United States Patent [19]

Fried et al.

[11] **3,717,259**

[45] **Feb. 20, 1973**

[54] TRAY RACK

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[21] Appl. No.: **152,058**

[52] **U.S. Cl.** .....**211/126**, 211/181, 220/19, 220/97 A

[51] **Int. Cl.**.....**A47f 3/14**

[58] **Field of Search**.....211/126, 181, 71, 7 A, 133; 220/97 A, 19; 34/238, 237; 312/351

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[57] **ABSTRACT**

A wire rack construction providing one or more support levels for carrying shallow trays at such support levels; the rack constructions being insertable into compartments of laboratory apparatus such as sterilizers, incubators, ovens or the like whereby to subdivide the compartments thereof when small or shallow containers, plates and the like are contained in the trays.

6 Claims, 8 Drawing Figures

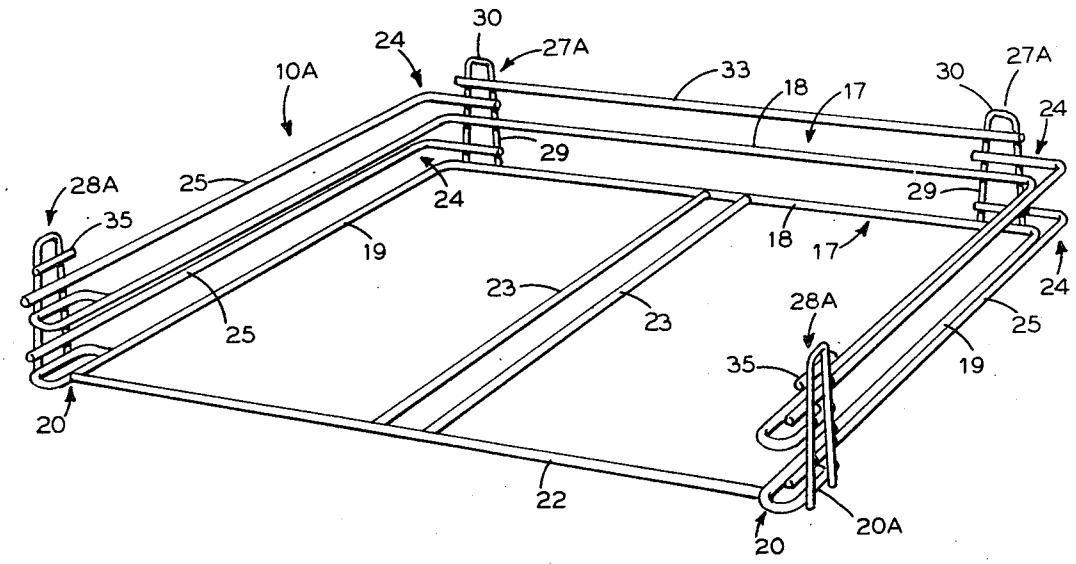


FIG. 5

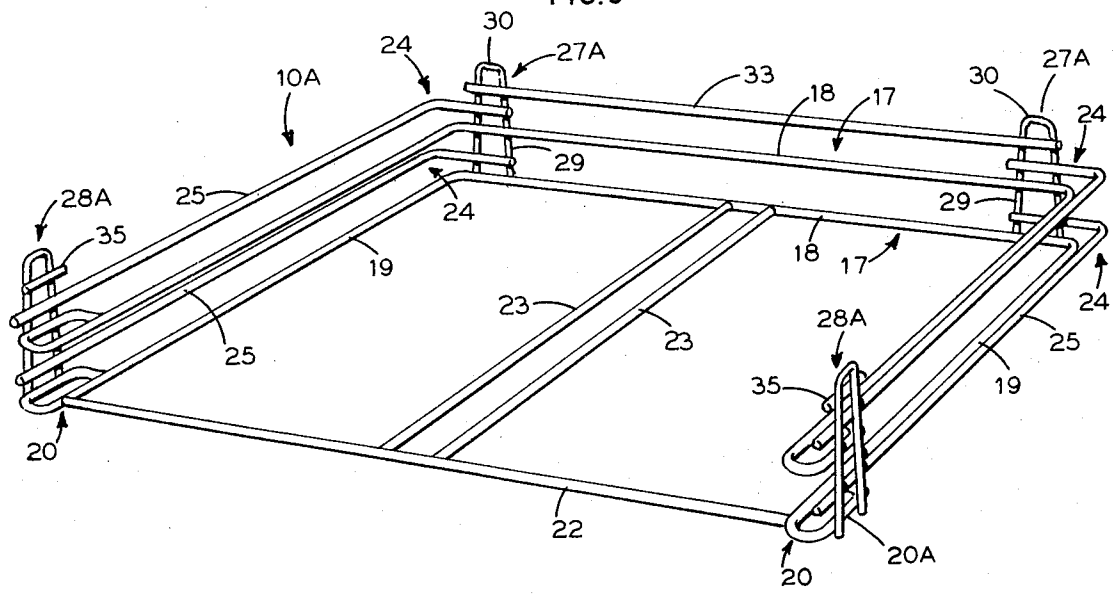
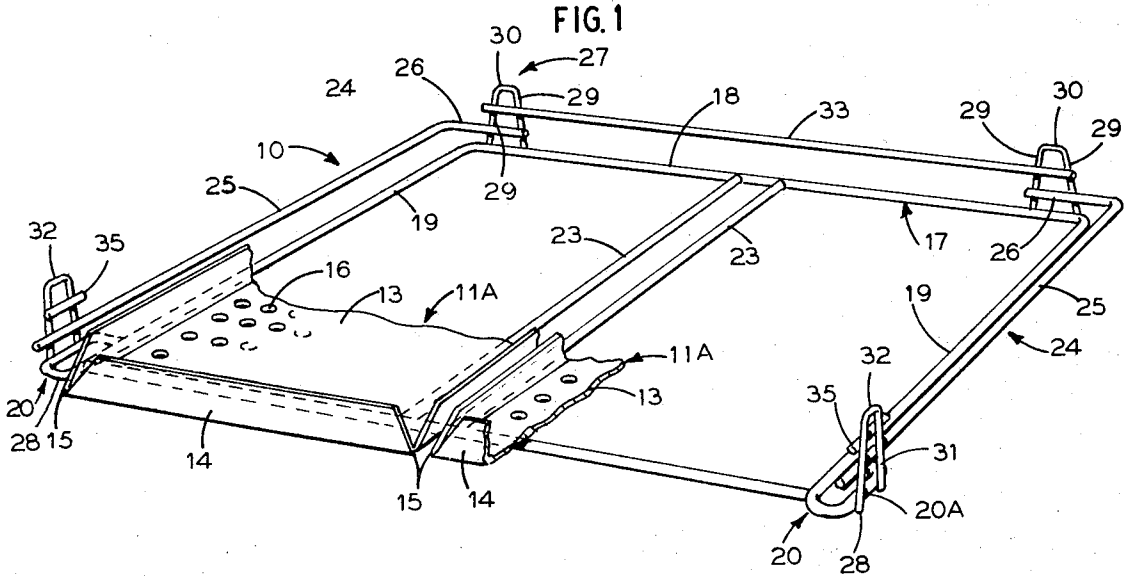


FIG. 1



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FIG. 2

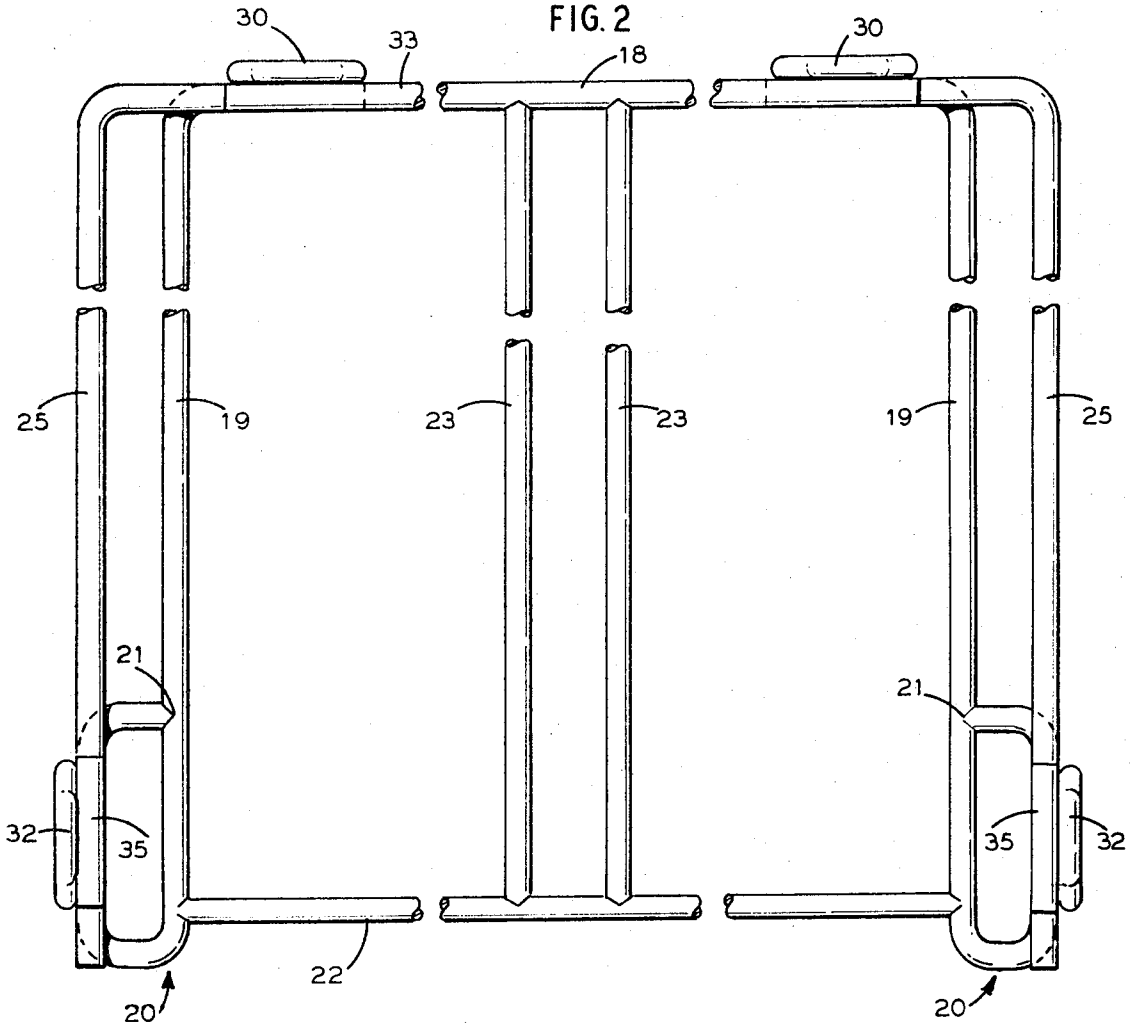

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FIG. 3

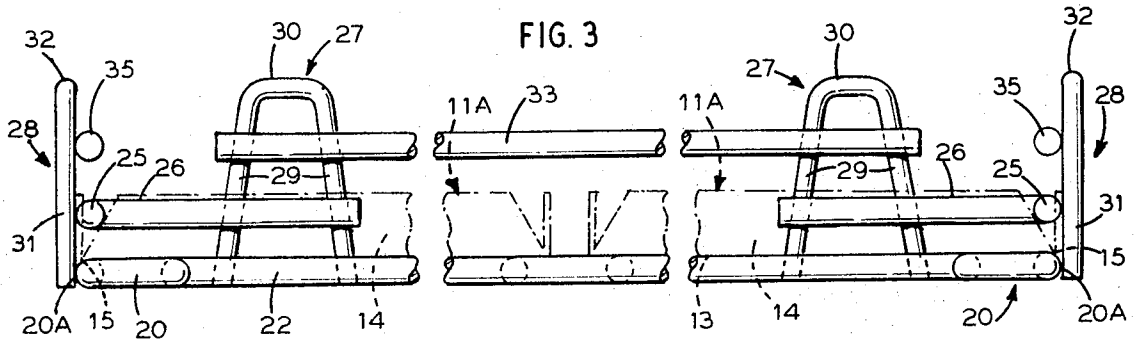

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20A
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FIG. 4

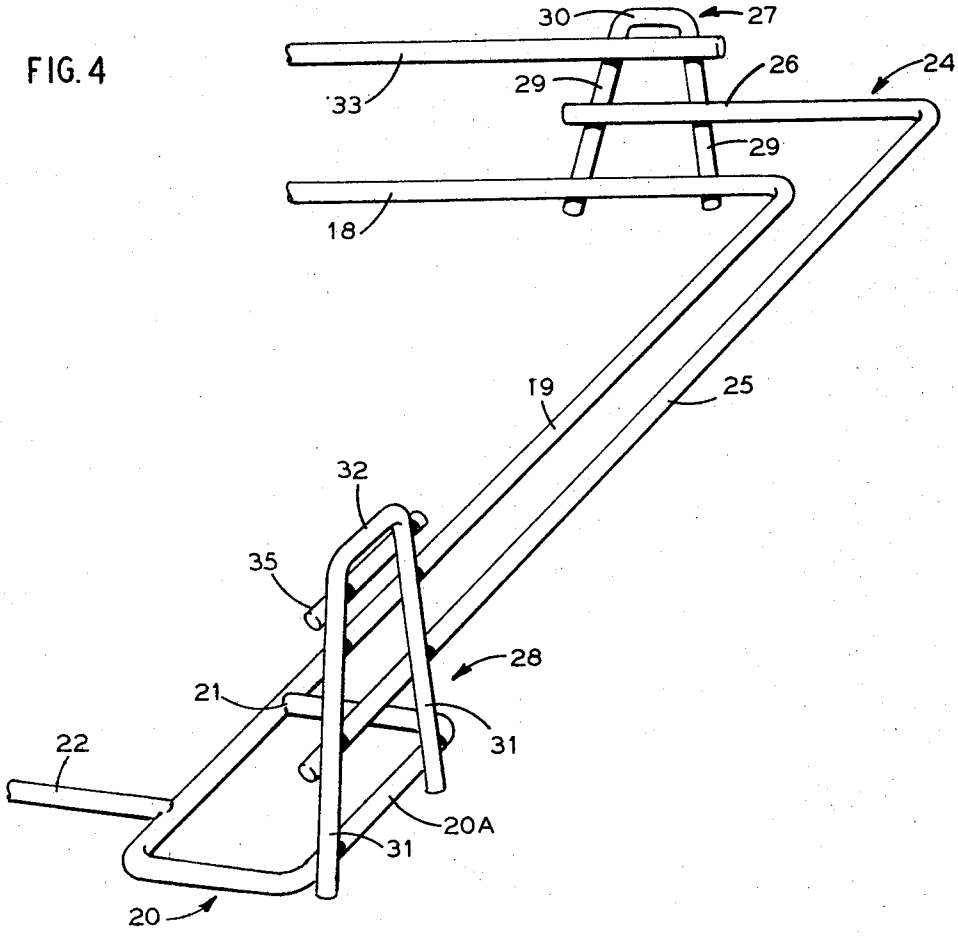

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FIG. 6

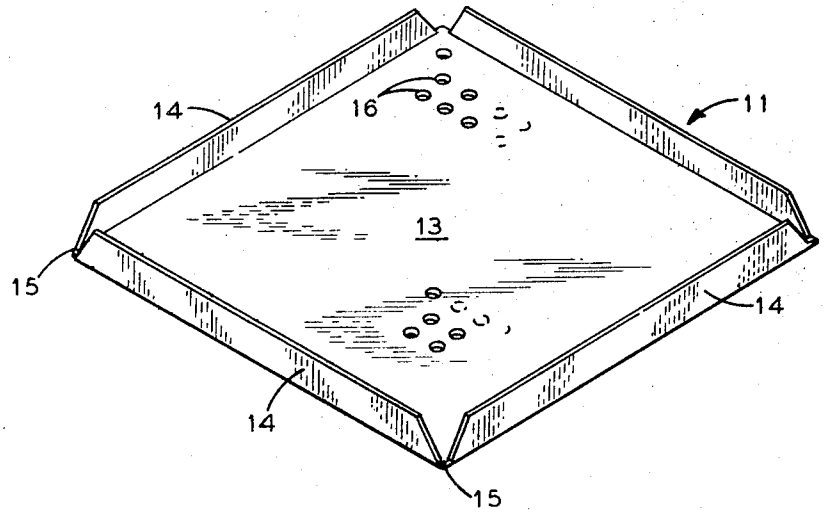

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FIG. 7

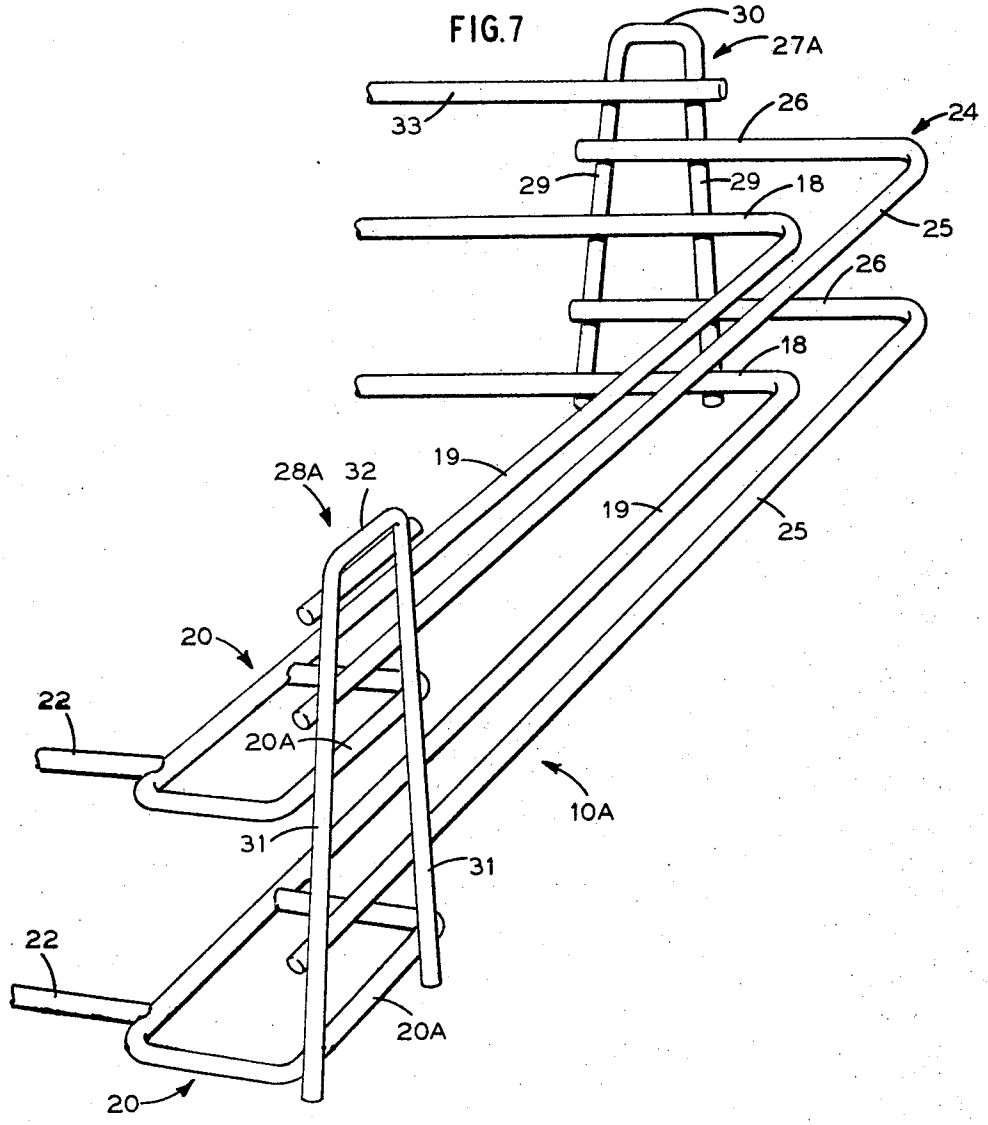
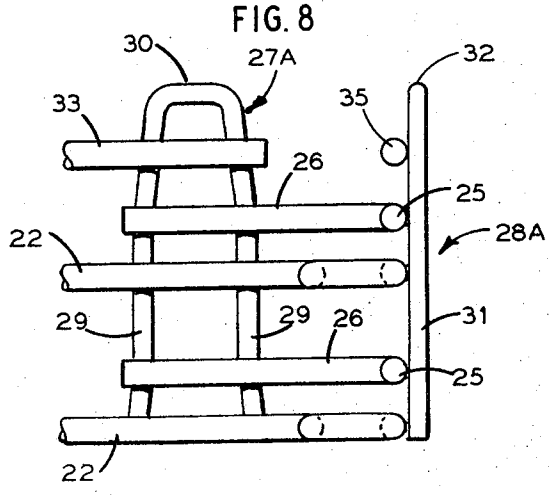

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FIG. 8


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TRAY RACK

BACKGROUND OF THE INVENTION

Research laboratories frequently have use for ovens, sterilizers, incubators and the like, wherein such devices have multiple compartments for receiving items to be processed therein. As there may be a wide range of dimensions for such items, the height of the individual compartments is dimensioned for the largest possible item. Thus, the shelves of such apparatus has a fixed maximum spacing in order to accommodate items of widely varying dimensional proportions.

It follows that when the items to be retreated by the apparatus are relatively small or shallow; the relatively large compartments receiving such small items gives rise to a substantial waste of space and minimal useful space.

Accordingly, an object of this invention is to provide an improved rack construction for mounting trays thereon where relatively small containers, shallow dishes and other small items are to be carried by the trays; the rack construction including one or more support levels for mounting the trays and their contents; two or more of such racks being stackable for insertion into compartments of laboratory equipment to subdivide the same and maximize the utility of the available space.

Another object of this invention is to provide a tray rack for use in laboratory work including tissue culture, virology, bacteriology, microbiology and other scientific research; the rack being formed of bent wire and designed to have one or more tray mounting levels; two or more of the racks being stackable to provide any desired number of tray mounting levels.

Yet another object of this invention is to provide a tray rack having various industrial applications, including storage and supply means for relatively small components and the like carried in small or shallow containers or directly in trays mounted on the tray rack.

A further object of this invention is to provide a rack construction which is adapted to selectively accommodate on a support level either a single large tray or a pair of small trays laterally related to each other.

Still another object of this invention is to provide a multiple level rack wherein a lower level thereof may accommodate either a single large tray or a pair of small trays, while an upper level accommodates a single large tray.

Still a further object of this invention is to provide stacking racks which are formed of bent metal wire to include tray supporting portions, tray edge restraining portions and interengageable stacking portions.

Yet another object of this invention is to provide a rack construction of the character described, which is formed of bent wire and is of minimal weight and bulk; which slidably accommodates trays on selected support levels thereof and may be selectively used to maximize the utility of compartments of laboratory or other apparatus for receiving the same; or, alternatively may be used for storage purposes; the racks being disposed on tables, desks or other supporting surfaces.

Yet another object of this invention is to provide improved tray racks of the character described, wherein each rack is provided with simple means for interengaging complementary means on another rack for stacking the same; such complementary stacking means being of a construction which facilitates engagement or disengagement of the stacked racks, and does not interfere with the mounting of trays on the racks.

Other objects of this invention will in part be obvious and in part hereinafter pointed out.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a single level rack construction embodying the invention;

FIG. 2 is a top plan view thereof;

FIG. 3 is a front elevational view thereof;

FIG. 4 is a partial perspective view thereof;

FIG. 5 is a perspective view of a double level rack construction embodying the invention

FIG. 6 is a perspective view showing a tray used with the rack construction;

FIG. 7 is a partial perspective view of a double level rack construction showing a modification thereof; and

FIG. 8 is a partial front elevational view thereof.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

The tray racks of the instant invention are fabricated from bent metal wire to provide tray supporting portions; tray edge restraining portions; multilevel portions; portions for accommodating single or paired trays; and stacking portions.

Thus, in FIGS. 1–4, 10 designates a single level tray rack embodying the invention; such rack being adapted to carry a single large tray 11 or a pair of small, similar trays in side by side relation. The tray 11 comprises a flat bottom wall 13 of rectangular shape and of suitable dimensions to be slidably received in rack 10. Wall 13 has upstanding from the periphery thereof, shallow flanges 14 which have corner openings 15 therein; the wall 13 being formed with closely spaced perforations 16 to allow the passage of gas, air or the like, therethrough.

The rack 10 is formed entirely of metal wire in bent or other suitable forms. Thus, rack 10 comprises a bottom tray supporting portion generally indicated at 17 and being of U shape with a back portion 18 and side portions 19 extending therefrom. The forward ends of side portions 19 terminate in flat, outwardly turned loop portions 20 of rectangular shape, the terminal ends 21 thereof being turned inwardly and abutting side portions 19 and being secured thereto by welding or the like.

A wire 22 interconnects forward end portions of wire portions 19, the ends thereof being welded in place at points spaced inwardly of the forward portions of loops 20. A pair of parallel wires 23 are centrally disposed between wire portions 19 and are secured at their opposite ends to wire portion 18 and wire 22.

It is understood that the dimensions of tray 11 and rack 10 are so proportioned that when tray 11 is mounted on rack 10, the side marginal edges of the tray 11 will outwardly overlap wire portions 19 and the forward side marginal portions of tray 11 are seated on loop portions 20.

Means is provided for restraining tray 11 to very limited movement from side to side or rearwardly in respect to rack side portions 19 and back portion 18. To this end, a pair of L shaped wire members 24 having long arm portions 25 and short arm portions 26 are

disposed at a level somewhat above that of tray supporting portion 17, the long arm portions 25 being located outwardly of side portions 19.

Members 24 are fixed to tray supporting portions 17 by a pair of upstanding, inverted U shaped members 27 and a second pair of upstanding, inverted U shaped members 28. Members 27 comprise divergent legs 29 and a bight portion 30; and similarly, members 28 comprise divergent legs 31 and a bight portion 32. Members 27 have the lower ends of their legs 29 fixed to opposite end portions of back member 18, while members 28 have the lower ends of their legs 31 fixed to the outermost portions 20A of loops 20.

The members 27 are interconnected by a wire member 33 whose opposite end portions are secured to inner surface portions of legs 29 at points spaced below bight portions 30. The short arm portions 26 of members 24 have their ends fixed to the inner surface portions of members 27 at points intermediate the ends of wire member 33 and end portions of back member 18.

The forward ends of long arm portions 25 of members 24 are fixed to inner surface portions of legs 31 of members 28 at points intermediate bight portions 32 and loop portions 20A. Short cross members 35 are fixed to inner surface portions of members 28, being located intermediate bight portions 32 and long arm portions 25. Further, cross members 35 are colevel with member 33.

It will be apparent that a tray 11 may be slidably mounted on rack 10 and have limited sidewise or rearward movement by reason of the restraining long arm portions 25 against which side flanges 14 of the rack may abut. Rearward movement of the tray 11 relative to rack 10 is limited by the short arm portions 26 against which the back flange 4 of the tray may abut.

The tray 11 is adapted to carry various small or shallow items including bottles or other containers, dishes and the like. Upon locating rack 10 and its tray 11 together with the contents of the tray in a compartment of an incubator, sterilizer or other shelved laboratory apparatus; steam, air or the like is free to pass through the tray 11 and contact the items carried thereon, by way of perforations 16.

Further, racks 10 may be stacked one on the other to thereby subdivide a given apparatus compartment; each rack carrying its own tray 11 together with the contents thereof. Stacking is facilitated by the interengagement of the corresponding members 27, 28. Thus, the bight portions 30, 32 of a lower rack 10 is received between the legs 29; 31 of an upper rack 10. The cross members 35 and members 33 provide locating means for spacing the successive racks 10, by engaging loop portions 20A and rack member 18.

The rack 10 may also accommodate a pair of half size trays 11A, similar to trays 11, except the size thereof. Trays 11A are arranged in side by side relation with the inner edge portions thereof supported on members 23. It follows that rack 10 may be used to hold either a single full size tray 11 or a pair of half size trays 11A.

As shown in FIGS. 5, 7 and 8, rack 10A is of the double level type in that it will accommodate a large tray 11 on each of two levels; or a pair of half size trays 11A on the lower level and a full size tray 11 at the upper level; or a pair of half size trays 11A on each level; or a pair of half size trays 11A on the upper level and a full size tray 11 on the lower level.

Rack 10A is similar to rack 10 except that the inverted U shaped members 27A, 28A are of greater height than the corresponding members 27, 28. Further a pair of tray supporting portions 17 are mounted in vertically spaced relation on members 27A, 28A. A pair of members 24 are also suitably located and secured to members 27A, 28A, their long arm portions 25 alternating with loop portions 20. Cross members 35 are mounted on the upper portions of members 28A.

As indicated in FIGS. 7, 8, a second member 22 may extend between loops 20 at the upper level so that a pair of members 23 may be provided at the upper level, to thereby allow for varied arrangements of trays 11, 11A on the two levels.

It will be apparent that racks similar to those set forth above, may have any desired number of levels and may be stacked in any combination thereof for either subdividing a given compartment or providing storage and dispensing means for small or shallow laboratory items as well as small industrial parts or components.

While the racks 10, 10A are shown and described as being formed of bent wire of suitable metal or alloy; it is understood that synthetic resin rods of suitable configuration, may also be used to form the racks.

We claim:

1. A wire tray rack comprising a bottom tray supporting portion, a restraining back portion and laterally related restraining side portions, a first pair of mounting members upstanding from said tray supporting portion, a second pair of mounting members upstanding from said tray supporting portion, said restraining back portion interconnecting said first pair of mounting members, each of said restraining side portions interconnecting one of said first pair of mounting members and one of said second pair of mounting members, said restraining back portion being disposed at a level above that of said tray supporting portion, and outwardly thereof, said tray supporting portion being formed of a bent U shaped wire member and said mounting members being formed of inverted U shaped members having diverging leg portions, the lower ends of the leg portions of said first pair of mounting members being secured to outer surface portions of the back portion of said U shaped supporting member, said restraining back portion comprising a linear wire member secured at the opposite ends thereof to inner surface portions of said first pair of mounting members, said restraining side portions comprising L shaped wire members, the short arms of said L shaped members being secured to inner surface portions of said first pair of mounting members, the outer ends of the long arms of said L shaped members being secured to inner surface portions of said second pair of mounting members.

2. A wire rack as in claim 1, wherein the side portions of said wire tray supporting portion terminate at their outer ends in a flat endless loop extending outwardly thereof, and a linear wire member interconnecting said loops.

3. A wire rack as in claim 2, and further including a pair of parallel linear wire members extending between said last mentioned linear wire member and the back portion of said U shaped supporting member and disposed intermediate the side portions of said U shaped supporting member.

4. A wire rack as in claim 1, and further including short cross members secured to inner surface portions of said second pair of inverted U shaped mounting members, said cross members being disposed between the bight of said second pair of inverted U shaped members and the long arms of said L shaped members.

5. A wire rack as in claim 1, wherein a plurality of tray supporting portions in vertically spaced relation are fixed to said first and second pairs of mounting members, each tray supporting portion having back restraining and a pair of side restraining portions associated therewith.

6. A stackable tray rack formed of bent wire including a rectangular U shaped tray supporting portion having a back wire portion and side wire portions, a first pair of inverted U shaped members fixed at their lower ends to said back wire portion at the opposite ends thereof and in upstanding relation thereto, a second pair of inverted U shaped members fixed at their lower ends to the outer end portions of said side wire portions, a linear wire member extending between said first pair of inverted U shaped members and disposed at a level above that of said tray supporting portion, a pair of L shaped wire members having the short arm portions thereof secured to said first pair of inverted U shaped members and the outer ends of the long arm portions thereof secured to said second pair of inverted U shaped members, said long arm portions being disposed at a level above that of that of said tray supporting portion and outwardly of the side wire portions thereof, and a linear wire member interconnecting the forward ends of the side wire portions of said tray supporting portion, whereby said racks may be stacked with the upper portions of said first and second pairs of inverted U shaped members received in the open lower portions of the corresponding first and second pairs of inverted U shaped members on a succeeding rack.

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