

Nov. 3, 1964

J. W. KAPPEN
MULTIPLE PURPOSE DOOR

3,155,203

Filed Nov. 28, 1961

3 Sheets-Sheet 1

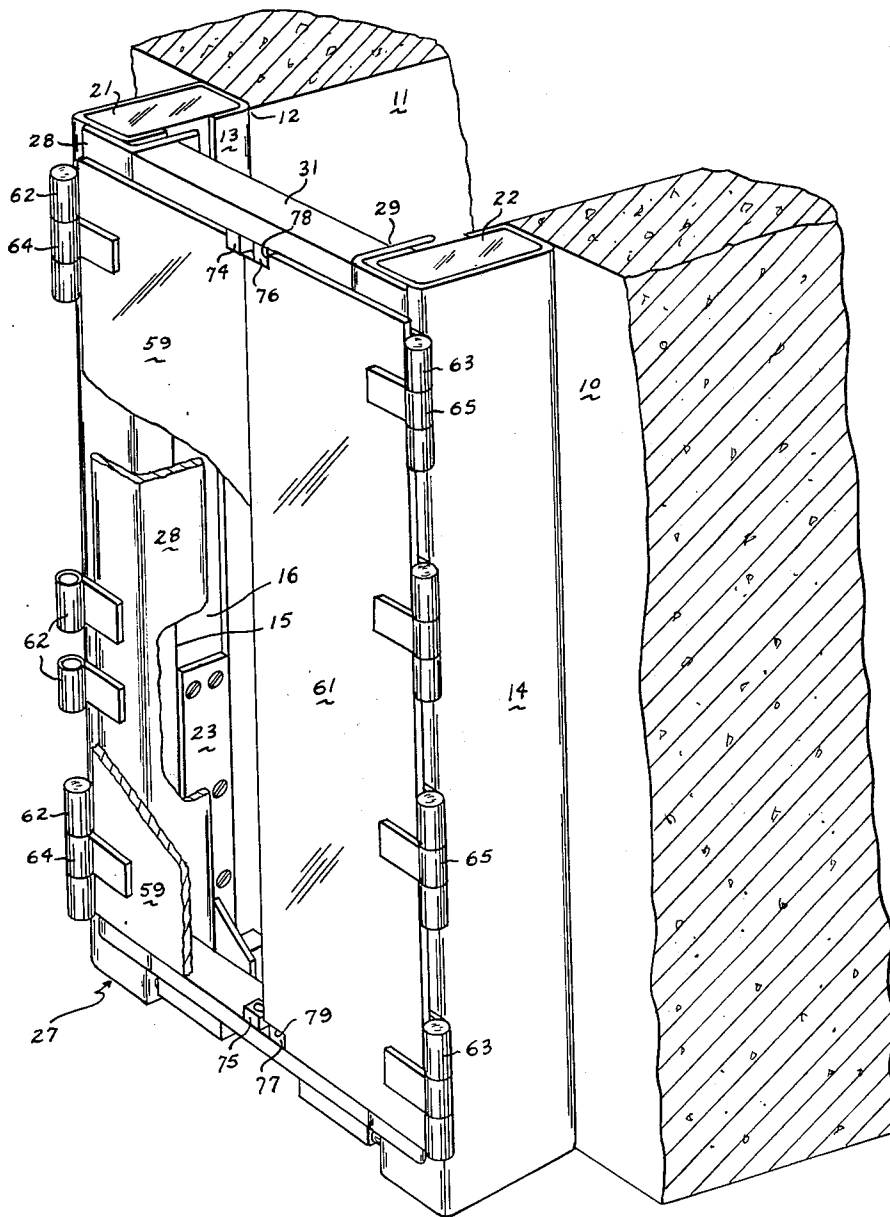


Fig-1

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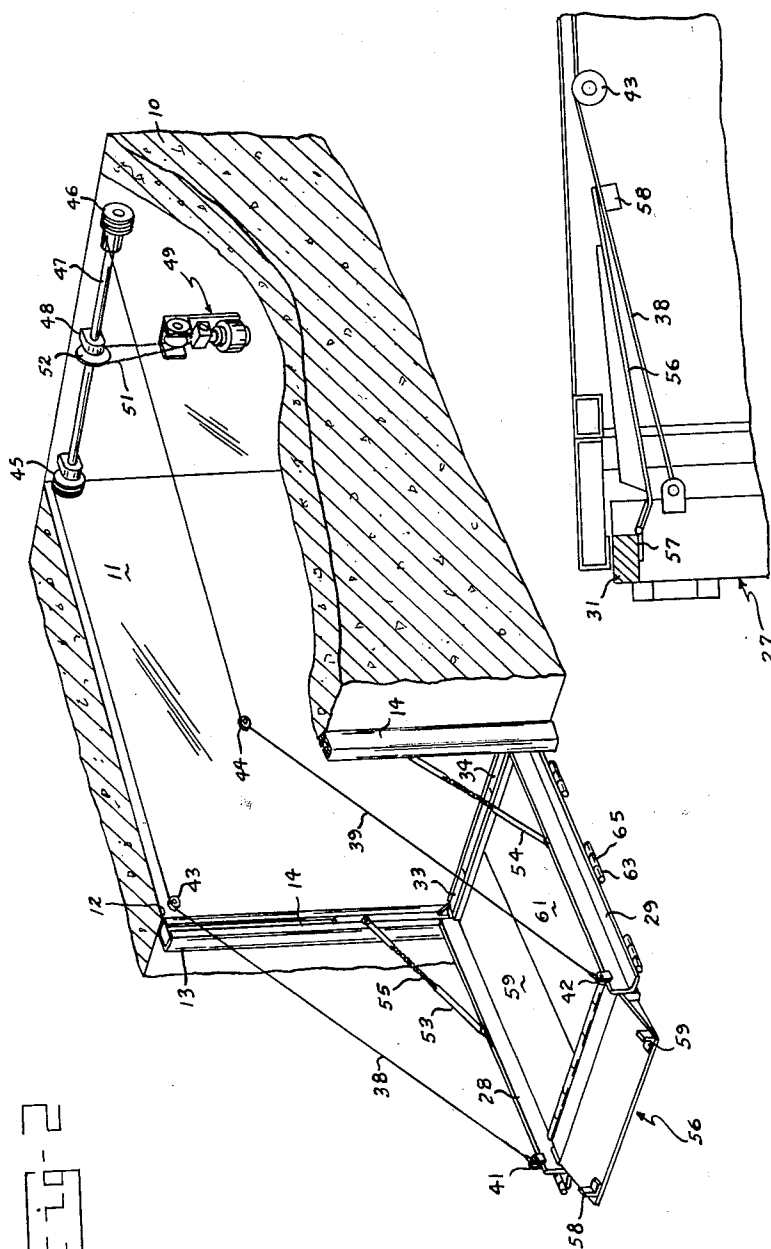
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3 Sheets-Sheet 2



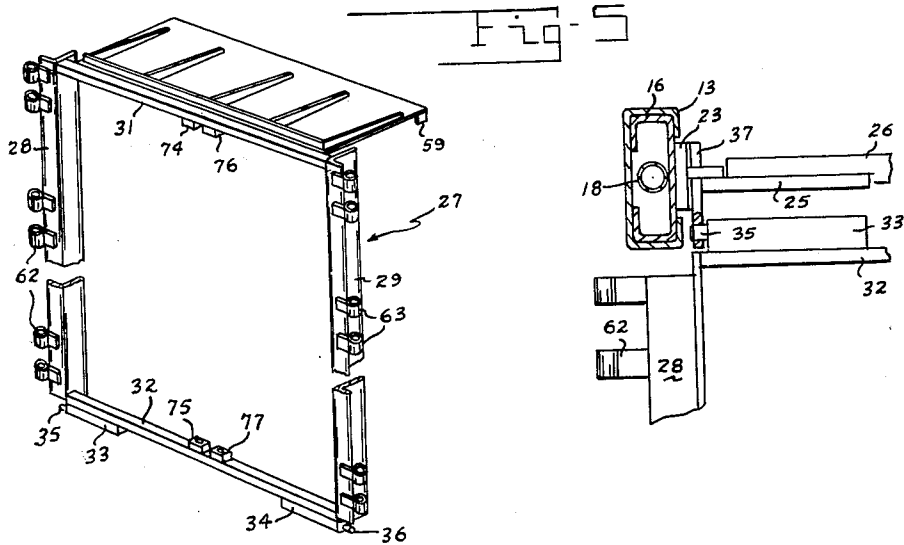
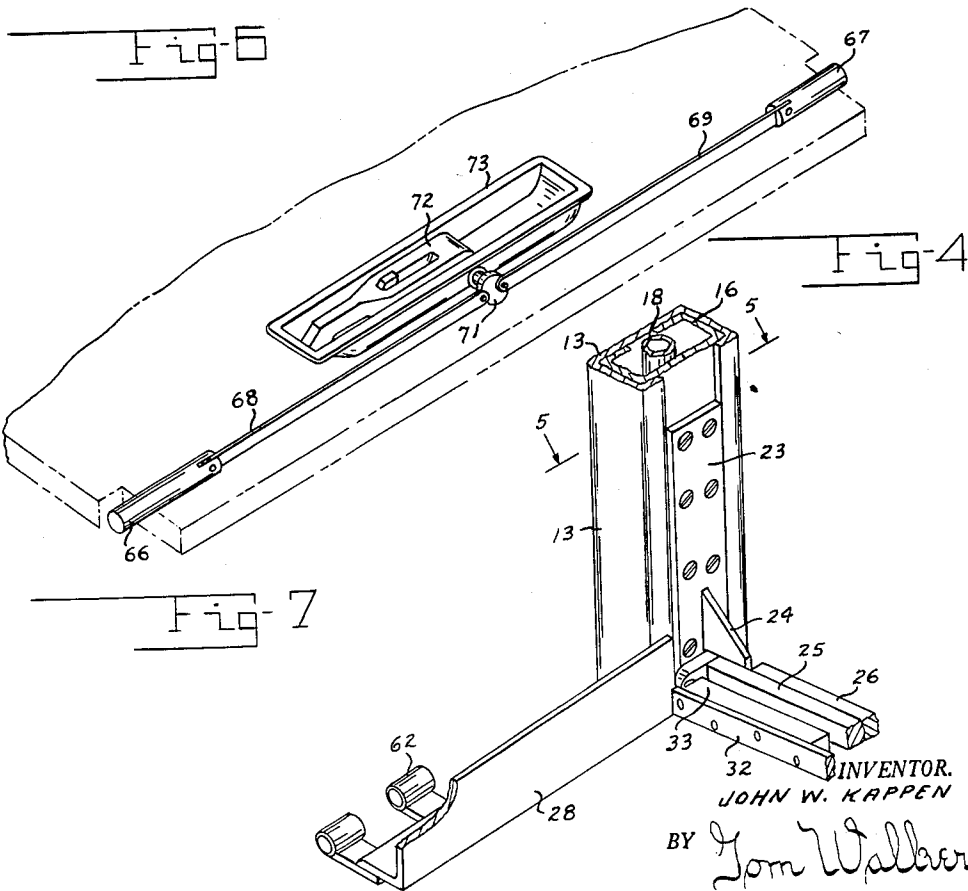
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1

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MULTIPLE PURPOSE DOOR

John W. Kappen, 243 Kenwood Ave., Dayton, Ohio;
Frieda E. Kappen, administratrix of the estate of said
John W. Kappen, also known as Jno. W. Kappen,
deceased

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5 Claims. (Cl. 189-46)

This invention relates to multiple purpose closures, having particular although not limited reference to the material handling art.

The object of the invention is to simplify the construction as well as the means and mode of operation of multiple purpose closures, whereby such closures may not only be economically manufactured, but will be more efficient and satisfactory in use, adaptable to a wide variety of applications, and be unlikely to get out of order.

A further object of the invention is to provide a device which while retaining a connected relation to a supporting structure may serve selectively as an access door to such structure, or as a bridge or ramp thereto and as a platform capable of being raised and lowered by elevator means.

Another object of the invention is to provide a device as described of general utility, applicable to a variety of structures and carriers, for example loading docks and ware houses, truck trailers, railroad cars, aircraft and the like.

A further object of the invention is to provide a closure device as described featuring door means having a conventional construction and mode of operation when used for closure and access and serving as the floor of the ramp or platform in a converted position of the device.

Still another object of the invention is to adapt the closure device for facile connection to and operation by elevator apparatus of a kind adapted for carrier mountings.

A further object of the invention is to provide a multiple purpose closure possessing the advantageous structural features, the inherent meritorious characteristics and the mode of operation herein mentioned.

With the above and other incidental objects in view as will more fully appear in the specification, the invention intended to be protected by Letters Patent consists of the features of construction, the parts and combinations thereof, and the mode of operation as hereinafter described or illustrated in the accompanying drawings, or their equivalents.

Referring to the accompanying drawing wherein is shown one but obviously not necessarily the only form of embodiment of the invention,

FIG. 1 is a view in perspective showing a device in accordance with the illustrated embodiment of the invention installed on a building structure with the device adjusted to serve as an access door;

FIG. 2 is a view similar to FIG. 1, showing the device adjusted to serve as a ramp or platform and showing further operating means for effecting and controlling pivotal adjustment of the device;

FIG. 3 is a detail view, partly in cross-section, showing how a ramp extension of the device is stored when not in use;

FIG. 4 is a detail view in perspective showing how the device is connected to elevator apparatus for raising and lowering thereof;

FIG. 5 is a view in cross-section, taken substantially along the line 5-5 of FIG. 4;

FIG. 6 is a detail view in perspective of a sub-assembly comprising a frame and attached ramp extension; and

2

FIG. 7 is a fragmentary view in perspective showing a latch mechanism installed in the door means in order selectively to lock the doors to the frame.

Like parts are indicated by similar characters of reference throughout the several views.

Referring to the drawings, the device is for illustrative purposes shown as incorporated in a building structure 10 providing an interior enclosure 11 to which access is gained by an opening 12. The structure 10, which may be a warehouse or the like, is representative only since, as noted, the invention is applicable also to truck trailers, railroad cars and the like and the opening 12 might in these instances be either at the end of the carrier or on the side thereof.

The opening 12 is considered as being above floor or ground level. It has side margins and along such margins in opposing relation to one another are vertical masts 13 and 14. Fixed to the structure 10 in any convenient manner, the masts 13 and 14 are formed to an elongated tubular shape and along sides facing one another are formed with open slots 15 of longitudinal extent. Slidably received in the stationary masts 13 and 14 are respective movable masts 16 and 17. The latter are telescopically mounted in their respective stationary masts and are similarly formed but occupy an inverted position in such manner as to present a closed side to the slotted portion 15 of the stationary mast. Extending upward through the bottom of the telescoping mast assemblies are respective posts 18 and 19 engageable with upper closed surfaces 21 and 22 of the inner masts 16 and 17. Joined together in a common hydraulic actuating system (not shown) the posts 18 and 19 are adapted vertically to be extended and retracted, and, by virtue of their engagement with surfaces 21 and 22, to effect corresponding raising and lowering motions of the inner masts 16 and 17. Each inner mast has secured to its outwardly facing closed side a plate 23. Stationed near the lower end of the mast assembly, the plate 23 is received in slot 15 and is connected to its corresponding element on the other mast assembly through means including an angle piece 24 and an adjustable cross-bar assembly comprising parts 25 and 26. The described cross-bar and angle piece assembly functions positively to interconnect the movable masts of the two mast assemblies whereby the two may more readily move in a stable manner and to corresponding extents.

In accordance with the instant inventive concept the described elevator means provides a mounting for a multiple purpose door assembly including a frame 27 (see also FIG. 6). The frame 27 is rectangular in form, having marginal side members 28 and 29 and interconnecting cross-bar portions 31 and 32 at the top and bottom respectively. On the underside of bottom cross-bar 32 are laterally spaced apart mounting blocks 33 and 34 formed at their respective outer ends with trunnions 35 and 36. As shown in FIG. 5 trunnion 35 is rotatably received in an opening in an arm 36 secured to the plate 23 on movable mast member 16. Trunnion 36 is mounted in a like manner in a similar arm secured to the plate 23 on movable mast 17. In accordance with this construction and arrangement of parts, therefore, the frame 27 is supported at its lower end by the elevator apparatus, or more particularly by the movable mast means thereof, in such manner that it may not only be raised and lowered in unison with the movable mast means but may be rocked relatively thereto outwardly and downwardly about the axis of the trunnions 35-36 and away from the structure 10.

Controlling the movements of the frame are cables 38 and 39 (FIG. 2) attached at their one ends to anchor brackets 41 and 42 on respective side members 28 and 29 of the frame near the upper ends thereof. The cables 38 and 39 extend rearwardly into enclosure 11 over

3

mounted pulleys 43 and 44 the opposite ends of the cables 38 and 39 extend to the rear of enclosure 11 where they are wound upon respective drums 45 and 46 on the end of a shaft 47 mounted by a bracket 48 to the rear wall of enclosure 11. Electromotive or like means 49 similarly is mounted on the rear wall of enclosure 11 and is connected in rotary driving relation to shaft 47 by means of a chain 51 and sprocket 52. According to the construction and arrangement of parts the electromotive means 49 may be energized to wind the cables 38 and 39 on the drums 45 and 46 whereupon the outer ends of the cables pull upon the frame 27 and effect an upward and inward rocking motion thereof, as for example from the position shown in FIG. 2 to a position as shown in FIG. 1. Similarly, upon being released for motion in an opposing sense, the frame 27 may rock under control of the cables 38 and 39 outwardly and downwardly from a position as shown in FIG. 1 to a position as shown in FIG. 2. The motive means 49 may be reversible to effect a powered playing out of the cables 38 and 39 in the lowering of the frame as well as a powered lifting thereof. Tie members 53 and 54, each incorporating a flexible chain link portion 55, may be interposed between the respective sides of the frame 27 and the aforementioned plates 23 on movable masts 16 and 17 in order positively to limit outward motion of the frame 27 and in so doing to limit the supporting load placed on the cables 38 and 39.

As shown also in FIGS. 2 and 3, an extension member 56 is pivotally connected to the top cross-bar 31 of the frame 27, as by being connected thereto through a hinge 57. In an upright position of the frame the extension 56 projects into enclosure 11 below the ceiling thereof and rests on the cables 38 and 39, guided by lugs 58 and 59 thereon. Upon outward rocking motion of the frame to a position as shown in FIG. 2, however, the extension 56 may similarly be rocked or folded about the top cross-bar 31 coming to rest thereon and inclining outwardly and downwardly therefrom.

The marginal sides 28 and 29 of the frame 27 have in cross-section a right angle configuration. They are, moreover, oppositely disposed relative to one another so that what may be considered the interior angle portion faces outwardly to either side of the frame. As such, the interior angle portions of such marginal sides achieve a complementary relationship to the stationary masts 13 and 14, one portion of each side member extending inwardly between the mast assemblies and the other being adapted to limit against the outward face of the mast assemblies in a manner to define a limit of upward and inward movement of the frame. So positioned, and in accordance with the hydraulic adjustment of the posts 18 and 19 of the elevator apparatus, the frame may occupy an aligned superposed position with respect to opening 12 of enclosure 11. Door means carried by the frame provides for a controlled access to the enclosure through the frame and through opening 12. While the door means may assume different forms it is in the illustrated instance comprised of a pair of doors 59 and 61 installed in the frame in a manner selectively to close the space defined by the margins of the frame. On the outwardly facing surface of frame margin 28 are longitudinally spaced hinge elements 62. On the corresponding face of side margin 29 are like hinge elements 63. The door 59 has on what may be considered its outer side edge hinge elements 63 adapted to interfit with and to be pinned to the hinge elements 62. Like hinge elements 64 are secured to the outer side edge of door 61 and are interengaged with frame hinge elements 63. The doors 59 and 61 are constructed to encompass substantially the whole of the frame 27 from top to bottom thereof and their inner side edges are adapted when swung inwardly to lie in substantially contacting adjacent relation to one another in an intermediate position between the sides 28 and 29. With the doors so positioned the space through frame 27 is closed. Rocking the doors

4

outwardly on the described hinge connections opens the door assembly for free access to and from the enclosure 11.

In a closed position the doors 59 and 61 occupy a common plane substantially within or adjacent to the frame 27. Outer side edges of the doors, as shown in FIG. 1 substantially abut the ends of hinge elements 62 and 63 while the doors themselves lie flush against the side margins 28 and 29. The doors are adapted to be locked in a closed position, and to that end each have pins 66 and 67 projecting from their upper and lower ends near the inner side edge thereof. The pins 66 and 67 are connected by links 68 and 69 to an eccentric 71. The eccentric 71 is selectively turned by means 72 mounted in a latch plate 73 and accessible from outside the door, the assembly comprising parts 66-73 being wholly contained within and movable with its respective door. Depending upon the direction of such turning motion the eccentric 71 either retracts the links 68 and 69 or extends them, accomplishing thereby locking and releasing motions of the pins relative to keepers 74-75 and 76-77 fixed to top and bottom cross-bars 31 and 32 of the frame. Top and bottom corners of each door are formed with respective cut outs 78 and 79 to clear the frame mounted keepers and allow the latch pins 66 and 67 access thereto.

As will be understood from the foregoing, the door assembly has multiple positions of adjustment and multiple purposes. With the parts positioned as shown in FIG. 1, wherein the frame 27 and its supported door means are folded to an upright position against masts 13 and 14, the assembly may function as a conventional door. Thus it provides access as required to the enclosure 11 and serves as a closure for opening 12 when no access is desired. Alternatively, and as let down by the cables 38 and 39 to a position substantially as shown in FIG. 2, the door assembly becomes a ramp or platform the floor of which is defined by the closed doors 59 and 61. In a let down or unfolded position the door assembly may serve varied purposes, for example as a bridge to a loading dock, an inclined ramp or as an elevator platform. In the latter use the door assembly is rocked outward to a generally horizontal position and then under actuation of the elevator apparatus is moved alternately between floor or ground level and the lower level of opening 12. Loading or unloading of enclosure 11 may thus proceed in an expedited manner. When finished, the door assembly is returned to its upright position, stowed for subsequent reuse and in the interim serving as a conventional access door.

The frame extension member 56 serves as a ramp facilitating movement of hand trucks and the like on to and off of the door assembly in its platform or ramp use.

From the above description it will be apparent that there is thus provided a device of the character described possessing the particular features of advantage before enumerated as desirable, but which obviously is susceptible of modification in its form, proportions, detail construction and arrangement of parts without departing from the principle involved or sacrificing any of its advantages.

While in order to comply with the statute the invention has been described in language more or less specific as to structural features, it is to be understood that the invention is not limited to the specific features shown, but that the means and construction herein disclosed comprise but one of several modes of putting the invention into effect, and the invention is therefore claimed in any of its forms or modifications within the legitimate and valid scope of the appended claims.

Having thus described my invention, I claim:

1. A door assembly including a frame having margins in the form of laterally spaced apart side portions and interconnecting top and bottom portions, hinges on opposite portions of said frame, said frame being open between said margins, a pair of doors received in said frame, each connected along one side edge to the hinges on one of said respectively opposite portions of said frame, said

5

doors being swingable on said hinges to open and closed positions relative to said frame, said doors when closed occupying a common plane located substantially within said frame with their other side edges in adjacent relation to one another intermediate said opposite portions of said frame, means for selectively locking said doors to said frame when closed, and means supporting said frame for bodily swinging motion about one of its marginal portions to provide that said frame be movable from a normal upright position to a generally horizontal position for service as a platform wherein said doors define the floor of said platform.

2. A door assembly including a frame having margins in the form of spaced apart sides and interconnecting top and bottom portions, hinges on the sides of said frame, said frame being open between said margins, a pair of doors received in said frame and each connected along one side edge to hinges on a respective side of said frame, said doors being laterally swingable on said hinges to open and closed positions relative to said frame, said doors when closed occupying a common plane located substantially within said frame with their other side edges in adjacent relation to one another intermediate the sides of said frame, means for selectively locking said doors to the top and bottom portions of said frame in a closed position, means supporting said frame for bodily swinging motion about one of its margins to provide that said frame be movable from a normal upright position to a generally horizontal position for service as a platform wherein said doors define the floor of said platform.

3. A multiple use closure for an opening having side margins, including vertical mast means stationarily mounted along each side margin of said opening, means longitudinally slidable on said vertical mast means, a four sided frame member bridging the space between said mast means and pivotally connected adjacent to its lower end to said longitudinally slidable means, said frame member aligning approximately with the margins of said opening and defining an aligned corresponding opening, means for holding said frame in a normally upright position approximately parallel to said mast means, said last named means being selectively operable to release said frame to a lowered angular position relative to said mast means to serve as a platform, door means installed in said

6

frame and hinged thereto to be opened and closed for access through the opening in said frame to the first said opening in the upright position of said frame and to serve as a platform floor in the lowered position of said frame, and means utilizing opposed sides of said frame for locking said door means in a closed position in said frame.

4. A multiple use closure for an opening to an enclosure, including a pair of vertically disposed masts stationarily mounted on opposite sides of an enclosure, means telescopically engaged with each of said masts for vertical relative sliding motion, a four-sided frame in bridging relation to said enclosure having side members in superposed relation to respective masts and having cross members at the extremities of said side members, said frame having upper and lower ends as defined by said cross members, a trunnion pivotally connecting the lower end of said frame at each side thereof to a respective telescopically engaged means, flexible cables connected to the upper end of said frame for rocking said frame about said trunnions to an upright position and for controlling a lowering motion thereof to a position approximately at right angles to said mast means, said frame in an upright position achieving a superposed relation to said masts, said side members having a configuration substantially to enclose respective mast, a platform received in said frame including door means hinged to respective side members of said frame, and an interlock selectively engageable between said door means and said cross members of said frame.

5. A multiple use closure according to claim 4, characterized by means interconnecting said telescopically engaged means and the said side members of said frame in a lowered position and to limit the extent of rocking motion thereof to lowered position.

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