Aug. 1, 1944. J. E. BORAH 2,354,938

EXTENSIBLE RACK

Filed Nov. 24, 1941

FIG. 1.

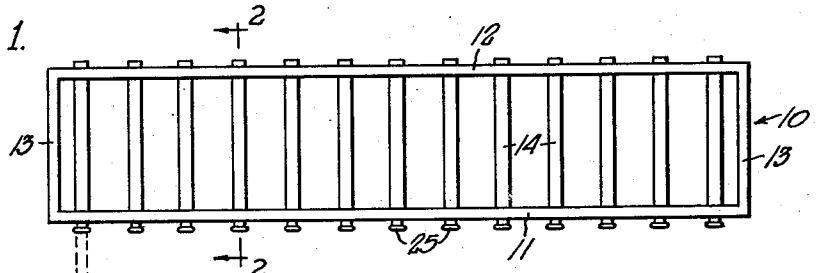


FIG. 2.

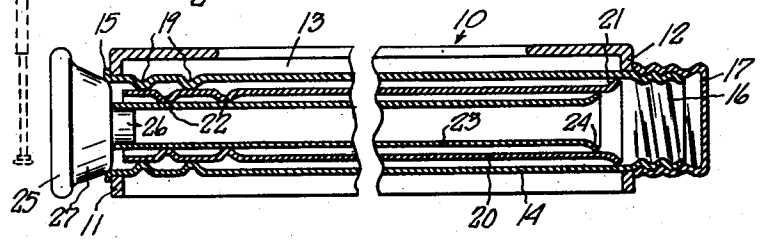


FIG. 3.

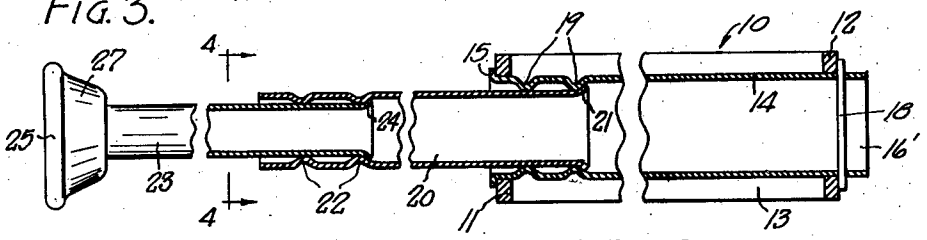


FIG. 4.

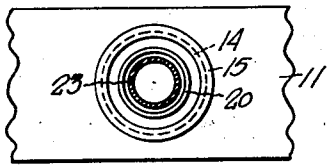


FIG. 7.

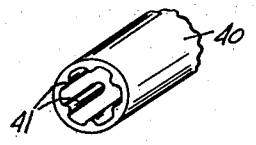


FIG. 5.

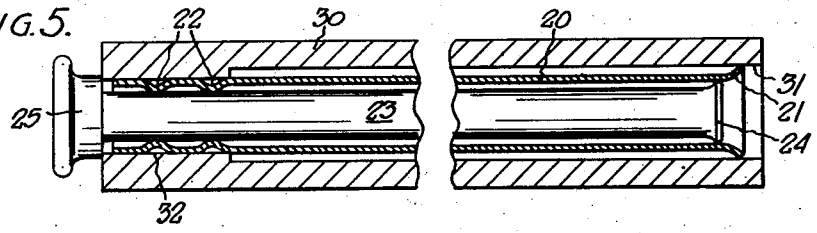
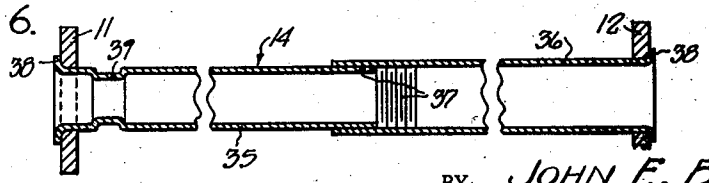


FIG. 6.



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EXTENSIBLE RACK

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Application November 24, 1941, Serial No. 420,163

10 Claims. (Cl. 211—94)

This invention relates to an extensible rack, and more particularly to an extensible rack adapted to support articles thereon when extended and retractible when not in use. One purpose for which the rack may be used is for drying wet clothing.

The primary object of the invention is to provide a novel, simple and inexpensive rack of the telescoping type.

A further object is to provide a telescoping tube arrangement wherein a plurality of tubes interfit for free sliding movement, and wherein each has integral guide means and movement limiting means at opposite ends for cooperation with like parts on adjacent tubes to guide and limit extension of the tubes.

A further object is to provide a rack having telescoping tubes in which spaced circumferential offsets are formed adjacent one end and a flared enlarged portion is formed at the opposite end, said offsets serving to guide sliding movement of the tubes to and from extended position, and the outermost offset of each encircling tube serving as an abutment which is engageable by the enlarged end of the tube encircled thereby.

A further object is to provide a rack including a plurality of interfitting tubes, wherein each encircling tube has a plurality of spaced circumferential offsets at one end for guiding the tube encircled thereby, and the spacing of the offsets of each tube differs from the spacing of the offsets in adjacent tubes to prevent interlocking of the offsets when the tubes are in retracted or collapsed relation.

A further object is to provide a telescoping tube unit which may be quickly and easily assembled and secured to a support.

A further object is to provide an extensible rack adapted for application to a wide range of articles such as cabinets, shelves, and the like.

Other objects will be apparent from the description, drawing, and appended claims.

In the drawing:

Fig. 1 is a top plan view of one embodiment of the invention.

Fig. 2 is an enlarged longitudinal sectional view taken on line 2—2 of Fig. 1.

Fig. 3 is a longitudinal sectional view illustrating the tube in an extended position.

Fig. 4 is a transverse sectional view taken on line 4—4 of Fig. 3.

Fig. 5 is a longitudinal sectional view illustrating a modified embodiment of the invention.

Fig. 6 is a longitudinal sectional view of a modified construction of the outer tube of the rack.

Fig. 7 is a fragmentary perspective detail view of another tube modification.

Referring to the drawing, which illustrates the preferred embodiment of the invention, the numeral 10 designates a support, here shown as a rectangular frame having a front rail 11, a back rail 12, and end rails 13 which are secured together to form a rigid unit. Both the front rail 11, and the rear rail 12 are provided with a plurality of spaced openings therein, and these openings in the two rails 11 and 12 are preferably paired in axial alignment.

Within the openings in the front and rear rails I mount an outer tube 14 whose forward end is outwardly spun or flared at 15 to bear against the front face of the front rail 11. The tube 14 is preferably of a length greater than the spacing of the rails 11 and 12, whereby the rear end portion thereof projects rearwardly from the rear face of the rear rail 12. This rearwardly projecting portion may be threaded at 16, as illustrated in Fig. 2, in which event a screw threaded cap 17 may be fitted upon the projecting threaded end 16 of tube 14 to bear against the rear face of rear rail 12 and thus hold the tube 14 in fixed relation to the frame 10, and the rails 11 and 12 thereof. It will be understood that the openings formed in the rails 11 and 12 are preferably of a size to slidably and snugly receive the tube 14. In Fig. 3, I have illustrated a modified embodiment of the securing means for tube 14 which consists in the use of a cotter pin 18 projecting through diametrically opposed openings in the rearwardly projecting portion 16' of the tube 14 in a position engaging the rear face of rear rail 12. Adjacent its forward end the tube 14 is provided with a pair of longitudinally spaced circumferential inwardly extending offsets 19.

A second or intermediate tube 20 having an outer diameter to snugly and slidably fit within the offsets 19 of tube 14 whereby the major portion of the outer surface thereof is spaced from the inner wall of tube 14, is inserted within tube 14. Tube 20 is preferably of shorter length than tube 14 and has an outwardly flaring rear end portion 21 whose outer diameter substantially conforms with the inner diameter of the tube 14, and is slidable within the tube 14. At the front end portion of intermediate tube 20 are formed a pair of inwardly projecting spaced circumferential offsets 22.

A third or inner tube 23, whose outer diameter substantially conforms with the inner diameter

of the circumferential offsets of the intermediate tube 20, is inserted within tube 20. Tube 23 is provided with an enlarged flaring rear end portion 24 whose diameter is substantially equal to the inner diameter of tube 20. A suitable hand grip member 25 is mounted upon the forward end of tube 23.

Referring to the Figs. 2 and 3, it will be observed that the parts are so proportioned and related that when the tubes are in collapsed position the handle 25 will project outwardly from the assembly and from the forward end of the tube 14 in a position to permit it to be grasped. As the user pulls upon the handle 25, the inner tube 23 is slid outwardly, guided by the offsets 22 of tube 20 and by the flared enlarged rear end 24 of tube 23. The outward movement of tube 23 in tube 20 is limited by the abutment or engagement of the flared end portion 24 of tube 23 with the rearmost offset 22 of tube 20. Thereupon, continued pull upon the handle 25 moves both the inner tube 23 and the intermediate tube 20 relative to the fixed tube 14, until the enlarged flaring end 21 of tube 20 engages the rearmost circumferential offset 19 of the tube 14. The fully extended position of the parts is illustrated in Fig. 3, and it will be noted that the longitudinally spaced circumferential offsets 19 of the tube 14 serve to position the intermediate tube 20, and the longitudinally paced offsets 22 of the intermediate tube 20 serve to position the inner tube 23. Hence, the outwardly flaring rear portions and the circumferential offsets in the front portions constitute means integral with the tubes themselves for serving the dual purposes of guiding and supporting the tubes in movement and of limiting the relative extension of the tubes. The proper spacing of the circumferential offsets and the snug fitting thereof around the tubes encircled thereby will provide a structure wherein the extended tubes are solidly supported from the tube 14 and are enabled to support articles such as damp laundered clothing.

In order to insure against interlocking of the tubes by interengagement of offsets 19 and 22 as might occur when the tubes are in retracted or collapsed position, it is advisable that the spacing between offsets in each tube should differ from the spacing of the offsets in the adjacent tube. Hence, not more than one of the offsets on two tubes can be positioned in register, and there is no possibility that the offsets will so interfit or interengage as to interlock the tubes against extension.

The device may be assembled quite simply after the tube 14 has been secured to place by inserting the intermediate and innermost tubes into tube 14 from the rear thereof. This necessitates the insertion of tube 23 before the hand portion 25 is applied thereto. The hand portion may include a part 26 projecting within the tube 23 and secured thereto, as by a screw threaded connection or the like.

In certain instances, it may be advantageous to seal the tubes against the entry of moisture therein. This can be accomplished by forming the hand grip 25 from resilient material such as rubber, and providing it with a frustoconical portion 27 so positioned and of such size that it may be forced into the outer end of the tube 14 to be held therein by its resilience or expansibility.

While the invention has been illustrated and described as comprising three telescoping tubes, it will be understood that this is illustrative only, and that any selected number of tubes may be used according to the purpose for which the invention is used and the conditions and problems encountered.

A slightly modified embodiment of the invention is illustrated in Fig. 5. This embodiment is intended for application to wood shelves or the like. Thus, the shelf 30 may be provided with a large diameter bore 31 extending from the rear edge thereof to a point adjacent but spaced rearwardly from the front edge of the shelf, and with a concentric reduced diameter bore portion 32 extending from the front edge of the shelf and communicating with the bore 31. Within these bores 31 and 32 may be mounted parts corresponding to the intermediate tube 20 and the inner tube 23 of the preferred embodiment of the invention.

It will be understood that this embodiment of the invention will operate in the same manner as the preferred embodiment. A suitable closure (not shown) may be applied to the rear edge of the shelf member 30 to hold the tubes 20 and 23 therein, or this may prove unnecessary if the rear edge of the shelf abuts a wall upon which it is mounted.

The extensible tube construction of this invention may be applied to a large number of items such as washing machines, and space heaters, or it may be applied to items of furniture such as chests, kitchen cabinets, shelves, and "whatnots." Additionally, a unit such as that illustrated in Fig. 1 may be mounted on a supporting rack and shelf. The tubes 14 may be spaced in the frame 10 in a manner to permit articles to rest and be supported thereon in the same manner in which articles may be supported upon a shelf or lattice work.

In certain instances where the rack is to be sold as a unit for installation by the user rather than as a prefabricated part of another item, it may be desirable to form the outer tube of the telescoping tube assembly in the manner illustrated in Fig. 6. In this construction, the outer tube 14 is formed of two parts including a front end portion 35 and a rear end portion 36. These tube portions are provided with interfitting threaded portions 37 at their inner ends which are of a substantial length. The outer end of each of the tubes 35 and 36 is provided with a flared or enlarged end portion 38 adapted to seat against the outer face of the adjacent rails 11 and 12 of the supporting device. It will be observed that when the threads 37 are formed through a sufficient length of the device, the tube unit 14 may be adapted for mountings differing in size or length and an effective connection of the tube assembly 14 can be obtained. Thus, it would be possible to mount the tube unit 14 on supports varying in length as much as one inch or more.

While certain advantages are achieved by the use of a pair of spaced inwardly projecting circumferential offsets such as the offsets 19 and 22 of the encircling tubes of the assembly, it is not essential that more than one of such offsets be used in any construction. Thus, I have illustrated in Fig. 6 the use of one circumferential offset 39 formed in the front tube section 35 adjacent the forward end thereof but spaced rearwardly from the front edge thereof. When this offset is shallow, for example in the order of $\frac{1}{16}$ of an inch, and its spacing from the front edge of the tube is sufficient, it will serve to support the extended tubes within it only slightly in-

clined with respect to the supporting tube 14. I have found that where the spacing of the single offset 39 is in the order of one-half to three-quarters of an inch from the front edge of the tube, and its projection is in the nature of 3/64 or 1/16 of an inch, the angle at which the projecting tube extends therefrom is not sufficiently great to render the device objectionable or impractical.

Another modification of tube construction is illustrated in Fig. 7. This modification is particularly applicable to tubes formed of glass or like material and entails the provision, in the front end of a tube 40 within which another tube is to be received, of a plurality of spaced longitudinally extending ribs 41 projecting inwardly from the inner periphery of said tube. The ribs 41 preferably extend from the front end of the tube and may be of any desired length effective to support the tube receivable therein when the latter is extended. A longitudinally ribbed structure may also be formed in metal tubing, as by forming off-sets therein, in which event the angular displacement of the off-sets of each of two interfitting tubes should differ sufficiently to prevent interlocking thereof at said off-sets when retracted.

Each of the parts of this invention has been referred to as a tube throughout, but this is illustrative only. The inner member, such as member 23, Fig. 2, may be formed of solid cylindrical or rod stock if desired.

I claim:

1. An extensible rack comprising a support, a plurality of telescoping tubes, and means fixedly mounting the outermost tube on said support, each of the encircling tubes having at least two spaced circumferential inwardly off-set portions adjacent the front end thereof, the opposite end of each of the encircled tubes flaring outwardly.

2. An extensible rack comprising a support, a plurality of concentric radially spaced telescoping tubes, and means fixedly securing the outermost tube to said support, each of the encircling tubes having at least two spaced circumferential off-sets adjacent the front end whose inner diameter is substantially equal to the outer diameter of the adjacent encircled tube, the opposite end of each encircled tube flaring outwardly and having an outer diameter substantially equal to the inner diameter of the adjacent encircling tube.

3. An extensible rack comprising a support, a plurality of telescoping tubes, and means securing the outermost tube to said support, each of the encircling tubes having at least two spaced circumferential inwardly off-set portions adjacent the front end thereof, the opposite end of each of the encircled tubes flaring outwardly, the spacing of the off-sets of each tube differing from the spacing of the off-sets of adjacent tubes.

4. An extensible rack comprising a support including a pair of spaced parts having aligned apertures, and a plurality of radially spaced telescoping tubes, the outermost tube being mounted in said apertures and having an outwardly flared forward end bearing against the front face of the front part of said support, retaining means carried by the rear end of the outermost tube rearwardly of the rear part of said support, each encircling tube having a plurality of spaced inwardly off-set circumferential guides in its forward end portion and each encircled tube having an integral enlarged rear end portion.

5. An extensible rack comprising a rigid support having an open ended tubular passage therethrough having a reduced diameter portion adjacent its front end, and a plurality of radially spaced telescoping tubes positioned within said passage and each having integral enlarged rear end portions, each encircling tube having a plurality of spaced circumferential guide off-sets adjacent its front end.

6. An extensible rack comprising a support, a plurality of telescoping tubes, means fixedly securing the outermost tube to said support, each of the encircling tubes having at least two spaced circumferential inwardly off-set portions in the front end portion thereof, the opposite end of each of the encircled tubes flaring outwardly, and a hand grip member carried by the front end portion of the innermost tube and having a frustoconical portion fitting within the mouth of the outermost tube.

7. An extensible rack comprising a rigid support having an open ended tubular passage therethrough bearing a reduced diameter portion at its front end, a plurality of telescoping tubes mounted in said passage, each of the encircling tubes having at least two spaced circumferential inwardly off-set portions in the front end portion thereof, the rear end of each of the encircled tubes flaring outwardly, and a hand grip member formed of rubber-like material mounted on the front end of the innermost tube and having an enlarged frustoconical portion fitting snugly and yieldingly within the mouth of said passage.

8. An extensible rack comprising a support, a plurality of telescoping tubes, and means fixedly mounting the outermost tube in said support, said outermost tube being formed of two tube sections having elongated interengageable threaded inner end portions, each of the encircling tubes having a circumferential inwardly off-set portion in the front end portion thereof spaced from the front edge thereof, the opposite end of each of the encircled tubes flaring outwardly.

9. A telescoping extensible rack comprising a support including opposed parts having aligned openings, a plurality of elongated interfitting relatively slidable members, and means fixedly mounting the outermost member in said support with its opposite ends in said openings, each of the encircling members having a plurality of spaced integral internal projections adjacent the front end of its inner periphery, the opposite end of each of the encircled members having an enlargement engageable with at least one projection, the projections of each encircling member being arranged for spaced substantially linear engagement with the encircled member.

10. An extensible rack comprising a rigid support having an open ended passage therethrough, a tube slidable within said passage, said passage and tube each having a restriction projecting from the inner periphery thereof adjacent the front end, an elongated inner member slidable within said tube, said tube and member each having an enlargement engageable with one of said restrictions, and a hand grip having a frustoconical portion formed of resilient material mounted on the outer end of said member and adapted for a wedged sealing fit in the outer end of said passage.

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