

# **CLOTHES DRYING RACK**

## **Field of the Invention**

[0001] The present invention relates to clothes drying, and more particularly to a clothes drying rack.

## **Background of the Invention**

[0002] Conventionally, wet clothes are commonly hung on a clothes rack for drying. Wet clothes are also exposed to the outside atmosphere to increase the rate of drying. The Housing and Development Board (HDB) of Singapore has implemented several generations of outdoor clothes drying racks for government housing in high rise buildings. One of the earliest generation outdoor clothes drying rack, which is still commonly used today for older government housing, is the pipe socket system. The system includes multiple pipe sockets on the external parapet wall of the unit with one end of a bamboo pole inserted into the pipe socket while the other end of the bamboo pole is cantilevered. The poles extend away from the building and a user will have to lift the pole with the wet clothes and position the end of the pole into and out of the pipe socket. This requires some amount of effort from the user and there is a danger of the bamboo pole falling out of the socket if not properly positioned within the socket causing harm to passers by at the base of the building.

[0003] In recent years, an increasing number of domestic workers have reportedly fallen to their deaths while attempting to position bamboo poles into the pipe sockets outside the kitchen windows. Domestic workers have also fallen to their deaths from cleaning windows. The pipe socket system therefore poses a danger to users attempting to position bamboo poles laden with wet clothes into the pipe sockets. A user may overstretch the upper half of his or her body out of the window while attempting to position the bamboo pole into the pipe socket and inadvertently fall out of the window.

[0004] Rainwater may collect in the pipe socket which may become a mosquito breeding ground. In an attempt to address the mosquito breeding problem, one of the solutions was to

introduce a self-draining pipe socket with an opening at one end to allow drainage of water at the opening. Another solution included customized plastic caps to cover the pipe socket. In a later generation clothes drying rack to enhance the safety and mitigate the risk of falling bamboo poles, clothes drying racks providing support to both ends of the bamboo poles were introduced. This was introduced in a number of ways. One of the clothes rack provided for separate supporting racks attached between exterior parapet walls of two rooms adjacent each other. Another rack provided for an I-shaped clothes rack which extends away from the parapet walls with an elongate bar attached to two perpendicular bars. The bamboo poles are supported on indentations on the perpendicular bars.

[0005] The problem of a user exerting a substantial lifting force to lift the bamboo poles with clothes, however, still remains unaddressed. Further improvements were made to address this problem. An outdoor clothes drying rack was introduced which removed the need for bamboo poles. The drying rack included parallel metal bars installed parallel to the window sill. Users could simply hang the wet clothes on the parallel metal bars without the need to exert much force. However, this led to a new problem of limited rack space as the number poles used is limited since having more poles make it difficult for the user to reach. In addition, the user may have difficulty hanging wet clothes on the pole furthest away from the window.

[0006] In periods of inclement weather, especially during rainy seasons, wet clothes that are hung out to dry on the outdoor drying rack are exposed to rain. Rain-soaked clothes leave an unpleasant odour on clothes when dry. Users who hang out the clothes to dry may inadvertently forget to rein in the clothes or are simply not at home when it rains. At times, droplets of water from wet clothes from upper floors of a building may also drip onto clothes of lower floors.

[0007] There is therefore a need for an outdoor clothes drying rack that has a large capacity, avoids pole carrying, protects wet clothes from inclement weather, is cost effective and provides a safer environment for users to hang and retrieve clothes.

## **Summary of the Invention**

[0008] In accordance with a first aspect of the present invention, there is provided a clothes drying rack that includes a wall mounting for connecting the rack to a wall surface, a frame including a plurality of elongate bars and two side bars, the frame being pivotally coupled to the wall mounting and wherein the frame is pivotally movable with respect to the wall mounting.

[0009] Preferably, the frame is pivotally movable between a substantially horizontal position orthogonal to the wall surface and a substantially vertical position parallel to the wall surface. In this way, a user who is hanging or collecting clothes from the rack will exert a minimal lifting force to bring the rack closer to him, thereby providing a safer environment for hanging and collecting of clothes from the rack.

[0010] Preferably, each of the plurality of elongate bars includes a plurality of through-holes positioned along the length of each of the plurality of elongate bars. This allows a user to insert a hook of a clothes hanger through the through-hole for drying purposes.

[0011] Preferably, the planar axis of at least one of the each of the plurality of elongate bars is inclined at an angle with respect to the planar axis of the frame in a substantially horizontal position. The elongate bars are angled in a position so as to orientate the through-holes to the user when the frame is in a horizontal position and thereby providing easier access to the through-holes.

[0012] Preferably, the planar axis of the at least one of the each of the plurality of elongate bars is inclined at an angle of 45 degrees with respect to the planar axis of the frame in a substantially horizontal position.

[0013] Preferably, the plurality of through-holes are equidistant from each other along the length of each of the plurality of elongate bars.

[0014] Preferably, the plurality of elongate bars are flat. This provides a non-hollow construction of the bars so as to prevent rainwater from collecting within the elongate bars.

[0015] Preferably, the wall mounting is provided at opposite ends of the frame to receive a portion of the frame.

[0016] Preferably, the rack includes a central wall mounting located midway between the length of the frame to receive one of the plurality of elongate bars.

[0017] Preferably, the central wall mounting engages part of the length of the frame and the wall mounting at opposite ends of the frame further includes a longitudinal portion and an orthogonal portion positioned midway between the longitudinal portion, wherein the orthogonal portion supports part of the breadth of the frame so that the frame can remain in a substantially horizontal position orthogonal to the wall surface.

[0018] Preferably, the length of the orthogonal portion extends to at least half of the breadth of the frame.

[0019] Preferably, the frame is capable of supporting a weight of up to 200kg.

[0020] Preferably, the breadth of the frame is approximately 1500mm.

[0021] Preferably, a protective cover is provided to shield the frame, and the protective cover is removably attached to the wall mounting. The cover prevents clothes from getting rain-soaked when it rains.

[0022] Preferably, the protective cover includes a top panel to cover the upper portion of the frame and at least three side panels to cover the side portions of the frame.

[0023] Preferably, the protective cover further includes a fastener to secure the protective cover to the wall mounting.

[0024] Preferably, the frame includes a pair of pins located at each corner of the frame closest to the wall surface, the pair of pins adapted to be received by the wall mounting for pivotal movement of the frame with respect to the wall mounting.

[0025] Preferably, a locking mechanism is provided to lock the frame in a substantially vertical position.

[0026] Preferably, the locking mechanism includes a protruding sleeve having a first cavity on the frame, a projecting member having a second cavity on the wall mounting, and a locking spindle for insertion into the first cavity and the second cavity when the first cavity and the second cavity correspond with each other.

[0027] According to second aspect of the present invention, there is provided a method of installing a clothes drying rack on the wall surface, the method comprising the steps of: drilling into the wall surface to create a cavity, affixing the wall mounting on the wall surface by threading a plug through the wall mounting and the cavity, and coupling the frame onto the wall mounting for pivotal movement of the frame with respect to the wall mounting so that the frame is pivotally movable with respect to the wall mounting between a substantially horizontal position orthogonal to the wall surface and a substantially vertical position parallel to the wall surface.

[0028] 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**

[0029] Preferred embodiments of the present invention will now be more fully described, with reference to the drawings in which:

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

Fig. 2 shows a plan view of the clothes drying rack attached to a wall;

Fig. 3A shows a plan view of a frame;

Fig. 3B shows a side view of the frame;

Fig. 4 shows a side view of a wall mounting with frame attached to the wall;

Fig. 5A shows a side view of a central wall mounting and frame attached to the wall;

Fig. 5B shows a perspective view of the central wall mounting of Figure 5A;

Fig. 6 shows a side view of the clothes drying rack when in use;

Fig. 7 shows a perspective view of the clothes drying rack with protective cover;

Fig. 8 shows a perspective view of the protective cover; and

Fig. 9 shows a perspective view of the protective cover when folded; and

Fig. 10 shows a side view of the clothes drying rack with protective cover when in use.

### **Detailed Description of the Invention**

[0030] 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 described at length so as not to obscure the present invention.

[0031] In the description of the embodiment that follows, positional terms of references such as 'horizontal' and 'vertical' are defined with respect to a wall surface.

[0032] Figures 1 and 2 show a clothes drying rack 10 in accordance with an embodiment of the present invention. The clothes drying rack 10 includes a frame 12 with wall mounting 17, 18 for affixing to a wall surface 50. The frame 12 is pivotally mounted to the wall mounting 17, 18 such that the frame 12 is movable between a substantially horizontal position to a substantially vertical position. The frame 12 includes a plurality of elongate bars 20 extending parallel to the wall surface and two side bars 11 bordering the plurality of elongate bars 20 to define the frame 12 for allowing clothes to be hung on each of the plurality of elongate bars

20. The clothes drying rack 10 is mounted on the external parapet wall of a building and is accessible by a user through the windows of a housing unit.

[0033] As mentioned above, the frame 12 includes a plurality of elongate bars 20 and two side bars 11. The frame 12 is constructed by joining the elongate bars 20 to the side bars 11 to form a quadrilateral shape. It will be appreciated by a skilled person that numerous techniques of joining the elongate bars are known. Preferably, the elongate bars 20 are welded to the side bars 11. The frame 12 may also be of an integral construction. The length of the frame 12 varies according to the specification of the windows of the housing unit. A suitable length of the frame 12 would range from between 800mm to 2000mm. The breadth of the frame 12 extends away from the wall surface 50 of the building. The breadth of the frame 12 may vary according to the functional use and aesthetics of the clothes drying rack 10. The breadth of the frame 12 should allow a normal user of average height to access the elongate bar furthest away from the wall surface 50. A suitable breadth of the frame 12 may range from approximately 800 mm to 1200mm. The plurality of elongate bars 20 which extends parallel to the wall surface 50 is preferably flat. Preferably, each of the elongate bars 20 has a rectangular cross-section, where the length of the cross-section is approximately 25mm and the breadth of the cross-section is approximately 3-5 mm. The elongate bars 20 are also non-hollow so as to prevent rainwater from collecting within the elongate bars 20 which are potential breeding grounds for mosquitoes. The plurality of elongate bars 20 are positioned approximately equidistant from each other across the breadth of the frame 12 so that the clothes may be hung in an orderly manner.

[0034] The wall mounting 17, 18 is affixed to the wall surface 50 of the building. The wall mounting 17, 18 is located at opposite ends of the length of the frame 12. A central wall mounting 19 is located approximately midway the length of the frame 12 and engages a portion of the length of the frame 12. If the central wall mounting 19 is used, the elongate bar 20 closest to the wall surface 50 has a spherical cross section since the central wall mounting 19 receives the elongate bar and provides for pivotal movement of the frame 12. Alternatively, the wall mounting may include a single wall mounting extending partially or wholly across the length of the frame 12. The wall mounting 17, 18 and the central wall mounting 19 may be

configured to be T-shaped such that it has a longitudinal portion for mounting to the wall surface 50 and an orthogonal portion midway and perpendicular to the longitudinal portion, which extends away from the wall surface 50. The orthogonal portion supports the underside of a portion of the breadth of the frame 12 so that the frame 12 will remain in a substantially horizontal position or substantially perpendicular to the wall surface 50 at rest. The length of the orthogonal portion extends to at least half of the breadth of frame 12. This allows the frame 12 to support a maximum weight of 200 kg. In the event of a user inadvertently falling out of the window while hanging clothes or cleaning the exterior of the windows where the clothes drying rack 10 is located, the frame 12 would be able to support at least the weight of a normal average person to prevent him or her falling to the base of the building. The longitudinal portion may be mounted to the wall surface 50 by way of conventional wall mounting such as drilling holes through the wall and wall mounting and using threaded screws for securing the longitudinal portion to the wall. The central wall mounting 19 located midway along the length of the frame 12 preferably includes a bore at near the end of the orthogonal portion from the wall surface 50 and allows the central wall mounting 19 to receive the elongate bar 20 through the bore.

[0035] The frame 12 is pivotally mounted to the wall mounting 17, 18 by having pins 28 located at the corners of the frame 12 closest to the wall surface 50, received by the wall mounting 17, 18. When the pins 28 of the frame 12 are received by corresponding bores on the wall mounting 17, 18, the pins 28 allow the frame 12 to rotate pivotably between a substantially horizontal position to a substantially vertical position. The pins 28 include a protruding portion from each corner of the frame 12 closest to the wall surface 50 and extends through the bores on the wall mounting 17, 18.

[0036] Figure 3A shows a plan view of the frame 12 of the clothes drying rack 10. As mentioned above, the plurality of elongate bars 20 are flat and slat-like in nature. Preferably, the plurality of elongate bars 20 are non-hollow so that mosquitoes will not breed within the hollow crevices of the elongate bars 20 if rainwater collects within the elongate bars 20. Each of the elongate bars 20 includes a plurality of through-holes 22, 24 which penetrate through the bar and are equi-distant from each other along the length of each of the elongate bars.

Each of the through-holes 22, 24 is dimensioned to allow the hook of a clothes hanger to be received by the through-hole so that lateral motion of the hook will be impeded thereby securing the clothes hanger to the elongate bar 20. Each through-hole has a diameter of approximately 10-15mm. On each elongate bar, each through-hole, except for the first through-hole at one end of the elongate bar, is positioned approximately midway between two through-holes on the adjacent elongate bar. In other words, the through-holes on each elongate bar are arranged alternately to the adjacent elongate bar such that the through-holes on the adjacent elongate bar will not be aligned with one another. This is to ensure that wet clothes are spaced apart along the length and breadth of the frame 12 to avoid overcrowding of the clothes on the frame 12. The plurality of elongate bars 20 is spaced approximately equal distance apart on the breadth of the frame 12. Figure 3B shows a side view of the frame 12 with the plurality of elongate bars 20 inclined at an angle with respect to the wall surface 50. The planar axis of the elongate bars 20 is preferably inclined at an angle of 45 degrees with respect to the planar axis of the frame 12 when the frame 12 is in a substantially horizontal position such that the through-holes 22, 24 are visible to the user when standing at the window. In other words, the central axis of the through-holes 22, 24 are directed towards the upper portion of the wall surface 50. In this way, this provides the user with greater convenience and easier accessibility to hang the hooks of clothes hanger through the through-holes 22, 24. The plurality of through-holes 22, 24 are also provided on the length of the frame 12 furthest from the wall surface 50.

[0037] Figure 4 shows a side view of the clothes drying rack 10 mounted to the wall surface 50. Conventional ways of mounting the wall mounting 17, 18 and central wall mounting 19 to the wall surface 50 may be used. An example of affixing the wall mounting 17, 18, 19 to the wall surface 50 is by boring a hole through the internal wall surface 40 to the wall surface 50 and using a wall plug 13 extending through the wall to secure the wall mounting 17, 18, 19. Alternatively, partial boring from the wall surface 50 to the internal wall surface 40 can be used to secure the wall mounting 17, 18, and central wall mounting 19 to the wall surface 50. The wall mounting 17, 18 also include a lower supporting bracket 14. The lower supporting bracket 14 is positioned below the orthogonal portion of the wall mounting where one end of the lower supporting bracket contacts the underside of the orthogonal portion and the other

end contacts the longitudinal portion of the wall mounting 17, 18. Figures 5A and 5B show the central wall mounting 19 mounted to the wall surface 50 in a similar manner to that for wall mounting 17, 18.

[0038] Figure 6 shows the clothes drying rack 10 when in use. When the user wishes to hang wet clothes on the frame 12 for drying purposes, he or she would hang the wet clothes on the plurality of elongate bars 20 when the frame 12 is in a substantially horizontal position or perpendicular to the wall surface 50. At this point, the frame 12 is in a resting position as it is supported by the orthogonal portion of the wall mounting 17, 18. Alternatively, the user could also hang wet clothes on clothes hangers by threading the hook of the clothes hanger through the plurality of through-holes 22, 24 disposed on the plurality of elongate bars 20. When the user wishes to bring the clothes indoors, the user grabs one of the plurality elongate bars 20 and exerts a lifting force towards him so that the frame 12 pivots about pivot points 15, 16 on the wall mounting 17, 18 thereby bringing the frame 12 closer to the user. Upon bringing the frame 12 closer to the user, the frame will be in a substantially vertical position or parallel to the wall surface 50. At this point, the user can collect the clothes while holding on to one of the elongate bars. A locking mechanism is provided on the clothes drying rack 10 to allow the frame 12 to be locked in the vertical position so that it will not fall back towards the resting position. In this way, the user can easily collect the clothes on the frame 12 without having to continue holding the frame 12. In this way, a faster time is taken and lesser energy is exerted to bring the clothes on the drying rack indoors.

[0039] Referring to figures 1 and 5A, the locking mechanism includes a protruding sleeve 41 extending from the breadth of the frame 12. The protruding sleeve 41 has a cavity for receiving a locking spindle 42. The locking spindle 42 is separate from the clothes drying rack and can be attached to either the wall mounting 17, 18 or the frame 12 by a connector such as a piece of string. The locking spindle 42 is threaded through the cavity of the protruding sleeve 41 and a cavity of a projecting member 43 on the wall mounting 17,18. The locking mechanism may be provided on both sides of the breadth of the frame 12 although having the locking mechanism on just one side of the frame 12 would suffice to prevent the frame 12 from falling back towards the resting position. In use, the user will simply exert a lifting force

to bring the frame 12 into a substantially vertical position. The protruding sleeve 41 of the frame 12 will slide above the projecting member 43 of the wall mounting 17, 18 when the frame 12 is in a vertical position. The cavity of the protruding sleeve 41 and the cavity of the projecting member 43 will correspond with each other to allow the user to insert the locking spindle 42 into both cavities in order to lock the frame 12 in a substantially vertical position. It will be appreciated to a skilled person that various configurations of locking mechanisms to prevent the frame 12 from falling back towards its resting position are possible.

[0040] Figure 7 shows the clothes drying rack 10 with a protective cover 30. The protective cover 30 shields the clothes hanging on the frame 12 from rainwater thereby preventing the clothes from getting soaked with rainwater. The protective cover 30 is removably detachable from the clothes drying rack 10 and can be attached to the rack 10 when required. The protective cover 30 may be made of a canvas material or a waterproof material. A fastener is provided on the protective cover 30 for securing the protective cover to the wall mounting 17, 18. Alternatively, the fastener may be secured on the frame 12. Conventional detachable fasteners may be in the form of a velcro or hook and loop fasteners. Figure 8 shows the protective cover 30 which includes at least four panels, three side panels 32, 33, 34 and a top panel 31, to shield the exposed areas of the clothes drying rack 10. The top panel 31 covers the upper portion of the frame 12 while the three side panels 32, 33, 34 cover the side portions of the frame 12. The protective cover 30 may be folded neatly into a single flat sheet by folding the side panels 32, 33, 34 onto the top panel 31. The side panels 32, 33, 34 may be provided with Velcro fasteners so that they can be folded into a single bundle for storing purposes. The protective cover 30 is attached to the clothes drying rack 10 by attaching the top panel 31 to the wall mounting 17, 18.

[0041] Figure 10 shows the protective cover 30 when in use. The user who wishes to collect the clothes on the frame 12 with the protective cover 30 will first detach the protective cover 30 from the wall mounting or the frame 12. He will next lift the top panel 31 which will at the same time raise the side panels 32, 33, 34. The user will fold the side panels 32, 33, 34 onto the top panel 31 and bring it through the windows of the housing unit.

[0042] The clothes drying rack and its related operations 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 appreciated that various modifications and improvements can be made without departing from the scope of the present invention.

## Claims

1. A clothes drying rack comprising:
  - a wall mounting for connecting the rack to a wall surface;
  - a frame including a plurality of elongate bars and two side bars, the frame being pivotally coupled to the wall mounting and
  - wherein the frame is pivotally movable with respect to the wall mounting.
2. The clothes drying rack according to claim 1, wherein the frame is pivotally movable between a substantially horizontal position orthogonal to the wall surface and a substantially vertical position parallel to the wall surface.
3. The clothes drying rack according to any one of the preceding claims, wherein each of the plurality of elongate bars includes a plurality of through-holes positioned along the length of each of the plurality of elongate bars.
4. The clothes drying rack according to any one of the preceding claims, wherein the planar axis of at least one of the each of the plurality of elongate bars is inclined at an angle with respect to the planar axis of the frame in a substantially horizontal position.
5. The clothes drying rack according to claim 4, wherein the planar axis of the at least one of the each of the plurality of elongate bars is inclined at an angle of 45 degrees with respect to the planar axis of the frame in a substantially horizontal position.
6. The clothes drying rack according to any one of claims 3-5, wherein the plurality of through-holes are equidistant from each other along the length of each of the plurality of elongate bars.
7. The clothes drying rack according to any one of the preceding claims, wherein the plurality of elongate bars are flat.

8. The clothes drying rack according to any one of the preceding claims, wherein the wall mounting is provided at opposite ends of the frame to receive a portion of the frame.

9. The clothes drying rack according to any one of the preceding claims, further comprising a central wall mounting located midway between the length of the frame to receive one of the plurality of elongate bars.

10. The clothes drying rack according to claim 9, wherein the central wall mounting engages part of the length of the frame and the wall mounting at opposite ends of the frame further includes a longitudinal portion and an orthogonal portion positioned midway between the longitudinal portion, wherein the orthogonal portion supports part of the breadth of the frame so that the frame can remain in a substantially horizontal position orthogonal to the wall surface.

11. The clothes drying rack according to claim 10, wherein the length of the orthogonal portion extends to at least half of the breadth of the frame.

12. The clothes drying rack according to claim 11, wherein the frame is capable of supporting a weight of up to 200kg.

13. The clothes drying rack according to any one of the preceding claims, wherein the breadth of the frame is approximately 1500mm.

14. The clothes drying rack according to any of the preceding claims, further comprising a protective cover to shield the frame, wherein the protective cover is removably attached to the wall mounting.

15. The clothes drying rack according to claim 14, wherein the protective cover includes a top panel to cover the upper portion of the frame and at least three side panels to cover the side portions of the frame.

16. The clothes drying rack according to any one of claims 14 or 15, wherein the protective cover further includes a fastener to secure the protective cover to the wall mounting.

17. The clothes drying rack according to any one of the preceding claims, wherein the frame includes a pair of pins located at each corner of the frame closest to the wall surface, the pair of pins adapted to be received by the wall mounting for pivotal movement of the frame with respect to the wall mounting.

18. The clothes drying rack according to any one of the preceding claims, further comprising a locking mechanism to lock the frame in a substantially vertical position.

19. The clothes drying rack according to claim 18, wherein the locking mechanism includes a protruding sleeve having a first cavity on the frame, a projecting member having a second cavity on the wall mounting, and a locking spindle for insertion into the first cavity and the second cavity when the first cavity and the second cavity correspond with each other.

20. A method of installing the clothes drying rack according to any one of the preceding claims, the method comprising the steps of:

drilling into the wall surface to create a cavity;

affixing the wall mounting on the wall surface by threading a plug through the wall mounting and the cavity;

coupling the frame onto the wall mounting for pivotal movement of the frame with respect to the wall mounting so that the frame is pivotally movable with respect to the wall mounting between a substantially horizontal position orthogonal to the wall surface and a substantially vertical position parallel to the wall surface.