

AN APPARATUS FOR DISPOSING AN OBJECT FROM AN OPENING OF A BUILDING

FIELD OF THE INVENTION

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The present invention relates to an apparatus for disposing an object from an opening of a building, in particular, a moveable rack for moving laundry outside a building for drying.

BACKGROUND

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Residents of high rise apartments usually face difficulties in drying their laundry. If the laundry is placed indoors for drying, it may be difficult for the laundry to be dried completely and that may result in the laundry having an unpleasant odour. Alternatively, the laundry may be placed outdoors where it would be exposed to the sun. Drying is more complete when the laundry is dried under the sun than being dried indoors, thus the unpleasant odour of the laundry can be avoided.

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In some high rise apartments, there is a fixture for hanging laundry outdoors for drying. The fixture is a hollow cylinder mounted on the exterior wall of a building. It is made to receive a laundry pole hung with laundry. The hollow cylinder is generally located close to and outside a window of the high rise apartment and accessible from the window. The pole hung with laundry is inserted into the hollow cylinder for outdoors clothes drying.

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It requires much arm strength to carry a pole hung with laundry through the window and insert the pole into the hollow cylinder outside the window. Furthermore, when the laundry is heavy or the weather is windy, the laundry pole may be dislodged from the hollow cylinder accidentally and drop down. This is dangerous to passer-bys in the vicinity of the high rise apartment block below the laundry pole.

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SUMMARY

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In one aspect of the present invention, there is provided an apparatus for disposing an object from an opening of a building, the apparatus may comprising: a carrier for holding the object; a support assembly; and a base, wherein the support assembly may couple the carrier to the base such that the carrier is movable relative to the base between a retracted position where

the carrier is accessible for placing the object on the carrier from the opening, and an extended position where the carrier is moved away from the opening, and the base may be mounted on an exterior wall of the building facing the carrier when the carrier is in the extended position.

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The support assembly may comprise at least two support members spaced apart from one another for coupling the carrier to the base, each of the support members may have a first end pivotally mounted to the carrier and a second end pivotally mounted to the base.

10 The carrier may comprise a pole for hanging or attaching the object.

The base may be mounted on a hollow cylinder located on the exterior wall of the building.

15 The base may comprise a tubular coupling and the tubular coupling may comprise a first end configured for engaging the hollow cylinder to mount the base on the exterior wall of the building.

The tubular coupling may comprise a second end opposite to the first end and the second end may be covered.

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Each of the at least two support members may be configured to accommodate contours of the building in the vicinity of the opening to avoid obstructing the carrier from moving through the opening of the building when the carrier is moving towards the retracted position.

25 The carrier may be substantially parallel to the base lengthwise.

The displacement between the first end and the second end of each of the at least two support members may be in the range between 10 cm and 60 cm.

30 The carrier may comprise a pole support assembly for holding the pole.

The pole held by the pole support assembly may comprise a stopper located at one end of the pole which is closer to the building when the pole is placed on the carrier, for preventing the pole from sliding out of the pole support assembly by obstructing movement of the pole
35 when the pole is sliding in a direction away from the opening of the building.

The pole support assembly may comprise a locking mechanism for locking movement of the pole with respect to the carrier.

5 The locking mechanism may comprise a locking member and the locking member may be configured to extend into a hole located on the pole to obstruct the pole from moving away from the opening of the building.

10 The pole support assembly may comprise a surface with low friction that makes contact with the pole to assist the pole to move towards or away from the opening of the building.

The pole support assembly may comprise at least one bracket formed with an opening for receiving the pole such that the pole resides between the walls of the bracket.

15 The pole support assembly may comprise at least one pole rest with two raised walls extending from the pole rest for resting the pole between the raised walls.

The carrier may comprise a cover adjustable to cover the opening of the bracket to prevent the pole from moving out of the bracket through the opening of the bracket.

20 The base may comprise a cover arranged to prevent the pole from moving out of the bracket through the opening of the bracket when the carrier is in the extended position.

The carrier may comprise one or more bearings arranged for guiding the pole to slide towards or away from the opening of the building.

25 At least one of the bearing may comprise an indentation configured for the pole to lean against so as to assist the guiding for the pole to slide towards or away from the opening of the building.

30 The pole support assembly may comprise an extension extending from the pole support assembly and the one or more bearings may be mounted to the extension.

The carrier may comprise an extension extending from the carrier and the one or more bearings may be mounted to the extension.

35 The apparatus may comprise a biasing mechanism arranged for biasing the carrier to move from the extended position to the retracted position.

The apparatus may comprise a retaining mechanism for retaining the carrier in the retracted position.

- 5 The apparatus may comprise a retaining mechanism for retaining the carrier in the extended position.

The carrier and the base may be configured to engage each other to prevent movement of the carrier with respect to the base in the extended position.

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The apparatus may be made of a material selected from aluminium, aluminium alloy, steel, stainless steel, or carbon fibre composite material.

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The base of the apparatus may comprise at least one extension for connecting the apparatus to an adjacent apparatus or additional hardware.

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In another aspect of the present invention, there is provided an apparatus for disposing one object or a plurality of objects from an opening of a building, the apparatus may comprise more than one of the apparatuses for disposing an object from an opening of a building arranged adjacent to each other.

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The bases or the carriers of the more than one apparatuses for disposing an object from an opening of a building may be coupled to one another.

BRIEF DESCRIPTION OF THE DRAWINGS

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Various embodiments of the invention will now be described, by way of example only, and with reference to the accompanying drawings in which:

Figure 1A shows a side view of an apparatus for moving an object away from an opening of a building.

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Figure 1B shows a perspective view of the apparatus.

Figure 1C shows a perspective view of a pole support assembly.

Figure 1D shows a perspective view of a pole comprising a hole and a pole support assembly comprising a first locking mechanism.

5 Figure 1E shows a perspective view of a pole comprising a stopper and a pole support assembly.

Figure 1F shows a perspective view of a pole comprising a stopper placed on a pole support assembly comprising a second locking mechanism.

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Figure 1G shows a perspective view of a pole support assembly comprising a third locking mechanism.

15 Figure 1H shows a perspective view of a pole support assembly comprising a fourth locking mechanism.

Figure 2A shows a side view of the apparatus in an extended position.

Figure 2B shows a side view of the apparatus in a retracted position.

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Figure 2C shows a perspective view of a tubular coupling.

Figures 2D and 2E show perspective views of an example of the apparatus with a retaining mechanism for retaining the carrier in the extended position.

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Figures 3 shows a side view of an apparatus with bearings.

Figure 4A shows perspective views of various types of pole support assemblies with bearings.

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Figure 4B shows perspective views of exemplar features for a pole support assembly.

Figure 5 shows a side view of an apparatus comprising a pole in position with one object loaded.

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Figure 6 shows a side view of an apparatus comprising a pole in position with two objects loaded.

Figure 7 shows a side view of an apparatus comprising a pole in position with three objects loaded.

- 5 Figure 8 shows a side view of an apparatus comprising a pole that has moved the three objects away from a building.

Figure 9 illustrates a biasing mechanism in the form of a spring for the apparatus.

- 10 Figure 10 illustrates a biasing mechanism in the form of a counterweight for the apparatus.

Figure 11 illustrates a retaining mechanism for the apparatus.

- 15 Figure 12 shows a side view of an apparatus with a locking nut for locking the carrier in the retracted position.

Figure 13A and Figure 13B show perspective views of an apparatus with a cover on the base.

- 20 Figure 14 shows a side view of an apparatus with an extension on the base.

Figure 15 shows a cross sectional view of a carrier and a base of the apparatus that are engaged with each other.

- 25 Figure 16 shows a perspective view of joined apparatuses with their bases and carriers connected together

It is appreciated that the drawings are not drawn to scale and are for illustrative purposes only.

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DETAILED DESCRIPTION

- Figure 1A shows a side view of an apparatus 100 for moving an object (not shown in Figure 1A) away from an opening (not shown in Figure 1A) of a building (not shown in Figure 1A; for reference purposes, the building should be to the left of Figure 1A). The apparatus 100 comprises a carrier 101 for holding the object, a support assembly 120, and a base 102. The support assembly 120 couples the carrier 101 to the base 102 such that the carrier 101 is
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movable relative to the base 102 between a retracted position (Figure 2B illustrates the retracted position) where the carrier 101 is accessible for placing the object on the carrier 101 from the opening, and an extended position (Figure 2A illustrates the extended position) where the carrier 101 is moved away from the opening. The base 102 is to be mounted on an exterior wall (not shown in Figure 1A) of the building facing the carrier 101 when the carrier 101 is in the extended position. It is noted that the exterior wall refers to the wall of the building that is exposed to the outside of the building and viewable from the outside of the building. In the extended position, the apparatus 100 is residing outside the building. Advantageously, the apparatus is designed to provide convenience to load/unload objects on the carrier 101.

The apparatus 100 may be used for moving an object, such as laundry or other items (e.g. country flag) to be dried or brought away from the opening of the building so that the object can be dried outdoors. The object that is moved away may be exposed to sunlight, natural wind or an environment suitable for drying the object. The opening of the building may be a window, a door, a balcony, a hole or the like in the building.

The support assembly 120 may comprise at least two support members. In Figure 1A, two support members 103 spaced apart from each other for coupling the carrier 101 to the base 102 are provided. Each of the support members 103 has a first end 105 and 106 pivotally mounted to the carrier 101 and a second end 107 and 108 pivotally mounted to the base 102. The carrier 101 is movable relative to the base 102 between the retracted position and the extended position. The apparatus may be arranged for the carrier 101 to be substantially parallel to the base 102 lengthwise when the carrier 101 is moving relative to the base 102 between the retracted position and the extended position. The carrier 101 would be substantially parallel to the base 102 as long as both of the following two conditions are satisfied. Condition 1, the displacement between the two ends 105 and 107 of one support member 103 is substantially equal to the displacement between the two ends 106 and 108 of the other one support member 103. And condition 2, the displacement between the first ends 105 and 106 of the support members 103 is substantially equal to the displacement between the second ends 107 and 108 of the support members 103. The apparatus may be arranged to satisfy both of these conditions so that the carrier 101 becomes substantially parallel to the base 102 all the way when the carrier 101 moves between the extended position and the retracted position.

The design of the support members 103 enables the carrier 101 to move relative to the base 102 in an arcuate manner.

With reference to Figure 1A, the carrier 101 may comprise a pole 104 that is substantially elongate and cylindrical in shape. The pole 104 is arranged for hanging or attaching the object on the pole 104. The pole 104 has a front end 161 away from the building and a back end 162 closer to the building when the pole 104 is placed on the carrier 101. The pole 104 is secured to the carrier 101 through the use of a pole support assembly. More information on the pole support assembly would be provided in later parts of the description.

Figure 1B shows a perspective view of the apparatus. The reference numerals in Figure 1B are similar to Figure 1A except for a longitudinal axis 130, which is provided for reference purposes. In Figure 1B, the carrier 101 is an elongate structure having the longitudinal axis 130 and a substantially inverted U cross section. Similarly, the base 102 may be an elongate structure, as shown in Figure 1B, like the carrier 101 and have a substantially inverted U cross section. It is appreciated that the shape of the carrier 101 or the base 102 is not limited to the elongate structure with a substantially inverted U cross section as shown in Figure 1B.

In Figure 1B, the two support members 103 are located on the same side of the longitudinal axis 130 of the carrier 101 with another pair on the other side. It is appreciated that the support assembly 120 may comprise more than two support members 103 to couple the carrier 101 to the base 102. In addition, the support assembly 120 comprising at least two support members 103 may have its support members arranged either on same side or on different sides of the carrier 101 adjacent to the longitudinal axis 130. Furthermore, any one of the at least two support members 103 may have a similar support member on the other side opposite and parallel to it. Hence, in Figure 1B, two pairs of the support members 103 are arranged on different sides of the longitudinal axis 130. That is, one pair is located on a first side adjacent to the longitudinal axis 130 and the other pair is located on a second side that is adjacent to the longitudinal axis 130 and opposite to the first side. The support assembly 120 may have other arrangement. In other examples, one of the support members 103 as illustrated in Figure 1A may have a similar support member on the other side opposite and parallel to it while the other one may not have a similar support member opposite and parallel to it. In other words, there may be actually three support members. It is appreciated that the support assembly 120 may be arranged in other ways to comprise a number of support members. For simplicity and consistency, the support members 103 in this specification generally refer to the ones as illustrated in Figure 1A unless otherwise indicated.

With reference to Figures 1A and 1B, the carrier 101 includes a pole support assembly 109 for holding the pole 104. It is appreciated that whatever that is comprised in the pole support assembly 109 is also considered to be comprised in the carrier 101.

5 The pole support assembly 109 may comprise at least one feature for holding the pole 104 on the carrier 101. For instance, a tube for receiving the pole 104 through the hollow centre of the tube, at least one pole rest with two raised walls extending from the pole rest for resting the pole 104 between the raised walls (e.g. could be substantially U, H, V or Y shaped), or at least one bracket formed with an opening for receiving the pole 104 such that
10 the pole 104 resides between the walls of the bracket. It is appreciated that the bracket could be a folded bracket or a bracket joined, moulded or welded (in the case of metal) from smaller parts or pieces to form the overall shape of the bracket. In Figure 4B, some exemplar features for the pole support assembly 109 are illustrated. A pole support assembly may comprise at least one of such features or a combination of them.

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Surfaces or parts of the pole support assembly 109 that would come into contact with the pole 104 may be coated with or made of a material with low friction so as to assist the pole 104 to move or slide towards or away from the opening of the building.

20 With reference to Figure 1B, the pole support assembly 109 comprises a tube, more specifically, a cylindrical tube 110 and a pole rest, more specifically, a U shaped rest 131 for holding the pole 104. The cylindrical tube 110 and the U shaped rest 131 are coupled to the carrier 101. The U shaped rest 131 is arranged at a location on the carrier 101 away from the opening of the building. The tube 110 is located closer to the opening of the building.

25 The tube 110 has an inner diameter larger than the outer diameter of the pole 104 to allow the pole 104 to pass through the tube 110. The tube 110 in Figure 1B is cylindrical in shape and has a circular cross section. It is appreciated that the tube 110 may have a square, triangular or any other suitable cross section.

30 The U shaped rest 131 has an opening 134 between two raised walls 133 extending from the U shaped rest 131 to allow the pole 104 to be placed into the U shaped rest 131 through the opening 134.

Figure 1C shows another example of the pole support assembly 109 of the apparatus 100.

35 With reference to Figure 1C, the tube (110 in Fig 1B) has been replaced by a folded bracket 111. In Figure 1C, the pole support assembly 109 comprises a folded bracket 111 and a pole rest, more specifically, a U shaped rest 112 that are both coupled to the carrier 101. The U

shaped rest 112 is arranged on the carrier 101 at the end that is away from the opening of the building (not shown in Fig 1C) when the carrier 101 is in the extended position. The folded bracket 111 is located on the carrier 101 close to the other end that is nearer to the opening of the building when the carrier 101 is in the extended position.

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The U shaped rest 112 has an opening 143 between two raised walls 144 (i.e. legs of the U shaped rest) extending from the U shaped rest 112 to allow the pole (104 in Figures 1A and 1B; not shown in Fig 1C; hereinafter 104) to be placed into the U shaped rest 112 through the opening 143. The distance between the two raised walls 144 is configured to be sufficiently larger than the outer diameter of the pole 104 such that the pole 104 should be able to slightly sway between the two raised walls 144.

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The folded bracket 111 is folded from, in this case, a straight metal strip. A first portion 137 at one end of the metal strip is joined to the carrier 101. A second portion 136 opposite to the first portion 137 is folded to form a circular arc. The second portion 136 resembles an inverted U shape, which also bears some resemblance to the arcuate portion of a hook. The folded bracket 111 is configured to form an opening 113 between the second portion 136 and the carrier 101 that is sufficiently large to allow the pole 104 to be placed into the folded bracket 111 sideways through the opening 113. The concave side of the U shaped cross section of the folded bracket 111 is facing the opening 113.

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Figure 1D shows yet another example of the pole support assembly 109. The drawing and reference numerals in Figure 1D are similar to Figure 1C except that the pole support assembly 109 in Figure 1D further comprises a locking mechanism. Details of the locking mechanism are as follows. The folded bracket 111 comprises a locking member 114 for locking movement of the pole 104 with respect to the carrier 101. The locking member 114 is an extension from the second portion 136 of the folded bracket 111, extending directly towards the carrier 101. The locking member 114 is configured to extend into a hole 115 located on the pole 104 to obstruct the pole 104 from moving away from the opening of the building.

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Figure 1E shows yet another example of the pole support assembly 109. The drawing and reference numerals in Figure 1E are similar to Figure 1C except that the pole 104 further comprises a stopper 118. The stopper 118 is a flange extending from the circumference of the pole 104 that is located at the back end of the pole 162 which is closer to the opening of the building (not shown in Figure 1E) when the apparatus 100 is in use. The stopper 118 prevents the pole 104 from sliding or moving out of the folded bracket 111 lengthwise. The

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stopper 118 has an inner diameter larger than or equal to the outer diameter of the pole 104 and an outer diameter larger than the inner diameter of the arcuate second portion 136 of the folded bracket 111 so that the stopper 118 would be able to obstruct the movement of the pole 104 when the pole 104 is moving lengthwise in a direction away from the opening of the building. To attach the pole 104 to the pole support assembly when the carrier 101 is in the retracted position, the pole 104 may first be placed into the U shaped rest 112 through the opening 143, followed by placing the pole 104 into the folded bracket 111 sideways through the opening 113. Afterwards, the pole 104 may be moved lengthwise in the direction away from the building until the stopper 118 contacts the folded bracket 111.

Figure 1F shows yet another example of the pole support assembly 109 of the apparatus 100. With reference to Figure 1F, the tube (110 in Fig 1B) has been replaced by a folded bracket 116 which has a bearing 151. Moreover, the U shaped rest (131 in Fig 1B) has been replaced by another U shaped rest 117 which has a bearing 152. In Figure 1F, the pole support assembly 109 comprises a folded bracket 116 and a pole rest, more specifically, a substantially U shaped rest 117 that are both coupled to the carrier 101. The U shaped rest 117 is arranged on the carrier 101 at the end that is away from the opening of the building when the carrier 101 is in the extended position. The folded bracket 116 is located on the carrier 101 close to the other end that is nearer to the opening of the building when the carrier 101 is in the extended position.

The U shaped rest 117 has an opening 145 between two raised walls 146 (i.e. legs of the U shaped rest) extending from the U shaped rest 117 to allow the pole 104 to be placed into the U shaped rest 117 through the opening 145.

With reference to Figure 1F and Drawing 150 (a zoomed in perspective view of the folded bracket 116 for illustrative purposes), the folded bracket 116 is folded from, in this case, a straight metal strip. A first portion 138 at one end of the metal strip is joined to the carrier 101. A second portion 139 opposite to the first portion 138 is folded to form an inverted U shape that has sharp corners instead of round corners. For the instance shown in Fig 1F, only the longer leg of the inverted U shape, i.e. the first portion 138, is coupled to the carrier 101. The folded bracket 116 is configured to form an opening 135 between the shorter leg of the inverted U shape and the carrier 101 that is sufficiently large to allow the pole 104 to be placed into the folded bracket 116 through the opening 135. There is a bearing 151 mounted between the two legs of the inverted U shape of the folded bracket 116. There is also a bearing 152 mounted between the two raised walls 146 of the U shaped rest 117 for the pole 104 to rest on. These bearings would be described in greater details later.

The pole 104 in Figure 1F comprises a stopper 118. The reference numeral of the stopper 118 in Figure 1E is reused for the stopper 118 in Figure 1F. Similarly, the stopper 118 in Figure 1F is a flange extending from the circumference of the pole 104 that is located at the back end of the pole 162 which is closer to the opening of the building (not shown in Figure 1F) when the apparatus 100 is in use. The stopper 118 prevents the pole 104 from sliding or moving out of the folded bracket 116 lengthwise. The stopper 118 has an inner diameter larger than or equal to the outer diameter of the pole 104 and an outer diameter larger than the distance between the two legs of the inverted U shape of the folded bracket 116 in order to obstruct movement of the pole 104 when the pole 104 is sliding lengthwise in a direction away from the opening of the building.

The carrier 101 further comprises a locking plate 119 that is substantially F shaped (other suitable shape is also possible). The bottom end of the F shape of the locking plate 119 is pivotally coupled to one end of the carrier 101 located closer to the opening of the building (not shown in Figure 1F) when the apparatus 100 is in use. The locking plate 119 comprises a receiving notch 121 located between the two prongs of the F shape of the locking plate 119. The receiving notch 121 is configured to have a dimension larger than the outer diameter of the pole 104 to receive the circumference of the pole 104 and smaller than the outer diameter of the stopper 118 to prevent the pole 104 from moving lengthwise towards the opening of the building when the apparatus 100 is in use. In the present instance, the receiving notch 121 is configured to fit the circumference of the pole 104 at a position adjacent to the stopper 118 and away from the folded bracket 116.

With reference to Figure 1F, when the pole 104 with the stopper 118 is loaded on the pole support assembly 109, there is a limit to how much the pole 104 can move or slide away from the opening of the building. The stopper 118 obstructs further movement of the pole 104 relative to the folded bracket 116 once the pole 104 is moved or slid lengthwise away from the opening of the building to an extent whereby the stopper 118 on the pole 104 comes into contact with the folded bracket 116. After the stopper 118 contacts the folded bracket 116, the locking plate 119 may be pivoted relative to the carrier 101 such that the receiving notch 121 receives the circumference of the pole 104 at a position adjacent to the stopper 118 and away from, more specifically, the point of contact of the stopper 118 and the folded bracket 116. Therefore, the stopper 118 is located between the folded bracket 116 and the locking plate 119. Consequently, the pole 104 becomes unable to slide lengthwise either away from or towards the opening of the building.

Figure 1G shows yet another example of the pole support assembly 109 of the apparatus 100. With reference to Figure 1G, the pole support assembly 109 comprises a pole rest, more specifically, a U shaped rest 123, a folded bracket 124 and a locking mechanism 126 that are all coupled to the carrier 101. The U shaped rest 123 is arranged at a location on the carrier 101 away from the opening of the building. The folded bracket 124 and the locking mechanism 126 are located closer to the opening of the building.

The U shaped rest 123 has an opening 148 between two raised walls 147 (i.e. legs of the U shaped rest) extending from the U shaped rest 123 to allow the pole 104 (not shown in Fig 1G) to be placed into the U shaped rest 123 through the opening 148.

The folded bracket 124 is folded from, in this case, a straight metal strip. A first portion 141 at one end of the metal strip is joined to the carrier 101. A second portion 140 opposite to the first portion 141 is folded to form a circular arc. The second portion 140 resembles an inverted U shape, which also bears some resemblance to the arcuate portion of a hook. The folded bracket 124 is configured to form an opening 125 between the second portion 140 and the carrier 101 that is sufficiently large to allow the pole 104 to be placed into the folded bracket 124 through the opening 125. The concave side of the U shaped cross section of the folded bracket 124 is facing the opening 125.

The locking mechanism 126 is configured to work with the folded bracket 124 to secure the pole 104 (shown in for instance, Figure 1A, but not shown in Figure 1G) to the carrier 101. The locking mechanism 126 comprises a substantially rectangular plate 142 (square shape or any other suitable shape is also possible in other examples) with an elongate aperture 128 that is located on the plate 142. The rectangular plate 142 is arranged for blocking the opening 125 of the folded bracket 124 and is located on the side of the carrier 101 opposite to the folded bracket 124. By blocking the opening 125 after the pole 104 is placed into the folded bracket 124, the plate 142 prevents the pole 104 from slipping out of the folded bracket 124 through the opening 125. The folded bracket 124 comprises an extension 127 extending from the location of the first portion 141 that is between the second portion 140 and the carrier 101, towards the rectangular plate 142. The extension 127 could be a bolt with a threaded end for receiving a wing nut 129. The threaded end of the extension 127 is sized to pass through the aperture 128 and receive the wing nut 129 on the other side. Consequently, the plate 142 is located between the wing nut 129 and the carrier 101. By tightening the wing nut 129, the plate 142 is pressed by the wing nut 129 to move towards the folded bracket 124. The extension 127 and the wing nut 129 are also parts of the locking mechanism 126.

It is appreciated that the aperture 128 is not required to be elongate as long as it allows the threaded end of the extension 127 to pass through. However, in this case, the aperture 128 is designed to be straight and elongate in the plate 142 so that the plate 142 has freedom of movement relative to the extension 127 along the aperture 128 after the extension 127 has passed through the aperture 128. Moreover, the plate 142 is rotatable about the extension 127. To block the opening 125 with the plate 142 after the pole 104 is placed in the folded bracket 124, the plate 142 is firstly adjusted to a position similar to that as shown in Figure 1G. The wing nut 129 is then tightened which in turn presses the plate 142 against the pole 104 (not shown in Figure 1G) to secure the pole 104 in the position surrounded by the plate 142, the carrier 101 and the folded bracket 124. Conversely, to unblock the opening 125, the wing nut 129 is firstly loosened. The plate 142 will then fall towards the carrier 101 due to gravity, leaving the opening 125 unblocked. The falling of the plate 142 is limited by the length of the aperture 128.

Alternatively, in another example, the extension 127 may be a cylindrical tube with a threaded interior for receiving a threaded end of a bolt. It is appreciated that other suitable fastening means could also be provided.

Figure 1H shows yet another example of the pole support assembly 109 of the apparatus 100. The reference numerals in Figure 1H are similar to Figure 1G except those for the components of the locking mechanism 126. In Figure 1H, the design of the locking mechanism 126 is different from that in Figure 1G. The locking mechanism 126 in Figure 1H comprises a substantially rectangular plate 132 with one end pivotally mounted to the carrier 101. The plate 132 is mounted to the carrier by way of a mounting fastener 149, which may be a rivet. The plate 132 is moveable relative to the carrier 101 between a first position where the plate 132 blocks the opening 125 of the folded bracket 124 to prevent the pole (not shown in Figure 1H) from moving out of the folded bracket 124 through the opening 125 and a second position where the plate 132 is moved away from the opening 125 to allow the pole to move in or out through the opening 125. The plate 132 can be secured in the first position or second position by friction between the plate 132 and the carrier 101 resulting from tight mounting of the mounting fastener 149 that presses the plate 132 and the carrier 101 together.

Referring to Figure 2A, there is shown a side view of the apparatus 100 described with reference to previous figures in the extended position. A building 201 and an opening 207

located to the left of Figure 2A are represented by cross-sectional views. In this extended position, the carrier 101 is positioned away from the opening 207 of the building 201 and is not located at the opening 207 of the building 201. A portion of the carrier 101 closer to the opening 207 is resting on the base 102. This allows the opening 207 to be closed if the opening 207 happens to be a window of that building. Any objects hung, placed or attached to the carrier 101 would also be brought away from the opening of the building 207 for drying, displaying or for other purposes.

The base 102 is mounted on an exterior wall 210 of the building 201 in the vicinity of the opening 207 of the building 201 where the apparatus 100 is accessible for hanging, placing or attaching an object on the carrier 101. More specifically, the base 102 is mounted on a hollow cylinder 202 located on the exterior wall 210 of the building 201 in the vicinity of the opening 207 of the building 201 where the apparatus 100 is accessible for hanging, placing or attaching an object on the carrier 101. It is appreciated that the base 102 could be mounted to the exterior wall 210 of the building 201 in a different way without the assistance of the hollow cylinder 202. For instance, the base 102 may be mounted directly to the exterior wall 210 of the building 201 by using one or more fasteners selected from bolts, rivets, screws, or pins. It is also feasible that the base 102 may be mounted to other types of hardware other than the hollow cylinder 202 which are installed on the exterior wall 210 of the building 201. It is appreciated that other suitable mounting means may also be employed to mount the base 102 to the exterior wall 210 of the building 201. Furthermore, the hollow cylinder 202 could be an existing fixture of the building 201 that is meant for inserting a pole (e.g. 104 in Figure 1A) into it to, for instance, sun out wet laundry. Drawing 200 (on the same page as Fig 2A and below Fig 2A) shows a side view of an example of such an existing hollow cylinder 202 fixed on the exterior wall 210 of a building 201 in the vicinity of the opening 207 of the building 201.

To assist in the mounting of the apparatus 100 to the exterior wall 210, the base 102 may further comprise a cylindrical tube 203. The tube 203 comprises a first end 204 configured for engaging the hollow cylinder 202 so as to mount the base 102, and thereby the apparatus 100, to the exterior wall 210 of the building 201. At least the inner diameter of the first end of the tube 203 is made larger than the outer diameter of the hollow cylinder 202 so that the hollow cylinder 202 can fit into the tube 203. It is appreciated that in this manner, the apparatus 100 is detachably mounted to the exterior wall 210.

With reference to Figure 2C, the tube 203 in Figure 2A may be replaced with a tubular coupling 206. The tubular coupling 206 may be formed from a strip of material, as is the

case in Figure 2C, or it could be formed by joining pieces of material together or by other suitable means. The tubular coupling is configured to have a tubular portion 207 with a substantially tubular cross section. The tubular portion 207 has an inner diameter larger than the outer diameter of the hollow cylinder (202 in Figures 2A and 2B; hereinafter 202) so that the hollow cylinder 202 could be inserted through the coupling 206 to mount the base 102 to the exterior wall 210 of the building 201. There are two legs 209 extending from the tubular portion 207. The two legs 209, thus the coupling 206, are coupled to the base 102 by one or more fasteners (e.g. bolts, rivets, screws, pins or the like). It is appreciated that additional mounting means may be provided to further secure the apparatus 100 to the building 201. For example, additional mounting kits (not shown in Figure 2C) which would be located at one end (not shown in Figure 2C) of the base 102 closer to the building 201 may be used to further mount the base 102 to the hollow cylinder 202. For the case shown in Figure 2C, such additional mounting kits should be located at the left most end (not shown in Figure 2C) of the base 102. With such mounting kits mounting the base 102 to the hollow cylinder 202 and the tubular coupling 206 enclosing the hollow cylinder 202, the base 102 is firmly attached to the hollow cylinder 202. The tubular portion 207 has a first end open for receiving of the hollow cylinder 202 and a second end covered by a cover 205. The first end of the tubular portion 207 is closer to the building 201 after installation of the apparatus. The second end of the tubular portion 207 is away from the building 201 after installation of the apparatus. When the apparatus is being mounted to the hollow cylinder 202, the cover 205 helps prevent over insertion of the hollow cylinder 202 into the tubular portion 207. The cover 205 will block further insertion once the cover 205 contacts the furthest end of the hollow cylinder 202 that is located away from the opening of the building 201. Furthermore, the cover 205 can prevent water from, for instance, rain from entering through the tubular portion 207 and into the hollow cylinder 202, thereby protecting the hollow cylinder 202 and the interior of the tubular portion 207 from corrosion.

With reference to Figure 2B, there is shown a side view of the apparatus 100 described with reference to previous figures in the retracted position. In this retracted position, the carrier 101 is moved towards the opening 207 of the building 201. A portion of the carrier 101 may be moved through the opening 207 of the building 201. In Figure 2B, the carrier 101 is substantially moved through the opening 207. By moving a portion of the carrier 101 through the opening 207, a user can access the carrier 101 easily to load an object on the carrier 101. Furthermore, as the apparatus 100 is mounted outside the building 201, it is safer and more convenient for the user to handle the loading of objects inside the building 201. After the desired object(s) is loaded on the carrier 101, the user may move the carrier 101 to the

extended position (as shown in Figure 2A) to have the objects displayed away from the opening 207. Similarly, when the user needs to unload object(s) from the carrier 101, the user may conveniently move the carrier 101 from the extended position to the retracted position (as shown in Figure 2B) to unload the object(s) from the carrier 101 safely.

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In Figure 2B, each of the two support members 103 of the apparatus 100 is configured to accommodate contours of the building 201 in the vicinity of the opening 207 to avoid obstructing the carrier 101 from moving through the opening 207 of the building 201 when the carrier 101 is moving towards the retracted position. Hence, in Figure 2B, each of the support members 103 is substantially L shaped. The respective corners 211 and 212 of the L shape of the support members 103 are pointing in a direction away from the building architecture at the opening 207, which also resembles an L shape with a sharp corner 213 that is pointing away from the building 201 and diagonally upwards with respect to Figure 2B. The corners 211 and 212 of the L Shape of the support members 103 are designed to accommodate contours of the building (e.g. the corner 213 as in Figure 2B) to avoid obstructing the carrier 101 from moving through the opening 207 of the building 201 towards the retracted position. In addition, the corner 212 of one of the L shape of the support members 103 is designed as such to accommodate contours of the tube 203 to avoid obstructing the carrier 101 from moving through the opening 207 of the building 201 towards the retracted position. The displacement between the first end 105 and second end 107 of one support member, and the displacement between the first end 106 and the second end 108 of the other one support member may be in the range between 10 cm and 60 cm.

With reference to Figure 15, there is shown the cross sections of the carrier 101 and the base 102 when the carrier 101 is in the extended position. In the extended position, the carrier 101 comes into contact with the base 102 and engages it. The carrier 101 and the base 102 may have cross sections of the same type of shape. The shape could be a substantially inverted U shape. Other shapes are possible as long as the carrier 101 could engage the base 102 firmly. With such cross sections and arrangement, the carrier 101 engages the base 102 in the extended position to prevent unnecessary movement of the carrier 101 with respect to the base 102. It is appreciated that the cross sections of the carrier 101 and the base 102 may be of U shape, H shape, rectangular shape, square shape, circular shape or arcuate.

Figure 2D shows a perspective view of a part of the apparatus with a retaining mechanism. In Figure 2D, the carrier 101 and the base 102 are of the type described with reference to Figure 15. The tubular coupling 206 in Fig 2D is the same as that shown in Fig 2C. In greater

details, Figure 2D shows that the carrier 101 is in the process of moving towards the base 102. There is provided a wing nut 215 arranged to be placed adjacent to the cover 205 on the base 102. The base 102 includes an elongate aperture 216 located beneath the wing nut 215 for a threaded portion of the wing nut 215 to insert through. The size of the winged portion of the wing nut 215 is larger than the size of the elongate aperture 216 so that the winged portion cannot pass through the elongate aperture 216. The threaded portion of the wing nut 215 is arranged for fastening to a nut (not shown in Figure 2D) located on the side of the elongate aperture 216 that is opposite to the side where the winged portion of the wing nut 215 is located. More specifically, the nut is below the elongate aperture 216 in Figure 2D. When the wing nut 215 is not tightened, it is free to move along the elongate aperture 216. In this case, the carrier 101 has an elongate cut 214 located at an extreme end that is facing the cover 205 when the carrier 101 is in the extended position. The elongate cut 214 is configured to match a portion of the elongate aperture 216 when the carrier 101 engages the base 102 in the extended position.

Figure 2E shows the instance when the carrier 101 of Figure 2D has engaged the base 102. In this arrangement, the elongate cut 214 is located above the elongate aperture 216 and defining a common elongate space with the elongate aperture 216. The common elongate space is located at one end of the elongate aperture 216 away from the cover 205. To lock the carrier 101 to the base 102, the wing nut 215 is firstly moved along the elongate aperture 216 into the common elongate space followed by being tightened to the nut (not shown in Figure 2D and 2E) located on the other side of the elongate aperture 216 opposite to the winged portion of the wing nut 215. The wing nut 215 and the nut (not shown in Figure 2D and 2E) in which the threaded portion is fastened to, the elongate aperture 216 of the base 102 and the elongate cut 214 described with reference to Figures 2D and 2E could be said to be parts of a locking mechanism to lock the carrier 101 to the base 102 or a retaining mechanism to retain the carrier 101 in the extended position.

Figure 3 shows yet another example of the pole support assembly 109 of the apparatus 100 described with reference to previous figures. In Figure 3, the pole support assembly 109 is shown to comprise three bearings 301, 302 and 303, which are arranged for supporting the pole 104 and guiding the pole 104 (as shown in Fig 1A, not shown in Fig 3) to slide towards or away from the opening 207 of the building 201. It is appreciated that the pole support assembly 109 is not just limited to have three bearings. There could be one or more bearings rotatably mounted to the pole support assembly 109 located in strategic locations in order to guide the pole 104 to slide towards or away from the opening 207 of the building 201. In Figure 3, the first bearing 303 is coupled to the carrier 101 at the end of the carrier

101 furthest away from the opening 207 of the building 201 in the extended position. The second bearing 301 and the third bearing 302 are coupled to an extension 306 extending orthogonally from the carrier 101 in a skywards direction (noting that the apparatus is residing outside the building) or upwards direction with respect to Figure 3. The extension
5 306 is located closer to the end of the carrier 101 that is closer to the opening 207 of the building 201.

There are two further extensions 305 and 304 extending laterally from the extension 306. The extension 305 is extending from a lower half of the extension 306 that is closer to the carrier 101 and in a direction towards the building 201 when the carrier 101 is in the
10 extended position. The extension 304 is extending from an upper half of the extension 306 that is away from the carrier 101 and in a direction away from the building 201 when the carrier 101 is in the extended position. A first end of the extension 305 is mounted on the extension 306 and the second bearing 301 is mounted on a second end opposite to the first end of the extension 305. Similarly, a first end of the extension 304 is mounted on the
15 extension 306 and the third bearing 302 is mounted on a second end opposite to the first end of the extension 304.

The distance between the extensions 304 and 305 is sufficiently far apart so that all the three bearings 301, 302 and 303 are able to contact the pole (not shown in Figure 3 but
20 found as 104 in Figure 1A) when it is loaded. Hence, the pole (104 in Figure 1A) would be residing in the space that is between the second bearing 301 and the third bearing 302 and would be resting on the first bearing 303. As the bearings 301, 302 and 303 are essentially rollers rotatable about an axle configured with an indentation for receiving the pole 104, the bearings 301, 302 and 303 would be able to assist or guide the pole 104 to move towards or
25 away from the exterior wall 210 of the building 201. All the axes of rotation of the bearings 301, 302 and 303 are orthogonal to the longitudinal axis 307 of the pole 104.

It is appreciated that the configuration of the bearings in Figure 3 is not limited to the configuration as shown in Figure 3.

Figure 4A shows four drawings containing perspective views of four different configurations of the bearings on the pole support assembly 109 of the carrier 101 described with reference to previous figures.

With reference to Drawing 401, there is shown the pole support assembly 109 comprising two bearings 406 and 407, a folded bracket 404 and a pole rest, more specifically, a substantially U shaped rest 405 that are both coupled to the carrier 101. Each of the

bearings 406 and 407 comprises an indentation 408 configured for the pole (104 in Figure 1F; not shown in Figure 4A; hereinafter 104) to lean against. The indentation 408 may be configured to match contours of the pole 104 so as to assist the guiding for the pole 104 to slide towards or away from the opening (207 in Figures 2A and 2B; hereinafter 207) of the building (201 in Figures 2A and 2B; hereinafter 201). Also, the axes of rotation of the bearings 406 and 407 are orthogonal to the longitudinal axis 421 of the pole 104. The U shaped rest 405 is located on the carrier 101 at the end that is away from the opening 207 of the building 201 when the carrier 101 is in the extended position. The folded bracket 404 is located on the carrier 101 close to the other end that is nearer to the opening 207 of the building 201 when the carrier 101 is in the extended position.

The U shaped rest 405 has an opening 417 between two raised walls 416 (i.e. legs of the U shaped rest) extending from the U shaped rest 405 to allow the pole 104 to be placed into the U shaped rest 405 through the opening 417. The bearing 407 is located between the two legs of the U shape of the U shaped rest 405 and rotatably mounted to the U shaped rest 405. The bearing 407 is orientated such that the pole 104 can rest on the indentation 408 of the bearing 407. The distance between the two raised walls 416 is configured to be sufficiently larger than the outer diameter of the pole 104 such that the pole 104 should be able to slightly sway between the two raised walls 416.

The folded bracket 404 is folded from, in this case, a straight metal strip. A first portion 418 at one end of the metal strip is joined to the carrier 101. A second portion 419 opposite to the first portion 418 is folded to form an inverted U shape that has sharp corners instead of round corners. Only one of the legs of the inverted U shape i.e. the first portion 418 is coupled to the carrier 101. The folded bracket 404 is configured to form an opening 420 between the second portion 419 and the carrier 101 that is sufficiently large to allow the pole 104 to be placed into the folded bracket 404 sideways through the opening 420. The bearing 406 is located between the two legs of the U shape of the folded bracket 404 and rotatably mounted to the folded bracket 404. The bearing 406 is orientated such that the pole (104 can lean upwardly (or skywards) against the indentation 408 of the bearing 406.

To attach the pole 104 to the pole support assembly when the carrier 101 is in the retracted position, the pole 104 may first be placed onto the bearing 407 of the U shaped rest 405 through the opening 417, followed by placing the pole 104 into the folded bracket 404 sideways through the opening 420. Afterwards, the pole 104 may be slid lengthwise in the direction away from the building until the stopper (118 in Figure 1F; not shown in Figure 4A; hereinafter 118) contacts the folded bracket 404.

With reference to Drawing 402, there is shown the pole support assembly 109 comprising two pairs of bearings 411 and 412, and two folded brackets 409 and 410 that are both coupled to the carrier 101. Each of the two pairs of bearings 411 and 412 comprises an indentation 408 (only one indentation is pointed out in Drawing 402), like in the case of the bearings in drawing 401, which is configured for the pole (104 in Figure 1A; not shown in Figure 4A; hereinafter 104) to lean against. The indentation 408 may be configured to match contours of the pole 104 so as to assist the guiding for the pole 104 to slide towards or away from the opening (207 in Figures 2A and 2B; hereinafter 207) of the building (201 in Figures 2A and 2B; hereinafter 201). Also, the axes of rotation of each of the two pairs of bearings 411 and 412 are orthogonal to the longitudinal axis 422 of the pole 104. The folded bracket 410 is arranged at a location on the carrier 101 away from the opening 207 of the building 201. The folded bracket 409 is located closer to the opening 207 of the building 201.

Each of the folded brackets 409 and 410 is folded from, in this case, a straight metal strip. A first portion 425 identified as two separate ends of the metal strip is joined to the carrier 101. A second portion 424 identified as the middle portion of the metal strip is folded to form an inverted U shape that has sharp corners instead of round corners. In this case, the two legs of the inverted U shape i.e. the first portion 425, is coupled to the carrier 101. Each of the folded brackets 409 and 410 is configured to form an opening 420 (only one opening 420 is pointed out in Drawing 402) between the two legs of the inverted U shape that is sufficiently large to allow the pole 104 to be inserted into the folded bracket 409 or 410 through the opening 420. Each pair of the bearings 411 and 412 are located between the two legs of the U shape of the respective folded brackets 409 and 410. Each pair of the bearings 411 and 412 are also rotatably mounted to the folded bracket 409 and 410, respectively such that the pole 104 could be received between each pair of the bearings 411 and 412. In other words, the two bearings in each pair of two pairs of bearings 411 and 412 sandwiches the pole 104 between them. The pole 104 may be placed onto the pole support assembly 109 by inserting the pole 104 through the openings 420 such that the pole 104 is located between the two legs of the inverted U shape of the folded bracket 409 and sandwiched by the two bearings 411. Similarly, the pole 104 is also located between the two legs of the inverted U shape of the folded bracket 410 and sandwiched by the two bearings 412.

Drawing 403 has substantially the same pole support assembly 109 design as that of the apparatus 100 in Figure 3. In Drawing 403, the pole support assembly 109 is shown to comprise three bearings 414, which are arranged at the same locations as the three bearing 301, 302 and 303 in Figure 3. The difference between Drawing 403 and Figure 3 lies in how

the three bearings 414 are supported in their locations. In Drawing 403, the three bearings 414 are mounted on three separate extensions 413 extending skywards or upwardly from the carrier 101. Also, the axes of rotation of each of the three bearings 414 are orthogonal to the longitudinal axis 423 of the pole 104. While it is shown in Drawing 403 that the extensions 413 are all extending from the same side of the carrier 101, it is appreciated that there is no limitation that the extensions 413 must be extending from the same side of the carrier 101. One or more of the extensions 413 may be extending from the opposite side of the carrier 101. Alternatively, one pair of extensions extending skywards or upwardly from the carrier 101 may be arranged on different sides of the longitudinal axis 423 for supporting one bearing. That is, a first extension is located on a first side adjacent to the longitudinal axis 423 and the other extension is located on a side that is adjacent to the longitudinal axis 423 and opposite to the first extension. The two connecting ends of the axle of each bearing may be coupled to a pair of extensions.

With reference to Drawing 404, there is shown the pole support assembly 109 comprising three bearings 426, 427 and 428, a folded bracket 429 and a pole rest, more specifically, a substantially U shaped rest 430 that are both coupled to the carrier 101. Each of the bearings 426, 427 and 428 comprises an indentation 408 configured for the pole (104 in Figure 1F; not shown in Figure 4A; hereinafter 104) to lean against. The indentation 408 may be configured to match contours of the pole 104 so as to assist the guiding for the pole 104 to slide towards or away from the opening (207 in Figures 2A and 2B; hereinafter 207) of the building (201 in Figures 2A and 2B; hereinafter 201). Also, the axes of rotation of the bearings 426, 427 and 428 are orthogonal to the longitudinal axis 431 of the pole 104. The U shaped rest 430 is arranged at a location on the carrier 101 away from the opening 207 of the building 201. The folded bracket 429 is located closer to the opening 207 of the building 201.

The U shaped rest 430 has an opening 432 between two raised walls 433 (i.e. legs of the U shaped rest) extending from the U shaped rest 430 to allow the pole 104 to be placed into the U shaped rest 430 through the opening 432. The bearing 428 is located between the two legs of the U shape of the U shaped rest 430 and rotatably mounted to the U shaped rest 430. The bearing 428 is orientated such that the pole 104 can rest on the indentation 408 of the bearing 428.

The folded bracket 429 is folded from, in this case, a straight metal strip. A first portion 434 of the metal strip is folded to form a U shape, and the trough of the U shape of the first portion 434 is joined to the carrier 101. A second portion 435 opposite to the first portion 434

is folded to form an inverted U shape that has sharp corners instead of round corners. The folded bracket 429 is configured to form an opening 436 on one side between the first portion 434 and the second portion 435 that is sufficiently large to allow the pole 104 to be placed into the folded bracket 429 through the opening 436. The bearing 426 is located between the two legs of the inverted U shape of the second portion 435. The bearing 427 is located between the two legs of the U shape of the first portion 434. The bearings 426 and 427 are also rotatably mounted to the folded bracket 429 such that the pole 104 could be received between the bearings 426 and 427. In other words, the bearings 426 and 427 sandwich the pole 104 between them.

With reference to Figure 4B, there is shown a few exemplar features for a pole support assembly with different configurations of bearings mounted on a U shaped rest or a bracket. Some of the features and some of the configurations of bearings have been described with reference to the previous figures. It is appreciated that other similar variations or modifications to the features or configurations of the pole support assembly and the bearings are also possible. A pole support assembly may comprise at least one of such features or any combination of them.

It is appreciated that, where appropriate, the locking mechanisms described with reference to Figures 1D to 1H may be employed for securing the pole 104 in position in the examples of the pole support assembly 109 described with reference to Figures 3 and 4.

Figures 5 to 8 illustrate an example of the operation of the apparatus 100 described with reference to previous figures for moving away an object from the opening 207 of the building 201. The pole support assembly 109 design in this case is the same as that described with reference to Figure 3.

With reference to Figure 5, the carrier 101 is in the retracted position for loading an object on the carrier 101. In this case, the front end of the pole 161 is at a position sufficiently close to the opening 207 of the building 201 for a user to hang an object 501 on the pole 104 at the vicinity of the front end of the pole 161. Subsequently, the pole 104 may be pushed away from the exterior wall 210 of the building 201 for a short distance with the assistance of the bearings 301, 302 and 303. In this case, the object is a piece of laundry.

With reference to Figure 6, the pole 104 in Figure 5 has been pushed away for a short distance from the exterior wall 210 of the building 201 to allow for a second piece of laundry

503 to be hung on the pole 104 at a position that is adjacent to the first piece of laundry 501 and closer to the exterior wall 210 of the building 201.

With reference to Figure 7, the pole 104 in Figure 6 has been further pushed away for a short distance from the exterior wall 210 of the building 201 to allow for a third piece of laundry 504 to be hung on the pole 104 at a position that is adjacent to the second piece of the laundry 503 and closer to the exterior wall 210 of the building 201.

Figure 8 shows the scenario in Figure 7 after the laundries 501, 503 and 504 have been hung on the pole 104 and the carrier 101 has been moved from the retracted position to the extended position. With that, the laundry 501, 503 and 504 have been moved away from the opening 207 of the building 201 for drying outside the building 201. When the apparatus is in use, the back end of the pole 162 is closer than the front end 161 to the opening 207 of the building 201.

To unload the laundry 501, 503 and 504 from the carrier 101, the user moves the carrier 101 from the extended position to the retracted position. Thereafter, the user unloads the third piece of the laundry 504 from the pole 104 and pulls the pole 104 towards the exterior wall of the building 201 for a short distance with the assistance of the bearings 301, 302 and 303. The process of unloading laundry from the pole 104 and pulling the pole 104 towards the exterior wall of the building 201 can be repeated until the user has unloaded all the laundries 501, 503 and 504 from the pole 104.

The apparatus 100 described with reference to previous figures may comprise a biasing mechanism arranged for biasing the carrier 101 to move from the extended position to the retracted position so as to assist a user to move the carrier 101, which can be heavy due to the object(s) loaded on the carrier 101.

Figure 9 illustrates an example of the biasing mechanism mounted in the apparatus 100 described with reference to previous figures. In this case, the biasing mechanism is a torsion spring 905. With reference to Drawing 901 (side view of the location where the biasing mechanism 905 is located in the apparatus 100) and Drawing 902 (a zoomed in front view of the torsion spring 905), the torsion spring 905 is arranged at a joint 904 where one of the support members 103 that is located further away from the building (201 in Figure 2A; hereinafter 201) is pivotally mounted to the base 102. It is appreciated that the biasing mechanism 905 may also be located at other suitable joints of the apparatus 100 to achieve the effect of biasing the carrier 101 to move from the extended position to the retracted

position. The joint 904 is formed by joining an extension 908 extending from the base 102 and the second end 108 of the respective support member 103 with a shaft 909 arranged to insert through the extension 908 and the second end 108 of the respective support member 103. The shaft 909 may be riveted to secure the joint 904.

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With reference to Drawing 903, the torsion spring 905 is wound over the shaft 909 and is residing between the extension 908 and the second end 108 of the respective support member 103. A first end 906 of the torsion spring 905 is arranged to cling on the extension 908. A second end 907 of the torsion spring 905 is arranged to cling on the respective support member 103. When the carrier 101 is moved towards the extended position, the respective support member 103 rotates relative to the extension 908 to cause the torsion spring 905 to be in a twisted state (stored energy state). In the twisted state, the torsion spring 905 is capable of providing a force for moving the carrier 101 from the extended position to the retracted position. The force provided by the twisted torsion spring 905 may be designed to be equal or less than the weight of the carrier 101 so that the carrier 101 may fully assume the extended position without rebound.

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With the use of the torsion spring 905, it becomes lighter to move the carrier 101 from the extended position to the retracted position. The force applied by a user to move the carrier 101 from the extended position to the retracted position is joined by the force provided by the twisted torsion spring 905. Therefore, less strength is required from the user to move the carrier 101 from the extended position to the retracted position.

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Alternatively, the biasing mechanism may be a counterweight. With reference to Figure 10, one of the support members 103 has an extension 1002 at the location close to the second end 108 that is extending towards the building (201 in Figure 2A; hereinafter 201). A counterweight 1001, which is in the form of a sphere (other shapes are also possible) in this case, is coupled to the extension 1002. In more detail, the counterweight 1001 and the extension 1002 are arranged beneath a joint 1004 where one of the support members 103 (i.e. the second end 108) is pivotally mounted to the base 102. One end of the extension 1002 is coupled to one of the support members 103 and the counterweight 1001 is mounted to the end of the extension 1002 opposite to the end coupled to the respective support member 103. With such an arrangement, the counterweight 1001 and the carrier 101 are residing on opposite sides of the joint 1004 when the carrier 101 is in the extended position. The counterweight may be a relatively heavy object of a certain weight that is sufficient to provide a mechanical advantage for biasing the carrier 101 in moving from the extended position to the retracted position. When the user moves the carrier 101 from the extended

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position to the retracted position in an anti-clock wise direction as illustrated by arrow 1005, the counterweight 1001, under gravity, would also move in the same direction as illustrated by arrow 1006. Therefore, the weight of the counterweight 1001 would assist and provide the bias for the carrier 101 to move from the extended position to the retracted position.

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The apparatus 100 described with reference to previous figures may comprise a retaining mechanism for retaining the carrier 101 in the retracted position.

Figure 11 illustrates an example of the retaining mechanism 1100 through various drawings.

10 Drawing 1101 shows a side view of the apparatus 100 with the retaining mechanism 1100 circled out. Drawing 1102 shows a zoomed in front view of the retaining mechanism 1100 to reveal greater details. Drawing 1103 shows a see through and zoomed in rear view of the retaining mechanism 1100 in a first position 1112. Drawing 1104 shows a see through and zoomed in rear view of the retaining mechanism 1100 prior to operation. Drawing 1105
15 shows a see through and zoomed in rear view of the retaining mechanism 1100 in a second position 1115.

With reference to all of the Drawings 1101, 1102, 1103, 1104 and 1105, the base 102 has an extension 1109 extending downwardly (with respect to Figure 11) from the base 102. The
20 second end 108 of one of the support members 103 is joined to the extension 1109 to form a joint 1110. The extension 1109 is coupled to a locking plate 1106. A first end of the locking plate 1106 is pivotally mounted to the extension 1109 at a joint 1108. A second end of the locking plate 1106 opposite to the first end of the locking plate 1106 comprises an opening 1107. Along the respective support member 103 referred in Figure 11, there is a protrusion
25 1105 located close to the joint 1110 that is configured to move into the opening 1107 of the locking plate 1106. It is appreciated that the retaining mechanism 1100 may be arranged at either joint of the carrier 101 e.g. at the first end 105 or 106 and/or the second end 107 or 108 of each of the support members 103, which are coupled to the carrier 101 and the base 102 respectively.

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With reference to Drawing 1103, when the carrier 101 is away from the retracted position, the locking plate 1106 is at the first position 1112 for receiving the protrusion 1105. In Figure 1103, the locking plate 1106 is engaged to a biasing mechanism such as a V shaped spring 1111. The V shaped spring 1111 could be a metal wire. In the first position 1112, a first end
35 1113 of the V shaped spring 1111 is arranged to cling on the locking plate 1106 and a second end 1114 of the V shaped spring 1111 is arranged to cling on the extension 1109.

When the locking plate 1106 is in the first position 1112, the V shaped spring 1111 is in a relaxed state.

Drawing 1104 illustrates the continued movement of the locking plate 1106 from the first position 1112 described with reference to Drawing 1103. In Drawing 1104, the carrier 101 is moving into the retracted position. As a result, the respective support member 103 referred in Figure 11 will move. When the locking plate 1106 is in the position as shown in Drawing 1104, the V shaped spring 1111 is still in a relaxed state. However, as the carrier 101 is moved further into the retracted position, the protrusion 1105 will begin to enter the opening 1107 of the locking plate 1106 and push the locking plate 1106 to pivot about the joint 1108 as the protrusion 1105 is moved further into the opening 1107. The spring 1111 is compressed as the protrusion 1105 is pushing the locking plate 1106 and moving further into the opening 1107. As the spring 1111 is compressed, the angle formed by the V shape of the spring 1111 is reduced. The force exerted by the spring 1111 creates a resisting force against the movement of the carrier 101 when the carrier 101 is in the process of moving from the extended position to the retracted position. The maximum stored energy of the spring 1111 is reached midway in the movement of the carrier 101 from the extended position to the retracted position, vice versa. In other words, the spring 1111 is most compressed when the carrier 101 is somewhere between the extended position and the retracted position. When the carrier 101 is moving either from the extended position to the retracted position or from the retracted position to the extended position, the V shaped spring 1111 is first compressed and subsequently relaxed.

Drawing 1105 illustrates the final position of the locking plate 1106 after it is moved from the position described with reference to Drawing 1104. In Drawing 1105, the carrier 101 has reached the retracted position. The locking plate 1106 has moved to the second position 1115 where the protrusion 1105 is fully slotted into the opening 1107 of the locking plate 1106. In the second position 1115, the V shaped spring 1111 is in a relaxed state and there will be resistance from the V shaped spring 1111 if the carrier 101 is attempted to be moved from the retracted position to the extended position. The resistance helps to retain the carrier 101 in the retracted position. A pushing strength greater than the resisting force of V shaped spring 1111 is required from the user in order to move the carrier 101 from the retracted position to the extended position.

It is appreciated that the locking of the carrier 101 in the retracted position by using the V shaped spring 1111 and the locking plate 1106 is releasable. It does not require additional interaction with the locking mechanism to release the locking. To release the locking of the

carrier 101 in the retracted position, the carrier 101 just needs to be moved by a pushing force from the retracted position to the extended position that is sufficient to overcome the resisting force of V shaped spring 1111.

5 Alternatively, the retaining mechanism may comprise a locking nut or bolt, or other fasteners, configured to tighten one or more joints connecting the support members 103 and the carrier 101 or base 102. With reference to Figure 12, a locking nut 1201 (may be a wing nut) is provided at a joint 1202 where one of the support members 103 is pivotally mounted to the carrier 101. The locking nut 1201 is configured to be tightened to lock the movement of the
10 respective support member 103 relative to the carrier 101 when the carrier 101 is in the retracted position. Accordingly the carrier 101 would be locked in the retracted position and would be unable to move relative to the base 102. With the carrier 101 locked in the retracted position, it would facilitate the user to load object(s) on the carrier 101 or to unload object(s) from the carrier 101. After loading/unloading of object(s), the locking nut may be
15 loosened so that the carrier 101 can be moved relative to the base 102.

Figures 13A and 13B illustrates another example of the apparatus having a cover on the base 102, with its carrier 101 in the retracted position (Fig 13A) and the extended position (Fig 13B), respectively. With reference to Figures 13A and 13B, the pole support assembly
20 109 comprises a folded bracket 1301 and a pole rest, more specifically, a U shaped rest 1304 that are both coupled to the carrier 101. The U shaped rest 1304 is arranged on the carrier 101 at the end that is away from the opening of the building (to the left of Fig 13A, not shown in Fig 13A and 13B) when the carrier 101 is in the extended position. The folded bracket 1301 is located on the carrier 101 close to the other end that is nearer to the opening
25 of the building when the carrier 101 is in the extended position.

The U shaped rest 1304 is the same as the U shaped rest 131 in Figure 1B.

The folded bracket 1301 is folded from, in this case, a straight metal strip. A first portion
30 1306 at one end of the metal strip is joined to the carrier 101. A second portion 1305 opposite to the first portion 1306 is folded to form a circular arc. The folded bracket 1301 has a substantially inverted J shape cross section. It is configured to form an opening 1307 in Figure 13B between the second portion 1305 and the carrier 101 that is sufficiently large to allow the pole (104 in Figure 1E; not shown in Figure 13A and 13B; hereinafter 104) to be
35 placed into the folded bracket 1301 sideways through the opening 1307. The concave side of the substantially inverted J shaped cross section of the folded bracket 1301 is facing the opening 1307.

In Figures 13A and 13B, the base 102 further comprises a cover 1302 extending upwardly (in the direction of the carrier 101) from the base 102. Drawing 1300 shows a cross sectional view of the circled portion in Fig 13A. For this instance, the cover 1302 has a substantially asymmetric U shaped cross section. The shorter side 1310 of the asymmetric U shape of the cover 1302 is joined to the base 102, with the remaining portion of the cover 1302 slightly away from the base 102. Therefore, the cover 1302 will not obstruct the carrier 101 from moving into the extended position. The cover 1302 is arranged to be on the side of the longitudinal axis 1303 of the base 102 that is opposite to the side that the first portion 1306 of the folded bracket 1301 is on. To block the opening 1307, the cover 1302 may be so positioned on the base 102 that it would be substantially opposite to the folded bracket 1301 when the carrier 101 is in the extended position. Such arrangement deliberately causes the pole 104 to reside between the folded bracket 1301 and the cover 1302 when the carrier 101 is in the extended position, so as to prevent the pole from accidentally moving sideways out of the folded bracket 1301. It is appreciated that the cover 1302 may be positioned anywhere on the base 102 as long as it would be able to obstruct the pole 104 from moving sideways out of the folded bracket 1301.

It is envisaged that more than one of the apparatus 100 may be arranged adjacent to one another for disposing one object or a plurality of objects from the opening 207 of the building 201. In such a scenario, the carrier 101 or the bases 102 of the more than one apparatuses may be coupled to one another. With reference to Figure 14, there is shown one example of modification that could be made to all the apparatuses for them to be coupled to one another. The modification is that the base 102 comprises an extension 1401 with an aperture 1402. The aperture 1402 is configured to allow a connecting shaft (not shown in Figure 14) to pass through the same apertures 1402 of all apparatuses to join them together. Alternatively, the aperture 1402 may be made directly on the base 102 at the end closer to the building, allowing the connecting shaft passing through it to join all the apparatuses together. One advantage of joining more than one apparatuses together is that if any one of the apparatuses incidentally dismounts from the exterior wall of the building (not shown in Figure 14), the dismounted apparatus would not fall to the ground as it is joined with adjacent apparatuses. It is appreciated that each apparatus may comprise more than one extension for coupling the apparatus to adjacent apparatuses. The connecting shaft may alternatively be welded or secured by fasteners to each extension 1401 of the apparatuses, instead of passing through the aperture 1402. It is appreciated that the extension 1401 may also be used for connecting the apparatus to a fixed hardware to provide further security, and the aperture 1402 may not be necessary for connecting the apparatus to adjacent ones or other

hardware through the extension 1401. It is appreciated that other suitable methods of coupling the more than one apparatuses together may also be employed.

Another advantage of joining more than one apparatuses together is the improved capability for disposing objects that are much heavier than the usual laundry. With reference to Figure 16, there are shown two apparatuses which are similar to the one shown in Fig 1B except the pole support assemblies are not comprised. The carriers 101 of the two apparatuses are connected by at least one solid carrier connecting bar 1601 that is welded or firmly mounted to the carriers 101. The bases 102 of the two apparatuses are connected by at least one solid base connecting bar 1602 that is welded or firmly mounted to the bases 102. Therefore, the joined carriers 101 may move together between the retracted position and the extended position relative to the joined bases 102. So joined apparatuses may be used for disposing heavy object(s) other than the usual laundry. It is appreciated that more than two apparatuses may be coupled together in similar ways.

The apparatus 100 may be made of a stiff material such as, for example, aluminium, aluminium alloy, steel, stainless steel, carbon fibre composite material and the like.

Many modifications and other examples can be made to the apparatus for disposing an object from an opening of a building by those skilled in the art having the understanding of the above described disclosure together with the drawings. Therefore, it is to be understood that the apparatus for disposing an object from an opening of a building is not to be limited to the above description contained herein only, and that possible modifications are to be included in the claims of the disclosure.

CLAIMS

- 5 1. An apparatus for disposing an object from an opening of a building, the apparatus comprising:
- a carrier for holding the object;
a support assembly; and
a base,
- 10 wherein the support assembly couples the carrier to the base such that the carrier is movable relative to the base between a retracted position where the carrier is accessible for placing the object on the carrier from the opening, and an extended position where the carrier is moved away from the opening, and
- the base is mounted on an exterior wall of the building facing the carrier when the carrier is in the extended position.
- 15 2. The apparatus as claimed in claim 1, wherein the support assembly comprises at least two support members spaced apart from one another for coupling the carrier to the base, each of the support members having a first end pivotally mounted to the carrier and a second end pivotally mounted to the base.
- 20 3. The apparatus as claimed in claims 1 or 2, wherein the carrier comprises a pole for hanging or attaching the object.
4. The apparatus as claimed in any one of the preceding claims, wherein the base is
- 25 mounted on a hollow cylinder located on the exterior wall of the building.
5. The apparatus as claimed in claim 4, wherein the base comprises a tubular coupling and the tubular coupling comprises a first end configured for engaging the hollow cylinder to mount the base on the exterior wall of the building.
- 30 6. The apparatus as claimed in claim 5, wherein the tubular coupling comprises a second end opposite to the first end and the second end is covered.
- 35 7. The apparatus as claimed in claim 2, wherein each of the at least two support members is configured to accommodate contours of the building in the vicinity of the opening to

avoid obstructing the carrier from moving through the opening of the building when the carrier is moving towards the retracted position.

- 5 8. The apparatus as claimed in claim 2, wherein the carrier and the base are substantially parallel to each other lengthwise.
9. The apparatus as claimed in claim 2, wherein the displacement between the first end and the second end of each of the at least two support members is in the range between
10 10 cm and 60 cm.
10. The apparatus as claimed in claim 3, wherein the carrier comprises a pole support assembly for holding the pole.
- 15 11. The apparatus as claimed in claim 10, wherein the pole held by the pole support assembly comprises a stopper located at one end of the pole which is closer to the building when the pole is placed on the carrier, for preventing the pole from sliding out of the pole support assembly by obstructing movement of the pole when the pole is sliding in a direction away from the opening of the building.
- 20 12. The apparatus as claimed in claims 10 or 11, wherein the pole support assembly comprises a locking mechanism for locking movement of the pole with respect to the carrier.
- 25 13. The apparatus as claimed in claim 12, wherein the locking mechanism comprises a locking member and the locking member is configured to extend into a hole located on the pole to obstruct the pole from moving away from the opening of the building.
- 30 14. The apparatus as claimed in any one of claims 10 to 13, wherein the pole support assembly comprises a surface with low friction that makes contact with the pole to assist the pole to move towards or away from the opening of the building.
- 35 15. The apparatus as claimed in any one of claims 10 to 14, wherein the pole support assembly comprises at least one bracket formed with an opening for receiving the pole such that the pole resides between the walls of the bracket.

16. The apparatus as claimed in any one of claims 10 to 15, wherein the pole support assembly comprises at least one pole rest with two raised walls extending from the pole rest for resting the pole between the raised walls.
- 5 17. The apparatus as claimed in claim 15, wherein the carrier comprises a cover adjustable to cover the opening of the bracket to prevent the pole from moving out of the bracket through the opening of the bracket.
- 10 18. The apparatus as claimed in claim 15, wherein the base comprises a cover arranged to prevent the pole from moving out of the bracket through the opening of the bracket when the carrier is in the extended position.
- 15 19. The apparatus as claimed in any one of claims 10 to 18, wherein the carrier comprises one or more bearings arranged for guiding the pole to slide towards or away from the opening of the building.
- 20 20. The apparatus as claimed in claim 19, wherein at least one of the bearing comprises an indentation configured for the pole to lean against so as to assist the guiding for the pole to slide towards or away from the opening of the building.
- 25 21. The apparatus as claimed in claims 19 or 20, wherein the pole support assembly comprises an extension extending from the pole support assembly and the one or more bearings are mounted to the extension.
- 30 22. The apparatus as claimed in any one of the preceding claims, wherein the carrier comprises an extension extending from the carrier and the one or more bearings are mounted to the extension.
- 35 23. The apparatus as claimed in any one of the preceding claims, wherein the apparatus comprises a biasing mechanism arranged for biasing the carrier to move from the extended position to the retracted position.
24. The apparatus as claimed in any one of the preceding claims, wherein the apparatus comprises a retaining mechanism for retaining the carrier in the retracted position.

25. The apparatus as claimed in any one of the preceding claims, wherein the apparatus comprises a retaining mechanism for retaining the carrier in the extended position.

26. The apparatus as claimed in any one of the preceding claims, wherein the carrier and the base are configured to engage each other to prevent movement of the carrier with respect to the base in the extended position.

27. The apparatus as claimed in any one of the preceding claims, wherein the apparatus is made of a material selected from aluminium, aluminium alloy, steel, stainless steel, or carbon fibre composite material.

28. The apparatus as claimed in any one of the preceding claims, wherein the base of the apparatus comprises at least one extension for connecting the apparatus to an adjacent apparatus or additional hardware.

29. An apparatus for disposing one object or a plurality of objects from an opening of a building, the apparatus comprising more than one of the apparatuses as claimed in any one of the preceding claims arranged adjacent to one another.

30. The apparatus as claimed in claim 29, wherein the bases or the carriers of the more than one apparatuses are coupled to one another.