate and is provided with a centrally disposed, elongated, vertical slot 41 through which extends the outer end of a threaded bolt 42 secured to and projecting inwardly through the associated end member. The bolts 42, 42 are provided with wing nuts 43, 43, by which the plates 40, 40 are secured against the inner faces of the end members 11' and 12'. The upper end of each of the members 40, 40 is wedge-shaped and is adapted to enter guide grooves 34', 35', and 36' provided in the ends of the plates 34, 35, and 36, respectively, of the slidable members 31 and 32. The form of the wedge-shaped upper end of the members 40, 40 is such, that the upper ends of such members are always in engagement with the slots 34', 34', and 36', 36', whatever the position of such members with relation to the end members 11' and 12', whereby the cooperativeness of such members is maintained.

It will be seen from the foregoing that the members 31 and 32 are readily movable in the slots 30, 30 and are normally urged towards one another by the springs 39, 39. The members 31 and 32 are maintained in proper relation to each other for a predetermined size of test tube and against the tension of the springs 39, 39 by means of the upper wedge-shaped ends of the plate or adjusting members 40, 40. Thus the test tube of predetermined size may be readily inserted in one of the square-shaped openings and when in position therein will be prevented from tilting by the engagement of the edges of the spaced plates 33, 34, 35, and 36. When the members 31 and 32 are to be adjusted for another size of test tube, the wing nuts 43, 43 are loosened and the members 40, 40 moved to a position where the members 31 and 32 will form square-shaped openings suitable to accommodate such tubes. The members 40, 40 are then fixed in such positions by again tightening the wing nuts 43, 43. Guide posts 44, 44 may be provided on the end members 11' and 12' to maintain the members 40, 40 in proper upright position during the adjustment of such members and thereby at all times maintain their proper relation with respect to the members 31 and 32. Finger grasps 45, 45 may also be provided on each of the members 40 to facilitate the adjustment of such members.

While I have by the foregoing description and in the drawings described and illustrated preferred forms of my invention, it will be understood that modifications and changes may be made therein without departing from the spirit of the invention or the scope of the appended claims.

I claim:

1. A rack for test tubes and the like, compris-

ing a base provided with upstanding end members having grooves disposed in opposed relation, a plurality of elongated members mounted on said end members so that their inner longitudinal edge portions are adjacent to each other, said edge portions having substantially V-shaped recesses to provide a series of substantially square openings between said members for the accommodation of test tubes, at least one of said elongated members being slidably mounted in said grooves to enable adjustment of said member relative to the other to cause said openings to be variably enlarged when one of said members is adjusted relative to the other in one direction and to be variably reduced when one of said members is adjusted relative to the other in the other direction and means for holding said elongated members in an adjusted position.

2. A rack comprising a base member provided with upstanding end supporting members having grooves disposed in opposed relation, a pair of cooperating supporting plates mounted on said end members, said plates having a plurality of recesses formed on one of their longitudinal edges, said recesses being arranged in opposed relation in a horizontal alignment, at least one of said plates being slidably mounted in said grooves to enable movement of such plate relative to the other to form openings of various sizes whereby test tubes of various sizes may be securely held therein, and means for holding said plates in their adjusted position.

3. A rack having adjustable means for holding test tubes or the like of various sizes, comprising a base member provided with upstanding end supporting members, a pair of plates having angularly shaped recesses in opposed relation thereto, said end members being provided with lateral grooves to receive the ends of said plate members and support the same in a substantially horizontal plane, said plate members comprising a front plate and a rear plate, said rear plate being fixed to said end members, and said front plate being adapted to be moved toward or away from said fixed plate to form angular openings, spring means secured to said end members arranged to frictionally engage said movable front plate and adapted to hold the same in adjusted position.

4. A rack such as is defined in claim 1, in which at least one of said members is provided with a pair of spaced plates adapted to receive therebetween a portion of the other member and each plate being provided on its inner edge with a series of aligned notches adapted to form part of the openings for the test tubes.

5. A rack such as defined in claim 1, in which each of said members comprises a pair of spaced plates having on their inner edges a plurality of

aligned notches adapted to form part of the openings for the test tubes.

6. A rack such as is defined in claim 1, in which the means for holding said elongated members in an adjusted position includes means to normally urge said members towards one another and means to maintain such members in proper relation to one another against the pressure of said first-mentioned means.

7. A rack such as is defined in claim 1, in which the means for holding said elongated members in an adjusted position includes spring means normally urging said members towards one another and positioning means intermediate said members and adjustable with relation to said members.

8. A rack such as is defined in claim 1, in which both of said members are movable and in which the means for holding said elongated members in an adjusted position includes positioning means engaging said members and adapted to maintain such members in proper relation to one another and means maintaining said members and positioning means in cooperative relation.

9. A rack for test tubes and the like, comprising a base provided with upstanding members having lateral grooves disposed in opposed relation, a plurality of cooperating supporting plates mounted on said members, and at least one of said plates being slidably mounted in said grooves to enable movement of said plate relative to the other, said plates being formed to provide a plurality of parallelogrammic openings with equal sides through which test tubes may be inserted and being so constructed and arranged that during their relative movement the areas of the openings may be varied while still retaining their parallelogrammic configuration and means for holding said plates in an adjusted position.

10. A rack for test tubes and the like, comprising a base provided with upstanding members having lateral grooves disposed in opposed relation, a plurality of cooperating supporting plates mounted on said members, and at least one of said plates being slidably mounted in said grooves to enable movement of said plate relative to the other, said plates being formed to provide a plurality of substantially square-shaped openings through which test tubes may be inserted and being so constructed and arranged that during their relative movement the areas of the openings may be varied while still retaining their substantially square configuration, whereby four equi-spaced portions of said plates define the limits of movement of a test tube inserted in a particular opening and means for holding said plates in their adjusted position.

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