

RETRACTABLE CLOTHES DRYING RACK

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Field of the Invention

10 The present invention generally relates to clothes drying, and more particularly to a clothes drying rack.

Background of the Invention

15 Clothes drying is commonly performed by exposing recently washed wet clothes to the outside atmosphere. The clothes are hung on and collected from clothes lines, hangers, rods and racks.

20 The Housing and Development Board (HDB) of Singapore has implemented several generations of clothes drying racks for residential housing. In an early generation, clothes drying racks were provided by bamboo poles inserted at one end into circular sockets on the external parapet wall and cantilevered at the free end. The poles extended away from the building at fixed positions. However, the user had to insert the poles with hanging clothes into and out of the sockets, and the clothes were exposed to rain and wind uplifting.

25 In the next generation, clothes drying racks were provided by bamboo poles supported by an external parapet wall beneath a reinforced concrete ledge to protect the clothes from rain and wind uplifting, but the user still had to carry the poles with hanging clothes to and from the wall.

30 In a third generation, the poles extended parallel to one another at fixed positions supported by the external parapet wall beneath the ledge, the user could hang and collect the clothes without carrying the poles, and the clothes were protected from rain and wind uplifting. However, the clothes drying rack leaves room for improvement. For instance, the clothes drying rack is limited to three poles since more poles are difficult for the user to reach. Three poles may be insufficient for large household clothes loads. In addition, the user may have difficulty hanging wet heavy clothes on the farthest pole.



Therefore, there is a need for a clothes drying rack that is safe, convenient, cost-effective, has large capacity and avoids pole carrying.

Summary

5 The present invention provides a clothes drying rack that improves upon existing racks and addresses the needs mentioned above.

Generally speaking, the present invention provides a clothes drying rack that includes first poles that slide together along horizontal tracks but not vertical tracks, and second poles that slide individually along the horizontal and vertical tracks.

10 In accordance with an aspect of the present invention, a clothes drying rack includes a track that includes horizontal tracks, corner tracks and vertical tracks, wherein the corner tracks are between the horizontal and vertical tracks, first poles that slide together along the track, horizontally slide along the horizontal tracks, do not slide along the corner tracks to the vertical tracks and do not slide along the vertical tracks, and second poles that slide
15 individually along the track, horizontally slide along the horizontal tracks, slide along the corner tracks to and from the horizontal and vertical tracks and vertically slide along the vertical tracks.

The first poles can horizontally slide along the horizontal tracks between first extended positions and first retracted positions on the horizontal tracks, and the second poles
20 can slide along the horizontal, corner and vertical tracks between second extended positions on the horizontal tracks and second retracted positions on the vertical tracks. The first retracted positions can be between the first extended positions and the corner tracks, and the second extended positions can be between the first extended positions and the corner tracks. Furthermore, the first retracted positions can be the second extended positions.

25 The first poles can include one pole that is rotatable to secure and release the first poles together to and from the horizontal tracks at the first extended and retracted positions, and the second poles can each be rotatable to secure and release the second poles individually to and from the horizontal tracks at the second extended positions.

The horizontal and vertical tracks can be essentially orthogonal to one another. For
30 instance, the horizontal tracks can extend essentially horizontally and slightly vertically from the corner tracks such that gravity assists the first and second poles as they horizontally slide along the horizontal tracks towards the corner tracks. Similarly, the vertical tracks can extend

vertically from the corner tracks such that gravity assists the second poles as they vertically slide along the vertical tracks away from the corner tracks.

The first and second poles can have the same number of poles. For instance, the first and second poles can each have three poles.

The clothes drying rack can be installed on an external parapet wall of a residential building so that the horizontal tracks are essentially orthogonal to the wall and the vertical tracks are essentially parallel to the wall.

Advantageously, the clothes drying rack can contain more than three poles to provide sufficient capacity for large household clothes loads. For instance, the clothes drying rack can contain three additional poles. The additional poles can be easily reached by the user and can retract towards the user into a vertical stack so that the other three poles can slide towards the user and be easily reached by the user. The clothes drying rack is compact and makes efficient use of the available space. The clothes drying rack can be installed on an external parapet wall beneath a reinforced concrete ledge to minimize rain exposure and wind uplifting. In addition, the poles need not be carried. Accordingly, the clothes drying rack is safe, convenient, cost-effective, has large capacity, avoids pole carrying and is especially beneficial for residential use.

These and other features and advantages of the present invention will become more apparent in view of the detailed description that follows.

Brief Description of the Drawings

Preferred embodiments of the present invention will now be more fully described, with reference to the drawings in which:

Fig. 1 shows a perspective view of a clothes drying rack in accordance with an embodiment of the present invention;

Fig. 2 shows an exploded view of the tracks and poles of the clothes drying rack;

Fig. 3 shows a side view of the pole/track interface;

Fig. 4 shows a side view of the hook/clamp interface;

Fig. 5 shows a side view of the clothes drying rack with the first and second poles on the horizontal tracks;

Fig. 6 shows a side view of the clothes drying rack with the first poles on the horizontal tracks, two of the second poles on the horizontal tracks, and one of the second poles on the vertical tracks after sliding a second pole to the vertical tracks;

Fig. 7 shows a side view of the clothes drying rack with the first poles on the horizontal tracks, one of the second poles on the horizontal tracks, and two of the second poles on the vertical tracks after sliding another second pole to the vertical tracks;

Fig. 8 shows a side view of the clothes drying rack with the first poles on the horizontal tracks and the second poles on the vertical tracks after sliding another second pole to the vertical tracks;

Fig. 9 shows a side view of the clothes drying rack with the first poles on the horizontal tracks and the second poles on the vertical tracks after sliding the first poles on the horizontal tracks; and

Fig. 10 shows the clothes drying rack installed on a residential building.

Detailed Description of the Invention

In the following description, the preferred embodiments of the present invention are described. It shall be apparent to those skilled in the art, however, that the present invention may be practiced without such details. Some of the details are not be described at length so as not to obscure the present invention.

Figs. 1, 2, 3 and 4 show clothes drying rack 10 and its components in accordance with an embodiment of the present invention.

Clothes drying rack 10 includes track 12, first poles 14 and second poles 16.

Track 12 includes first side track 20 and second side track 22. First side track 20 includes first horizontal track 30, first corner track 32, first vertical track 34 and first clips 36. Second side track 22 includes second horizontal track 40, second corner track 42, second vertical track 44 and second clips 46.

First corner track 32 is between and adjacent to first horizontal and vertical tracks 30 and 34 and forms a 95 degree angle between first horizontal and vertical tracks 30 and 34. Thus, first horizontal and vertical tracks 30 and 34 are essentially orthogonal to one another since the angle is between 80 to 100 degrees. Furthermore, first horizontal track 30 extends essentially horizontally and slightly vertically (at a 5 degree angle) in the upward direction

from first corner track 32, and vertical track 34 extends vertically (at a 90 degree angle) in the downward direction from first corner track 32.

Second corner track 42 is between and adjacent to second horizontal and vertical tracks 40 and 44 and forms a 95 degree angle between second horizontal and vertical tracks 40 and 44. Thus, second horizontal and vertical tracks 40 and 44 are essentially orthogonal to one another since the angle is between 80 to 100 degrees. Furthermore, second horizontal track 40 extends essentially horizontally and slightly vertically (at a 5 degree angle) in the upward direction from second corner track 42, and vertical track 44 extends vertically (at a 90 degree angle) in the downward direction from second corner track 42.

Side tracks 20 and 22 are L-shaped supports and mirror images of one another. Side tracks 20 and 22 are made of zam (zinc-aluminium-magnesium) coated steel that is durable to usage and weather exposure. In addition, vertical tracks 34 and 44 include weep holes (not shown) at their bottom portions to discharge water from side tracks 20 and 22, respectively.

First poles 14 include first poles 14A, 14B and 14C. First poles 14 are secured to sliding plates 50 and 52, and sliding plates 50 and 52 are slideably attached to side tracks 20 and 22, respectively, at horizontal tracks 30 and 40, respectively. As a result, first poles 14 slide together as a group along horizontal tracks 30 and 40 and remain at a fixed distance from one another. However, sliding plates 50 and 52 cannot slide along corner tracks 32 and 42 to vertical tracks 34 and 44. Instead, corner tracks 32 and 42 prevent sliding plates 50 and 52, which are rigid, from sliding to vertical tracks 34 and 44. Thus, first poles 14 horizontally slide together along horizontal tracks 30 and 40 but do not slide along corner tracks 32 and 42 or vertical tracks 34 and 44. In addition, sliding plates 50 and 52 prevent first poles 14 from dislodging from horizontal tracks 30 and 40.

Second poles 16 include second poles 16A, 16B and 16C. Second poles 16 are each slideably attached at their respective enlarged circular bearings 54 and 56 to side tracks 20 and 22 at horizontal tracks 30 and 40, respectively. Second poles 16 are not mechanically coupled to one another or to first poles 14. Instead, second poles 16 slide individually along side tracks 20 and 22 and can have varied distance between them. Furthermore, second poles 16 slide along horizontal tracks 30 and 40, corner tracks 32 and 42 and vertical tracks 34 and 44. That is, second poles 16 slide from horizontal tracks 30 and 40 across corner tracks 32 and 42 to vertical tracks 34 and 44, and from vertical tracks 34 and 44 across corner tracks 32 and 42 to horizontal tracks 30 and 40. Thus, second poles 16 slide individually along

horizontal, corner and vertical tracks 30, 32, 34, 40, 42 and 44. In addition, bearings 54 and 56 provide intervening gaps that enable the user to grip second poles 16 when they are stacked on one another, and prevent second poles 16 from dislodging from horizontal, corner and vertical tracks 30, 32, 34, 40, 42 and 44.

5 First poles 14 horizontally slide along horizontal tracks 30 and 40 between corner tracks 32 and 42 (when second poles 16 are on vertical tracks 34 and 44) and end portions of horizontal tracks 30 and 40 opposite corner tracks 32 and 42. In this manner, first poles 14 horizontally extend from and retract towards corner tracks 32 and 42. Second poles 16 slide along horizontal, corner and vertical tracks 30, 32, 34, 40, 42 and 44 between first poles 14
10 and end portions of vertical tracks 34 and 44 opposite corner tracks 32 and 42. Furthermore, gravity assists first poles 14 as they horizontally slide towards corner tracks 32 and 42, and assists second poles 16 as they horizontally slide towards corner tracks 32 and 42 and vertically slide down away from corner tracks 32 and 42.

Poles 14 and 16 are adapted for hanging clothes and are essentially identical to one
15 another. Poles 14 and 16 are rods made of zam-coated steel that is durable to usage and weather exposure. Poles 14 and 16 include hollow internal sections to reduce weight.

Poles 14C, 16A, 16B and 16C are rotatable and include first hooks 60 and second hooks 62 for engaging first and second clips 36 and 46, respectively. Poles 14C, 16A, 16B and 16C can each be pushed forward (away from corner tracks 32 and 42) to a pair of
20 corresponding clips 36 and 46 with hooks 60 and 62 extending upward, and then rotated forward and released so that hooks 60 and 62 extend forward and engage clips 36 and 46, respectively, thereby securing the pole to horizontal tracks 30 and 40 at a fixed position and preventing it from sliding backwards (towards corner tracks 32 and 42). Likewise, poles 14C, 16A, 16B and 16C can each be pushed forward (away from corner tracks 32 and 42), rotated
25 backwards and released so that hooks 60 and 62 extend upward and disengage clips 36 and 46, thereby releasing the pole from horizontal tracks 30 and 40 and allowing it to slide backwards (towards corners 32 and 42).

First poles 14A and 14B are not rotatable and do not include hooks since they slide in tandem with first pole 14C and sliding plates 50 and 52. Thus, securing and releasing first
30 pole 14C to and from horizontal tracks 30 and 40 results in securing and releasing the remaining first poles 14A and 14B to and from horizontal tracks 30 and 40. Second poles 16A, 16B and 16C, however, are each individually rotatable to enable them to slide

individually, independently of the other poles. Likewise, second poles 16A, 16B and 16C each include hooks 60 and 62 for engaging clips 36 and 46.

Clips 36 and 46 are horizontally oriented in the same manner as poles 14 and 16. Clips 36 and 46 are arranged in four pairs, with separate pairs at increasing distance from corner tracks 32 and 42 and each pair the same distance from corner tracks 32 and 42.

Clothes drying rack 10 has the following sample dimensions. Side tracks 20 and 22 have a height of 75 mm and a width of 40 mm. Horizontal tracks 30 and 40 combined with corner tracks 32 and 42 have a horizontal length of 700 mm, and vertical tracks 34 and 44 combined with corner tracks 32 and 42 have a vertical length (height) of 300 mm. Poles 14 and 16 have a length (between side tracks 20 and 22) of 2000 mm and a diameter of 25 mm. First poles 14 have a pole-to-pole spacing of 115 mm, and clips 36 and 46 have a clip-to-clip spacing (along horizontal tracks 30 and 40, respectively) of 115 mm.

Figs. 5 to 9 illustrate pole positions that include a first position (P1), second position (P2), third position (P3), fourth position (P4), fifth position (P5), sixth position (P6), seventh position (P7), eighth position (P8) and ninth position (P9). Positions P1 to P6 are on horizontal tracks 30 and 40, with position P1 farthest from corner tracks 32 and 34 and position P6 nearest to corner tracks 32 and 42. Positions P7 to P9 are on vertical tracks 34 and 44, with position P7 closest to corner tracks 32 and 42 and position P9 farthest from corner tracks 32 and 42. Positions P1 to P6 are separated from one another by the pole-to-pole spacing of first poles 14, and positions P7 to P9 are separated from one another by the pole-to-pole spacing of second poles 16 when stacked on one another. Furthermore, positions P3 to P6 are located at the four pairs of clips 36 and 46.

First poles 14A, 14B and 14C can be located at positions P1, P2 and P3, respectively, at their extended positions, with first pole 14C secured to horizontal tracks 30 and 40 at position P3. First poles 14A, 14B and 14C can then slide to positions P2, P3 and P4, respectively, with first pole 14C secured to horizontal tracks 30 and 40 at position P4. First poles 14A, 14B and 14C can then slide to positions P3, P4 and P5, respectively, with first pole 14C secured to horizontal tracks 30 and 40 at position P5. First poles 14A, 14B and 14C can then slide to positions P4, P5 and P6, respectively, at their retracted positions, with first pole 14C secured to horizontal tracks 30 and 40 at position P6. First poles 14A, 14B and 14C can slide in the other direction to positions P1, P2 and P3, respectively, in the same manner.

Second poles 16A, 16B and 16C can be located at positions P4, P5 and P6, respectively, at their extended positions, and secured to horizontal tracks 30 and 40 at these positions. Second pole 16C can then slide to position P9 at its retracted position. Second pole 16B can then slide to position P8 at its retracted position stacked on second pole 16C.

5 Second pole 16A can then slide to position P7 at its retracted position stacked on second pole 16B. Second poles 16A, 16B and 16C can slide in the other direction to positions P4, P5 and P6, respectively, in the same manner.

Fig. 5 shows a side view of first poles 14 at their extended positions P1, P2 and P3, and second poles 16 at their extended positions P4, P5 and P6. In this configuration, the user
10 can conveniently access clothes on second poles 16, particularly second pole 16C.

Fig. 6 shows a side view of first poles 14 at their extended positions P1, P2 and P3, second poles 16A and 16B at their extended positions P4 and P5, and second pole 16C at its retracted position P9 after second pole 16C slides from position P6 to position P9. In this configuration, the user can conveniently access clothes on second poles 16A and 16B.

15 Fig. 7 shows a side view of first poles 14 at their extended positions P1, P2 and P3, second pole 16A at its extended position P4, and second poles 16B and 16C at their retracted positions P8 and P9 after second pole 16B slides from position P5 to position P8. In this configuration, the user can conveniently access clothes on second pole 16A.

Fig. 8 shows a side view of first poles 14 at their extended positions P1, P2 and P3, and second poles 16 at their retracted positions P7, P8 and P9 after second pole 16A slides
20 from position P4 to position P7.

Fig. 9 shows a side view of first poles 14 at their retracted positions P4, P5 and P6, and second poles 16 at their retracted positions P7, P8 and P9 after first poles 14 slide from positions P1, P2 and P3 to positions P4, P5 and P6. In this configuration, the user can
25 conveniently access clothes on first poles 14.

Numerous pole configurations and sliding sequences will be apparent as illustrated below.

The user can hang clothes on first poles 14 while first poles 14 are in positions P4, P5 and P6 and second poles 16 are in positions P7, P8 and P9. Thereafter, the user can slide first
30 poles 14 to positions P1, P2 and P3, slide second pole 16A to position P4 and hang clothes on second pole 16A. Alternatively, the user can slide second pole 16A to position P6, hang clothes on second pole 16A and then slide pole 16A to position P4. Thereafter, the user can

slide second pole 16B to position P5 and hang clothes on second pole 16B. Alternatively, the user can slide second pole 16B to position P6, hang clothes on second pole 16B and then slide pole 16B to position P5. Thereafter, the user can slide second pole 16C to position P6 and hang clothes on second pole 16C. Alternatively, the user keep second pole 16C at position P9
 5 if all clothes are hung.

The user can collect clothes on second poles 16 while first poles 14 are in positions P1, P2 and P3 and second poles 16 are in positions P7, P8 and P9. Thereafter, the user can slide second poles 16 to positions P7, P8 and P9, then slide first poles 14A, 14B and 14C to positions P4, P5 and P6 and then collect clothes on first poles 14A, 14B and 14C.

10 Alternatively, the user can collect clothes on second pole 16C, then slide second pole 16C to position P9, then collect clothes on second pole 16B (in position P5 or P6) and then slide pole 16B to position P8. As another alternative, the user can collect clothes on second poles 16B and 16C, then slide second poles 16B and 16C to positions P8 and P9, then collect clothes on second pole 16A (in position P4, P5 or P6) and then slide second pole 16C to position P7.

15 **Fig. 10** shows clothes drying rack 10 installed on residential building 70. Residential building 70 includes external parapet wall 72 and overlaying reinforced concrete ledge 74. Clothes drying rack 10 is mounted on wall 72 by bolts 76. As a result, horizontal tracks 30 and 40 are essentially orthogonal to wall 72, and vertical tracks 34 and 44 are essentially parallel to wall 72. Furthermore, the user located inside residential building 70 can easily
 20 reach across wall 72 to slide poles 14 and 16 and access clothes on poles 14 and 16 as described above.

The clothes drying rack and its related operation described above are merely exemplary. Numerous other embodiments are contemplated. The above description and examples illustrate the preferred embodiments of the present invention, and it will be
 25 appreciated that various modifications and improvements can be made without departing from the scope of the present invention.

Claims

1 1. A retractable clothes drying rack, comprising:
 2 a track that includes horizontal tracks, corner tracks and vertical tracks, wherein the
 3 corner tracks are between the horizontal and vertical tracks;
 4 first poles that slide together along the track, horizontally slide along the horizontal
 5 tracks, do not slide along the corner tracks to the vertical tracks and do not slide along the
 6 vertical tracks; and
 7 second poles that slide individually along the track, horizontally slide along the
 8 horizontal tracks, slide along the corner tracks to and from the horizontal and vertical tracks
 9 and vertically slide along the vertical tracks.

1 2. The rack of claim 1, wherein the first poles horizontally slide along the
 2 horizontal tracks between first extended positions and first retracted positions on the
 3 horizontal tracks, the second poles slide along the horizontal, corner and vertical tracks
 4 between second extended positions on the horizontal tracks and second retracted positions on
 5 the vertical tracks, and the first retracted positions and the second extended positions are
 6 between the first extended positions and the corner tracks.

1 3. The rack of claim 2, wherein the first retracted positions are the second
 2 extended positions.

1 4. The rack of claim 2, wherein the first poles include one pole that is rotatable to
 2 secure and release the first poles together to and from the horizontal tracks at the first
 3 extended and retracted positions, and the second poles are each rotatable to secure and release
 4 the second poles individually to and from the horizontal tracks at the second extended
 5 positions.

1 5. The rack of any of claims 1 to 4, wherein the horizontal and vertical tracks are
 2 essentially orthogonal to one another.

1 6. The rack of claim 5, wherein the horizontal tracks extend essentially
2 horizontally and slightly vertically from the corner tracks such that gravity assists the first and
3 second poles as they horizontally slide along the horizontal tracks towards the corner tracks.

1 7. The rack of claim 6, wherein the vertical tracks extend vertically from the
2 corner tracks such that gravity assists the second poles as they vertically slide along the
3 vertical tracks away from the corner tracks.

1 8. The rack of claim 5, wherein the first and second poles have the same number
2 of poles.

1 9. The rack of claim 8, wherein the first and second poles each have three poles.

1 10. The rack of claim 5, wherein the rack is installed on an external parapet wall
2 of a residential building, the horizontal tracks are essentially orthogonal to the wall and the
3 vertical tracks are essentially parallel to the wall.