

FOLDABLE CLOTHES-DRYING RACK CUM SUN-SHADING DEVICE**Field of the Invention**

5 This invention in general relates to an improved foldable clothes-drying rack cum sun-shading device, generally mounted indoor in a building, possesses structural supports of a plurality of mounting brackets for articulated a plurality of elongated supporting arms with a plurality of transversal poles in a foldable manner, thereto supporting the rack at least substantially
10 horizontal or fold externally beyond an external parapet wall for drying.

The rack further including outward guiding or telescopically function for an elongated tube from inside the pole, the pole assembly is interposed inserted into sequentially openings of the arms for outdoors drying. The rack mounted at convenience height for the occupants, the
15 retraction of the tube with multiple securing features for securing the pole assemblies for suspending laundries that are carryout indoors, whereby contributed to the safety and aesthetics of this invention.

Description of Related Art

20 The execution of outdoor/indoor clothes drying varies with each individual occupant practice, the physical height of the carrier and the weight of the wet laundries on a clothes-drying pole to be maneuvered and the type of clothes-drying device use.

25 Mounted clothes drying devices are widely use, outdoor device such as a short pipe socket device; being partially embedded inside an external parapet wall, thereto allowing a short end portion of the clothes-drying pole to be inserted into the pipe socket device so as to cantilevered the pole outwardly in an upward direction for drying wet washed laundries. Another known device; the clothes-drying pole placed onto a both ends tool design support
30 rack, thereby supporting the poles with laundries on both of its ends for drying in buildings.

Indoors mounted clothes drying devices are generally use, such as wall/ceiling mounted retractable racks, clotheslines, self-standing racks and others. The entire above prior art are created to assists, convenience the occupant for outdoor/indoor laundries drying in a building
35 and are described in US 5219080, US 4029211, US 03920127, CN 2333738, GB 2305853, JP 08175495, JP 09110501, JP 07000850, JP 09327593, JP 10143696, US 5971170, EP 916297, JP 9327597 and US 3712556.

Commercially available foldable laundry wall hangers, at first appearance have similarities with the present invention, there are of differ in structural, functions and distinctly does not support outward protrusion of an elongated tube for outdoor drying in a building. These differences, which will be described in more detail hereinafter, are essential for the effective use of the invention and admit of the advantages that are not available with the prior art.

These foldable wall hangers generally of a U-shaped, mounted indoor, consisting of a plurality of transversal poles that are either interposed inserted or snap into a pair of arms and drying of laundries is assumes between the arms, the arms are articulated adjacently to an upper top portion of a mounting bracket in a foldable manner, and diagonally supported by its adjustable struts or telescopic braces from the lowest bottom portion of the bracket to a horizontal oriented position.

Conventional rotational fastening devices that facilitated frictional clamping of the telescopically extendable elongated tube to a desirable length have been known. Pole or tube-fastening devices that are rotationally driven and facilitated clamping of the pole onto the tube or vice-versa to a length for their purpose are commercial known.

Resilient control-pin device (also known as ball-locking bolt in multi-industries) is assumes and developed to provide rotationally indexed (ball-locking) engagement of the pole to an opening into a notch of the arms and for use in this instant invention.

These rotational fastening devices that rotationally immobilized or engaged will be described in more detail hereinafter, are essential for the effective use of the invention and admit of the combined advantages that are not available with the prior art.

Summary of Invention

It is a main objective of the present invention to provide an improved foldable clothes-drying rack, generally mounted indoors in a building for laundries drying, the rack is improved in its supports and provides with the best possible convenience and functionality for the occupants. It should be attractive in appearance, desirable to current manufacturing process and according be manufacture from various materials.

According, the rack is of U-shaped that folds at least substantially horizontally and being parallelism to the external of the building in a distance above coping of the parapet wall comprises of a matching interlocking construction having a plurality of mounting brackets

supporting a plurality of elongated supporting arms, wherein the arms is articulated in a foldable manner, and thereof to be slidably retain by an inclined spring loaded snap-pin devices. The snap-pins is slip fit within an inclined bore of an elongated housing member of the bracket and a compression spring resiliently extend to slide into an inclined mating
5 passage of the arm thereto supporting the rack.

Furthermore, the arm after the matching interlocking construction with the bracket includes sequentially thru openings for interposed insertion of a plurality of transversal poles. At least one pole are inserted with a resilient control pins device on one end or on both ends to at least
10 one number of the pole, whereby the interposed inserted pole with the control-pin device confidently secure to a notch of the opening of the arm preventing inadvertent dislodgement.

The arm after the interlocking construction with the bracket is of a **I** -shaped cross-section shaped, the longer edges being vertically oriented, has a further increasing in its spatial
15 complexity, and whereby the thinning of internal thickness of the arms reduces the weight contributed to a lighter and rigidified the folding operations.

According, the control-pin device enable rotationally indexed engagement into the notch within an opening of the arm thereby structurally rigidified the arms, increases the structural
20 strength of the overall rack and further rigidified the operations of the rack at any positions. The rack with the control-pin device realizes the advantage to fold either upward or downward structurally that is not available in related prior art.

It is an additional objective of the present invention to provide the bracket's construction that is suitable for use in many positions to secure the arms with its interposed inserted poles,
25 capable of folding the rack beyond an external parapet wall for outdoor drying. Ideally the brackets articulated method for securing the arms in a foldable manner should provide an attachment plane that's permits various positions and also use as a sun-shading device.

Furthermore, according to another aspect of the present invention, the rack further includes an elongated tube inserted into the pole, the inserted tube secured by a plurality of rotationally
30 driven fastening devices and the control-pin device that secured these pole assembly to the notch of the arm's opening. The multi-securing features abilities for secure the tube telescopically to a desirable length beyond an external parapet wall for outdoors drying.

35 According, the rack for retracting/drawing-out of the tube from the pole generally mounted adjacently to an external wall, above the top level of parapet wall with sufficient clearance,

thereof enhance safety measures standards and improved in its carrying abilities for outdoor drying.

5 The pole inserted with the control-pin devices into one end portion for rotationally indexed engagement into the notches of the arm's openings that enable the tube to be guided outwardly beyond a parapet wall for drying. It should be understood that the rack with its multiple secured feature abilities securing the pole assemblies, hardly dislodgable even in windy weather conditions in a building, and which admits of the advantages that are not available with the prior art.

10 It is the principal objective to the present invention, the poles being made of aluminium alloy or even stainless steel, extruded in cylindrical cross-section shaped in a single void construction, an internal diameter of not less than 26.5mm that enable the retraction of the tube having an outer diameter of 25.4mm, the tubes are also made of aluminium alloy,
15 extruded in cylindrical cross-section shaped in one single void construction, the external surface having uniform elliptical shaped for increasing the overall structural strength capacity, light in weight.

The pole characteristics are essential for the effective use and its abilities of this invention
20 comprising the following:

- (a) slidably movements within longitudinal length of the tube inside of the pole,
- (b) anti-clockwise rotationally frictional fastening of the tube-fastening device from the tube to the pole,
- (c) rotationally indexed engagement into the notch by the control-pin devices within at
25 least one ends portion of the pole,
- (d) stability and rigidity of the overall rack by the first transversal pole of the rack having both end portion with the control-pin devices,
- (e) limitation protrusion of the tube by a mechanical inwards force indentation on the circular wall of the pole, and
- 30 (f) prevention of any inadvertent dislodging by an rotationally anti-clockwise pole-fastening device,

whereby the pole is provided in a matching combination, arrangement and its multiple secured feature that confidentially securing the pole assemblies to the arms thereof achieves the best possible combination of convenience and safety for the occupants.

35 According to the present invention, the rack provides by its supporting and guiding function, thereby enhance the safety standards for outdoor drying that achieves the best possible

combination of convenience for the occupants. While the advantages of the invention are fully realized by the rack abilities, comprising the following:

- (a) reverse abilities to fold the rack as close to the wall as possible by reversing the mounting brackets,
 - 5 (b) folding the arm with the poles that extend outwardly above an external parapet wall and maintains its internal mounting construction,
 - (c) installing the rack at convenience level for the spreading or removing of laundries,
 - (d) interlocking the arms structurally into the brackets by the spring loaded snap-pin devices,
 - 10 (e) rigidified the folding movements by the first transversal pole of the rack having control-pin device on both of its end portions,
 - (f) reversible orientation of the pole assemblies to direct the tube either outwardly or inwardly, and
 - (g) quickly release the pole assemblies for the insertion or removing of laundries by a
 - 15 push-button of the control-pin device,
- whereby the rack supporting the poles realizes some of the advantages that are increase by its own abilities.

Furthermore, according to another aspect of the present invention, the rack for use as a sun-shading device (not shown) are constructed in accordance with the principles of the rack, generally mounted internally above an opening, and thereto enable supporting of the arm to pivotally fold outwardly for blocking the sun direct radiation. The resilient mating insertion of the snap-pin device is incorporated into the one portion of arm that enables quick release of the ring or a locking fastener (not shown) for disengaging from the bracket. The arms

25 supporting the interposed poles at closer spacing and for use as a sun-shading device for blocking sun direct radiation and glare.

Further according to the present invention, various types of permanent anchoring methods for specifically designed mounting methods with different plane surfaces commonly encountered in the building industries are provided. These racks are to be economically feasible, long

30 lasting, and structurally strong and relatively trouble free in operation.

Briefly, the rack that are constructed in accordance with the principles of the present invention are essential for the effective use and admit the advantages that are not available with the prior

35 devices. These together with other objects and advantages, which will become subsequently apparent, are treated in the detailed description, reference to the drawings throughout forming the important part of this invention.

In order to understand the object of the present invention, the detailed description of the invention set forth below is to be read in conjunction with the following drawings.

Brief Description of the Drawings

- 5
- FIG. 1: an isometric view of an improved foldable clothes-drying rack mounted internally in a building at matching interlocking position for outdoor drying;
- FIG. 2: a cross-sectional view of a mounting bracket engaging with a supporting arm at matching interlock construction position as of FIG. 1;
- 10 FIG. 3: an enlarge cross-sectional view of the arm at folded position and during engagement of a spring loaded snap-pin device into an inclined passage of the bracket as of FIG. 2;
- FIG. 4: an isometric view of another aspect of the rack mounted internally in a building and a partial section of a parapet wall;
- 15 FIG. 5: an enlarge cross-sectional view of the bracket engaging with the arm at matching interlocking position as of FIG. 4;
- FIG. 6a: a top view of FIG. 5;
- FIG. 6b: a bottom view of FIG. 5;
- FIG. 7a: a cross-sectional view of the arm before engaging with the bracket at vertical oriented foldable position;
- 20 FIG. 7b: a cross-sectional view of FIG. 7a;
- FIG. 8: an isometric view of the rack with a plurality of transversal poles supporting a plurality of elongated tubes;
- FIG. 9: a plan view of FIG. 8 at horizontal orientated position and at folded position;
- 25 FIG.10a: a enlarge cross sectional view showing a rotationally indexed resilient control-pin device engagement in a notch of the arm's opening in their operative position;
- FIG.10b: a cross-sectional view showing a rotationally anti-clockwise tube-fastening device and the pole in their operative position;
- FIG.10c: a cross-section view of the tube-fastening device terminated before a mechanical inward force indention on the wall of the pole;
- 30 FIG.10d: a cross-sectional view of a rotationally pole-fastening device;
- FIG.10e: a cross-sectional view of the pole on the arm's opening;
- FIG.10f: a cross-sectional view of an end stopper of the pole;
- FIG.11a: another cross-sectional view of the control-pin device during disengagement of the pole from the notch of the arm in horizontal orientation position;
- 35 FIG.11b: an enlarged cross-sectional view of FIG. 10b;
- FIG.11c: an enlarged cross-sectional view of FIG. 10c;

Detailed Description of Preferred Embodiment

The invention is particularly applicable to the otherwise conventional indoor mounted foldable clothes-drying rack for used in a building, and the invention will be described with reference to this application with the conventional rotationally fastening devices of a telescopically extendable elongated tube inserted into an extruded aluminium transversal pole.

As illustrated in FIGS. 1 - 3, a generally Π -shaped clothes-drying rack in operation position, generally mounted indoors in an exterior parapet wall of the building so as to fold externally beyond the parapet wall in an upward direction for outdoor drying. The rack folds at least substantially horizontal, being parallelism to the external of the building in a distance above coping of the parapet wall and the rack comprises of three main parts: a plurality of mounting brackets **50** in the form of Γ -shaped, a plurality of elongated supporting arms **70** and a plurality of transversal poles **21a** & **21b** inserted into a plurality of openings **72** of the arms **70**.

The bracket **50** is made of stainless steel and comprises of a thin rectangular flat mounting plate **51** being vertically oriented for mounting to any structure surface and an elongated **U**-housing **52** attached to upper top portion of the plate **51**, the upright legs of the housing **52** includes a thru opening **56** for attachment of a pivotably-dowel **57** near the interfacing of the plate **51** and housing **52**. The plate **51** includes a plurality of thru openings **54a** on its facial for a plurality of matching anchorage bolts **54** for structurally mounting to any surface.

The supporting arm **70** is made of stainless steel and comprises of an oblate-portion **74** at one of its end of an arm **71** for a matching construction plane to upright portion of the housing **52**. Within oblate-portion **74** include a plurality of snap-pin device **60**. Forward end **71a** portion of the arm **71** is inserted in a matching manner into a frustrum portion between legs of the housing **52** and articulated by the pivotably-dowel **57** in a foldable manner matching the thru openings **56** to be slidably retain by the snap-pin device **60** within a inclined bore **55** of the housing **52** of the bracket **50**.

The upright legs of the housing **52** after the pivotably-dowel **57** insertions is incurvate downwardly to provide a matching marge construction with the oblate-portion **74** of the arm, thereby maintain as a compact elongated construction of the present invention. The frustrum portion within the legs of the housing **52** are for the matching marge construction in a foldable manner further included an inclined housing **76** for an second inclined spring loaded snap-pin device **80** incorporated within the oblate-portion **74** of the forward end arm **71a**.

The remaining portion **71b to 71c** after the oblate-portion **74** of the arm **71** is elongated rectangular of **I-shaped** cross-section shaped, the remaining portion **71b to 71c** includes a plurality of thru sequentially openings **72** for interposed insertions of the pole. The openings **72** include a convoluted circumference wall **72a** in a mating central passage into a notch **73** for a plurality of balls **49** of a resilient control-pin device **40** that facilitated a rotationally indexed engagement. The opposite end **71c** portion of the arm **71** is in close-end web construction.

The poles **21a** for insertion into the sequentially openings **72** of the arm **71** being at least substantially the same length of the spaced located arm are provided with a pointed arch end-stoppers of polymer material to both of its ends. The first transversal pole **21b** of the rack are provided with the control-pin devices **40** to both of its end that structurally rigidified the overall rack for ease of operation.

The poles **21, 21a, 21b & 21c** as according to the present invention is made of aluminium alloy, extruded in cylindrical cross-section shaped in a single void construction with uniform convoluted permanent-mold cast on its external periphery surface along its entire length, a constancy wall thickness of about 0.75mm and an internal diameter of about 26.5mm.

Another aspect of the present invention as accordingly to FIGS. 1 - 3, the rack assumes as a sun-shading device (not shown) is reverse mounted internally above an opening of an external wall, at least substantially horizontal, being parallelism to the external wall of the building, in a distance from the wall and assumes suspending of clothes hanger or likes for outdoor drying. The rings **62** for disengaging the snap-pin devices **60 & 80** from the bracket **50** is either maintains or replaced by a lockable fastener (not shown) incorporated into the snap-pin devices **60 & 80**.

As illustrated in FIGS. 4 to 7b, the rack as according to the present invention having similarities to commercially available foldable laundry wall hangers, but of differences in its structure characteristics supporting the arms **70**. The improved rack is generally mounted indoors in the building of the invention is shown as according to the foregoing construction principles which comprises of the three main parts: the plurality of mounting brackets **50a** in form of **└**-shaped, the plurality of supporting arms **70a** and the plurality of transversal poles **21 & 21b** inserted into the sequentially of thru openings **72** in the middle portion of the arm **71** of the supporting arms **70a**.

The arm **71** is articulated by the pivotably-dowel **57** in a foldable manner and slidably retain

by the inclined mating insertion construction of the first inclined spring loaded snap-pin device **60a**, preferably of one hundred and seventeen degrees (117°) from the pivotably-dowel **57** horizontal plane, and inserted inside the inclined bore **55a** incorporated within end portion of an elongated Π -shaped housing member **52a** of the bracket **50a**.

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In FIGS. 5 & 7a, the bracket **50a** comprising of a thin rectangular mounting plate **51a** being vertically orientated for perpendicularly facial attachment to the horizontal oriented housing **52a** at its upper middle facial portion. The plate **51a** includes the plurality of thru openings **54a** on its facial for the plurality of matching anchorage bolts **54** for structurally mounting to any surface.

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In FIG. 7a, the lower half portion of the member **52a** legs near the interfacing of the plate **51a** include a thru openings **56** for insertion of the mechanical jointed pivotably-dowel **57**. The end **71a** portion of the oblate-portion **74a** of the arm **71** includes a thru opening for matching mounting and insertion of the pivotably-dowel **57** and allowing the arm **71** to fold as close as possible to any mounting structure.

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The frustrum portion within the legs of the housing **52a** are for the insertion in a foldable manner by the inclined second spring loaded snap-pin device **80** incorporated within the oblate-portion **74a** of the forward end arm **71a** inside an inclined holder **76**, preferably of fifty-six degrees (56°) from the pivotably-dowel **57** horizontal planes. The sole of the legs of the housing **52a** after the pivotably-dowel **57** insertions is incurvate upwardly to provide a matching marge with the remaining portion **71b** to **71c** of the arm, thereby maintain as a compact elongated construction of the present invention.

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The snap-pin devices **60a** & **80** as illustrated in FIGS. 5 & 7b, comprising of the dowels **61** & **61a** of a circular cross-section shaped, one end portion has a U-shaped tip to provide slidably surface and smooth penetration into an inclined mating insertion passages **77a** or **53a** of the oblate-portion **74a** or a socket **53** of the plate **51a** and prevents avulsion of the arm **71** when inserted.

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The middle longitudinal portion to opposite end portion of the dowels **61** & **61a** is shrink to a smaller circular diameter; the shrink portion is a shank. The shank of the dowels **61** & **61a** enable insertion of a metal compression spring **64** and maintains within a slidably movement in an inclined bores **55a** & **75**. The end of the shank penetrated into their respective matching thru opening eyelets **63** & **63a** and containing the snap-pin devices **60a** & **80** within the bores **55a** & **75**.

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The end portion of the shank includes an eyelet for the insertion of a ring **62** to facilitate the withdrawing and for disengagement of the arm **71** from the bracket **50a**. The top portion of the eyelet **63** includes a longitudinal recess **65** to house circular surfaces of the salient ring **62**, thereto containing the dowel **61** at withdrawn position.

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In FIGS. 7a & 7b, within the oblate-portion **74a** from the end **71a** portion to the end **71b** portion, further include the second snap-pin device **80** for securing the arm **71** to storage or kept position. The holder **76** for the second snap-pin device **80** incorporated into the oblate-portion **74a** of the arm **71** are chamfered inwards and maintain a clear spacing from the legs and frustrum portion of the housing **52a**.

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The eyelet **63a** on top of holder **76** includes a parallel recess **66** maintaining the ring **62** at a salient position without obstructing the leg's sole of the housing **52** during folding operation. Within the first inclined snap-pin device **60a** and the position of the second snap-pin device **80** include a bracket-opening **58** on the housing **52a**. The bracket-openings **58** are for the interposed insertion of the pole **21** and at its middle portion of the bracket-opening **58** include a notch **58a**.

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As shown in FIGS. 6a, 6b & 7b, the arms **71** extend horizontally and perpendicularly to the mounting bracket **51a** with the oblate-portion **74a** in substantially parallelism matching engagement with the housing **52a**. The end **71b** portion of the oblate-portion **74a** is acclivity upwards in a matching inclined plane with the first inclined snap-pin device **60a**. The end portion of the housing **52a** includes a pair of leg's wall protruded acclivity front wings **59**. The wings **59** are chamfered upwardly provide guiding and lateral resistant movement for the arm **71** after its mating engagement position with the housing **52a**.

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As illustrated in FIG. 7a, the position of the pivotably-dowel **57**, the rotational folding of the arm **71**, the tip of the snap-pin **61a** from the matching passage **75** into the passage **53a** determined the socket **53** position on the vertical mounting plates **51a**.

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Remaining portion **71b** to **71c** of the arm **71** after its inclined mating attachment with the housing **52a** is of **I**-shaped cross-section for material saving and minimize the weight for ease of operation. The openings **72** include a convoluted circumference walls **72a** in a mating central passage into the annular notch **73** for rotationally indexed engagement of the control-pin device **40**.

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Referring now to FIGS. 8 to 11c, the rack is constructed as according to the foregoing mention

principles, mounted adjacently indoor to an external parapet wall to direct an elongated tube 34 from the internal void of the pole 21c, the tube 34 telescopically extend outwardly for outdoor clothes drying is made of aluminium alloy, extruded in cylindrical cross-section shaped in a single void with permanent-mold cast with a plurality of uniform corrugated elliptical shaped along its entire extend, a constancy wall thickness of about 1mm and an outer diameter of about 25.4mm.

One ends 25 portion of the pole 21c is provided with the control-pin device 40 and the opposite ends 25a include a pole-fastening device 26 to facilitated rotationally frictional clamping onto the tube 34. Further, the inserted ends 23 of the tube 34 into the pole 21c include a force inserted rotationally clockwise of the tube-fastening device 35.

As shown in FIGS. 9, 10b, 10c, 11b & 11c, the tube-fastening device 35 is rotationally fastening anti-clockwise into the internal slidably surface of the pole 21c in the operative position, the remaining longitudinal drawing out length of the tube 34 extend thru the pole-fastening device 26 into the opening 72 of the opposite arm 71.

It should be noted that the anti-clockwise fastening of the tube-fastening device 35 and the clockwise fastening of the pole-fastening device 26 increase its magnitude of fastening the tube 34 of the pole assembly 20.

In FIGS. 11b & 11c, the tube-fastening device 35 made of polymer material comprising of a coupling 36 having changes at its forward end 36a portion to include a recess cylindrical housing 38 for the insertion of a resilient circular-locking element 37. The opposite end having a matching outer periphery surface for force inserting into inter periphery of the end portion of the tube 34 preferably about 15mm. The housing 38 has one section thicken 38a in its surface to a mating tapered frictional pressing with a thicken-section 37a of the circular-locking element 37.

The rotation of the tube 34 that facilitated a centripetal force with the force inserted coupling 36 towards the thicken-section 37a of the locking element 37, thereto create an outward radial force acting on the thicken-section 37a that rotationally immobilized and frictionally hold the tube 34 to the pole 21c. The centrally passage is void to minimize to weight of the tube fastening device 35.

In FIGS 9 & 10c, a short length preferably about 200mm before the pole-fastening device 26 includes a mechanical inwards force indentation 39 on the wall of the pole 21c for terminate the

drawing-out of the tube 34. An outer periphery 36b of the coupling 36 having a wider circumference as compare to the internal's ridge of the indentation 39, thereby at its interfacing with a ridge of the indentation 39 and end 23 portion of the tube 34 facilitated limitation containment of the tube 34 within the pole 21c.

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The pole-fastening device 26 as illustrated in FIG. 10d, comprising of an annular locking taper sleeve 27 preferably a length about 80mm and has a cylindrical cross-section shaped stationary clamp 30 having thread portion on the outer periphery that enable engagement into an inner periphery threaded 29 of the sleeve 27. The clamp 30 inserted into end portion of the tube 34 includes breakages on its threaded portion for resilient receiving of the thread 29.

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The clamp 30 further includes a plurality of extended elongated leg 31 from collar 30a portion of the clamp 30. At its forward end of the leg 31 include a foot 32 having a thick sole for pressure clamping into the tube 34 from a plurality of matching cavities 33 on the cylindrical wall of one end 25a portion of the pole 21c.

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As illustrated in FIG. 10d, the pole-fastening device 26 in their relative engagement positions of the clamp 30 at the end 25a portion of the pole 21c and the threaded 29 about to engage collar 30a portion of the clamp's 30 in a clockwise rotationally manner. The sleeve 27 has a forward end mouth 27a to accept the clamp 30 and at the other end a reduce diameter mouth 27b slidably matching diameter to the outer-surface of the tube 34. In this annular passage of the sleeve 27, include the threaded-portion 29 near the mouth 27a for rotational engagement into a threaded portion of the clamp 30, at its middle portion of the annular passage has a mating tapered section 28, preferably inclined about eight degrees (8°) to facilitated rotational pressure detent on top portion of the foot 31, thereto frictional clamping the tube 34 by the tapered section 28.

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The control-pin device 40 as illustrated in FIG. 10a, comprising of four main parts: a cylindrical cross-section polymer stationary holder 42 for insertion into one end 25 portion of the pole 21c, a pointed arch push-button 41 made of polymer material with a mould-cast hexagonal metal nut 41b incorporated into one end 41c portion, a metal shaft 43 having a threaded 43a portion at forward end and a head 46 on the opposite end, a metal compression spring 44 inserted into the shaft 43 and captured inside a spring-housing 44a and a plurality of metal balls 49 force matching inserted into a plurality of ball 49 size-matching openings 48 of the holder 42, the openings 48 is radiated perpendicularly from the center of shaft 43.

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The head 46 of the shaft 43 has two plane of circular cross-section of a matching outer-surface

urging the balls 49 into a locking position or a reduced circular cross-section plane 45 for disengagement the urging of the balls 49. The forward end of the holder 42 comprises of a push-button recess 41d for the push-button 41, a spring-housing 44a to contain the spring 44 and a matching thru opening 43b for the shaft 43 at its centrally passage. Further, a centrally
5 passage recess 45a for the shaft's head 46 & 45 include the openings 48 that are radiated perpendicularly from the center of shaft 43 for the balls 49.

In operative or buck position of the control-pin device 40 as shown in FIG. 10a, the balls 49 protruding from the openings 48 of the holder 42, and penetrated into a smaller diameter as
10 compare to the size of the ball 49 in a matching thru openings 47 on the wall's of the pole 21c. The spring 44 is supplied to resiliently extend within the spring-housing 44a, which directs the head 46 inwardly into the holder 42 that imparts a radial torque from the outer-surface of the head 46 into the protruding balls 49, thereto urging the balls 49 rotationally indexed to the notch 73.

15 In disengagement position of the control-pin device 40 as shown in FIG. 11a, the push-button 41 compressed that is limit by a collar 41a and the recess 41d, the spring 44 is fully compressed and readily capture in the recess in the spring-housing 44a. The balls 49 relaxed or released from the radial imparts torque of the head 46 and move freely within the plane 45,
20 whereby the balls 49 continues to rotate freely within the openings 48, disengaging the rotational indexed between the balls 49 and the convoluted recess of the notch 73.

Accordingly, the versatility and usefulness of the rack and pole assemblies are increase by its own ability. Since numerous modifications and changes readily will occur to those skilled in
25 the art, it is not desired to limit the present invention to the exact construction and operation shown and described.

Furthermore, the present invention has been described with reference to the illustrated and presently preferred embodiment. It is not intended that the invention be unduly limited by this
30 disclosure of the preferred embodiment. Instead, it is intended that the invention be defined by their means and obvious equivalents.

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CLAIMS

1. A **conventional** foldable clothes-drying rack/hanger, generally mounted indoors in a building to accommodate use by a human being for suspending laundries or likes and drying,
5 comprising;

(a) a plurality of transversal poles of aluminium alloy, extruded in cylindrical cross-section shaped in a single void construction, an outer diameter of about 22mm, a wall thickness of about 0.5mm, a various length of about 1200 to 2000mm and both ends portion enable force insertion of an extruded polymer material end stoppers,

10 (b) a pair of elongated supporting arms is plate form of stainless steel, bent to a rectangular cross-section shaped in a single void construction, said arms at spaced location so as to able to support attach said poles at sequentially spaced, said arm's one end portion for attachment and remaining portion include a plurality of sequentially openings with inserted plastic material sleeves for said poles and of a length of about 750mm,

15 (c) a pair of mounting brackets is made of stainless steel of a height of about 330mm comprises of a thin rectangular flat plate and a pair of side plate attached to edges of vertical oriental side of said plate to a $\square$ -shaped so as to enable pivotally attachment of said arm at its upper top portion of said bracket, vertical middle facial portion of said plate include a plurality of openings for matching anchorage bolts for structurally mounting to any surfaces,
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(d) a pair of diagonal telescopic braces made of metal material of a sufficient length, one end portion of said brace pivotally attached to lowest end portion of said bracket means so as to enable diagonal telescopically bracing supports of said arms to a substantially horizontal orientations,

25 wherein the **improvement** comprises:

(a) a plurality of transversal poles is of metal material, in a cylindrical cross-section shaped in a single void construction, an internal diameter of about 26.5mm, both ends portion enable force insertion of an extruded polymer material end stoppers, further said poles has a further increase in its spatial complexity and changes in its sizes,

30 (b) a plurality of elongated supporting arms is made of metal material of equal length of rectangular cross-section shaped of sufficient size and at spaced location so as able to support attach said pole at sequentially spacing, one end portion said arm being exposed for pivotally attachment and remaining vertical oriented facial portion for attachment of said poles, and

35 (c) a plurality of mounting brackets is of metal material of sufficient size comprises of a mounting plate and an elongated housing, said housing attached to facial of said plate at integrable position for securing said arms when placed adjacently, vertical middle facial



portion of said plate include a plurality of openings for matching anchorage bolts for structurally mounting of said bracket to any surfaces,

whereby said rack is generally mounted indoors of the building so as to fold at least substantially horizontal, being parallelism to the wall in a distance and further said rack is improved in its structural supports for supporting of said arms.

2. The rack as according to Claim 1, further including a plurality of snap-pin devices that can be attached to opposite portions for securing of said arm thereto preventing avulsion from said bracket when placed adjacent said snap-pin device.

3. The rack as according to Claims 1 to 2, within said rack comprising:

(a) a plurality of transversal poles is made of aluminium alloy, extruded with uniform convoluted permanent-mold cast on its external periphery surface along its entire length and a wall thickness of about 0.75mm,

(b) a plurality of elongated supporting arms (70 & 70a) is made of steel, forward end (71a to 71b) portion said arm is flatten on vertical orientation thereof to provide a matching construction plane to frustrum base of said housing (52 & 52a), said housing is of U or Π-shaped, said flatten portion is oblate-portion (74), forward end (71a) portion of said oblate-portion include a thru opening for a pivotably-dowel (57) insertion into openings (56) of legs of frustrum portion of said housing, interfacing end (71b) portion between said housing and said arm include a snap-pin device (60 & 60a), end (71b) portion of oblate-portion (74) of said arm is acclivity upwards in a matching inclined plane with said snap-pin device, end (71c) portion of said arm is of closed-end web construction,

(c) a plurality of mounting brackets (50 & 50a) comprises of a thin rectangular mounting plate (51 & 51a) being vertically oriented for mounting to any structure surface and said housing attached to upper top portion of said plate, legs of said housing include thru said opening (56) for attachment of said pivotably-dowel (57), vertical middle facial portion of said plate include sequentially openings (54a) for matching anchorage bolts (54) for structurally mounting of said bracket to any surfaces, and

(d) a plurality of snap-pin devices (60 & 60a) is made of steel that can be incorporated into one portion of said arm's end (74) portion or said housing (52a) for mating interlocking thereto supporting of said arm to said designated intergralable position thereto for suspending laundries or likes.

4. The rack as according to Claim 1, further including a plurality of second snap-pin devices that can be attached to opposite portions for securing of said arms thereto preventing avulsion from said plate when placed adjacent said snap-pin device.



5. The rack as according to Claims 1 to 3, wherein said rack install above an opening of an external wall of a building so as to fold at least substantially horizontal, being parallelism to the wall in a distance that enable blocking of sun radiation and assumes as a foldable sun-shading device (not shown) comprising of said brackets, said arms, said poles and said snap-pin devices, whereby said poles is of closer sequentially spacing for blocking the sun heat and further assumes suspending of clothes hangers or likes for outdoor drying.

6. The sun-shading device as according to Claim 5, further including a plurality of said second snap-pin devices (80) incorporated into said oblate-portion (74) of said arm (71) for securing of said sun-shading device to said storage or kept position.

7. As according to Claim 5, wherein said poles is of flat shaped of metal material, has a further increasing in its spatial complexity, of sufficient sizes and includes means for joining comprises ends, wherein each end comprises joins means attachment to said arms.

8. The rack as according to Claims 2 & 4, wherein said snap-pin devices (60, 60a & 80) comprising:

(a) a dowel (61 & 61a) is of metal material of circular cross-section shaped, one end portion of said dowel has rounded edges to a U-shaped thereof convenient mating insertion into respective passage (77, 77a & 53a), middle longitudinal portion to opposite end portion of said dowel is shrink to a smaller circular cross-section, said shrink portion is a shank thereof enable inclusion of a compression spring and insertion to an eyelets (63 & 63a) thereof contain said dowel within an inclined respective bore (55, 55a & 75),

(b) a compression spring (64) is of metal material of sufficient size to provide a limited degree of resilient force within said bores for use by a human being, and

(c) a ring (62) is of rigid material of sufficient size for insertion into end portion of said shank having an eyelet thereof convenience disengaging of said dowel (61 & 61a) from respective inclined mating said passage,

whereby said snap-pin device is spring-loaded that facilitated a resilient mating insertion into respective passage preventing avulsion of said arm from said bracket.

9. The rack as according to Claim 3, wherein said remain portion (71b to 71c) of said arm maintain as said elongated flat shaped is of T-shaped cross-section shaped, and said arm further including a plurality of thru sequentially openings (72) for interposed insertions of said poles (21 & 21b) at sequentially spacing, within said opening include a convoluted circumference wall (72a) in a mating central passage for convenient insertion of said poles.



10. The rack as according to Claims 1,5 & 9, wherein said arms are metal material is made of aluminium alloy.

5 11. The poles as according to Claims 1 & 9, further including a control-pin device (40) is attached to one end portion of at least one number of said pole comprising of a plurality of rigid parts for engaging the pole into said opening (72) thereto preventing said pole from inadvertent dislodgement.

10 12. The poles as according to Claim 11, wherein said control-pin device (40), comprising:

(a) a plurality of balls (49) is of metal material of sufficient size to accommodate rotationally indexed engagement to the convoluted recess's notch (73) of said opening (72) of said arm (71),

15 (b) a shaft (43) is of rigid material of sufficient size has a head of two circular cross-section plane to accommodate axially slidably of said balls, within said balls in operative position is seated in a forward end (46) portion of said head, said head having a wider circumference that imparts a radial torque forcing said balls outwardly indexed into said notch of said opening of said arm, and in disengagement position said ball rotationally relaxed in the second circumference (45) of said head, further said on opposite end of said shaft includes a threaded portion (43a) for rotationally fastening,

20 (c) a push-button (41) is of rigid material of sufficient size to accommodate use by a human being for urging disengagement said rotationally indexed engagement of said ball from said notch, and said push-button includes a hexagonal nut (41b) incorporated at end (41c) portion of sufficient size for rotationally fastening of said threaded (43a) portion of said shaft,

25 (d) a compression spring (44) is of metal material of sufficient size to provide a limited degree of resilient force for use by a human being's hands, said force is supplied to resiliently extend to said head outwardly to relaxed said balls from said indexed engagement from said notch, further said spring resilient urge to its buck position into a engagement position after removable of said force, and

30 (e) a stationary holder (42) is of rigid material of sufficient size to accommodate insertion to one end portion of said pole and includes a centrally passage housing (43b) for said shaft, recess (41d) for said push-button, housing (44a) for said compression spring and housing (48) for axially radiated said balls,

35 whereby said control-pin device for engagement into said notch of said sequentially opening (72) of said arm that facilitated rotationally indexed engagement of said pole into said arm.



13. The rack as according to Claims 1 & 9, wherein said poles for insertion into said openings of said arms further including an elongated tube of substantially matching size to internal periphery of said pole so as enable slidably mating insertion into pole with a limited degree of frictional pressing restriction movement during extending or retracting being carried out by a human being.

14. The tubes as according to Claim 13, further including an tube-fastening device for engagement one portion of said pole into said tube, comprising of a plurality of rigid parts that can be attached to end (23) portion of said tube for interlocking into said pole thereto preventing inadvertent dislodgement.

15. The tubes as according to Claim 14, wherein said tube-fastening device (35) force inserted into one end portion of said tube for extending outwardly, comprising:

(a) a resilient circular-locking element (37) is of polymer material of sufficient size to accommodate within slidably internal surface of said pole, further said circular-locking element is of circular shape having a thickness, a inward thicken portion (37a) at one end portion, a outer diameter substantially wider than said pole with a break portion whereby facilitated a compressed inward material resilient strength, and

(b) a coupling (36) is of polymer material of sufficient size to provide insertion into one end portion of said tube and enable nutate movement within slidably longitudinal length said pole, within said coupling-socket include a recess cylindrical housing (38) at forward end and a thicken-section (38a), thereby facilitated outwardly rotational frictional pressing for said thicken portion (37a) of said circular-locking element (37),

whereby said coupling is driven in rotation by said tube with stationary position of said pole until said thicken-section of said circular-locking element interlock frictionally with said thicken-section of said circular-locking element, further said circular-locking element is rotationally immobilized during the run up of said tube that facilitated outwardly frictional pressing engagement.

16. The tubes according to Claims 13 to 15, wherein said tubes (34) is made of aluminium alloy, extruded in cylindrical cross-section shaped in a single void construction, permanent-mold cast with a plurality of uniform corrugated elliptical shaped along its circular wall to its entire extend, a constancy wall thickness of about 1mm and an outer diameter of about 25.4mm.

17. The poles as according to Claims 14 to 16, further including a pole-fastening device (26) comprising of a plurality of rigid parts that can be attached to outer periphery of said pole



for interlocking into said tube (34) thereto preventing inadvertent dislodgement.

18. The poles according to Claims 16 & 17, wherein said pole-fastening device (26) comprising:

5 (a) a sleeve (27) of polymer material of sufficient size to accommodate use by a human being rotationally engagement for clamping from said pole onto said tube, said sleeve having a mouth at forward (27a) portion, a threaded portion (29) for engaging and a reduce diameter mouth (27b) matching to slidably outer periphery of said tube, and

(b) a stationary clamp (30) of polymer material of sufficient size to accommodate
10 insertion into one end (25a) portion of outer periphery of said pole and a threaded portion on outer periphery to accommodate rotationally engagement of said sleeve, further end (25a) portion of said pole includes a plurality of matching cavities (33) for a plurality of extended elongated legs (31) from collar (30a) portion of said clamp, said leg include a foot (32) having a thick sole to accommodate within cavities of said pole, thereto facilitated pressure clamping
15 of said pole onto said tube,

whereby said pole-fastening devices that facilitated inwardly frictional clamping engagement of said pole onto outer periphery of said tube.

19. The poles as according to Claims 13 to 15, further including an inwards force
20 indentation (39) into circular wall of short end portion of said pole thereto provide a ridge between said socket's outer periphery (36b) edges and end (23) portion of said tube, whereby said ridge provide limitation protrusion of said tube from internal periphery of said pole thereto preventing inadvertent dislodgement.

25 20. The rack as according to Claims 1 to 3 & 5, wherein said poles is omitted and said sequentially openings (72) of said arm (71) is for suspending of clothes hanger or likes for drying.

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