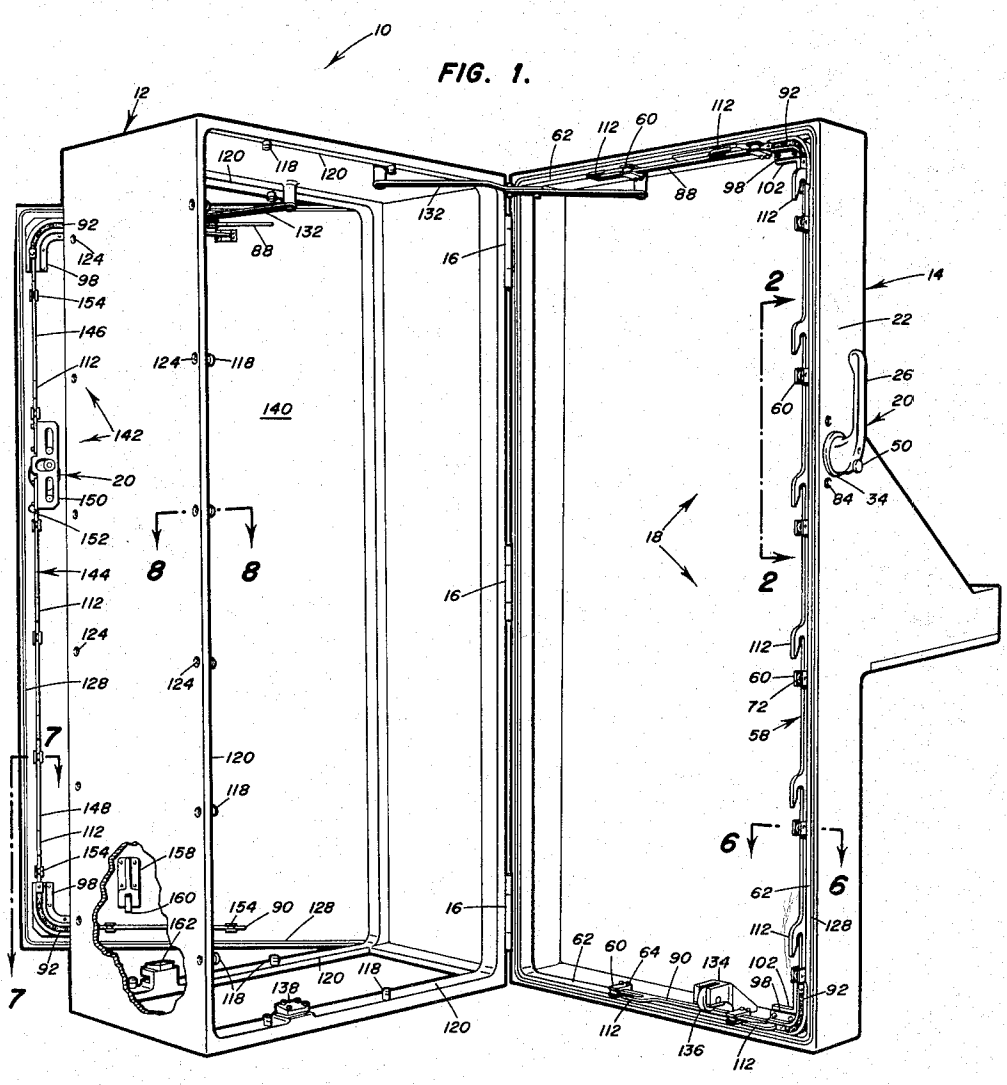
March 30, 1965 A. G. BLOMQUIST ETAL 3,175,873

PANEL LOCKING MECHANISM FOR CONSOLE TYPE STRUCTURES

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FIG. 1.




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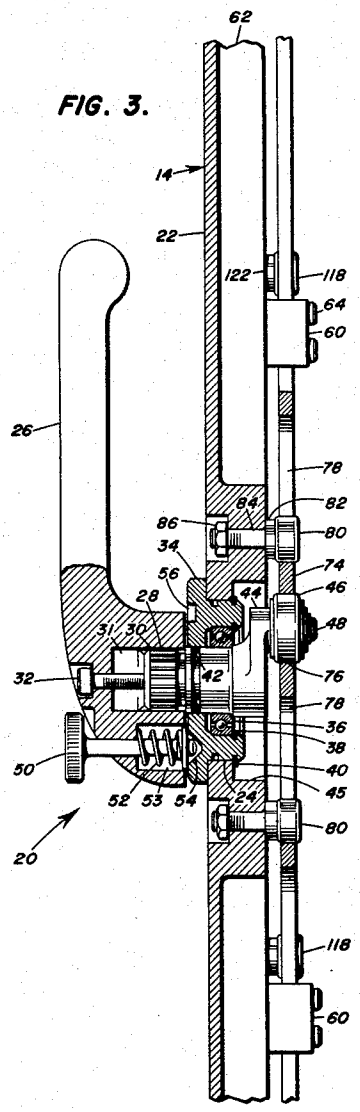
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PANEL LOCKING MECHANISM FOR CONSOLE TYPE STRUCTURES

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FIG. 3.



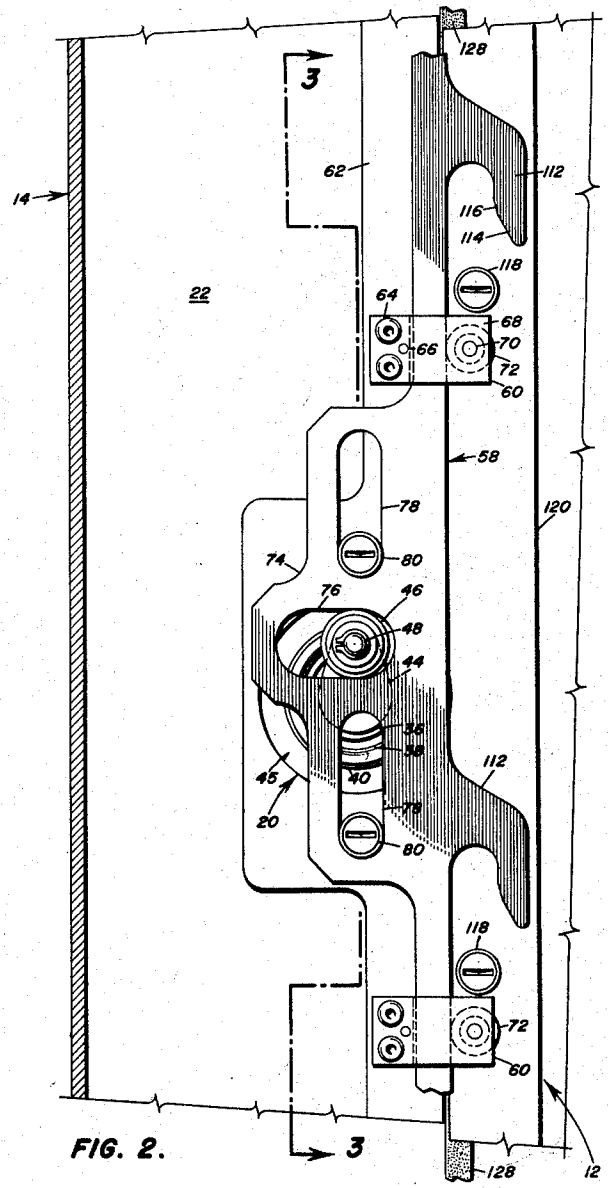




FIG. 2.

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PANEL LOCKING MECHANISM FOR CONSOLE TYPE STRUCTURES

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FIG. 5.

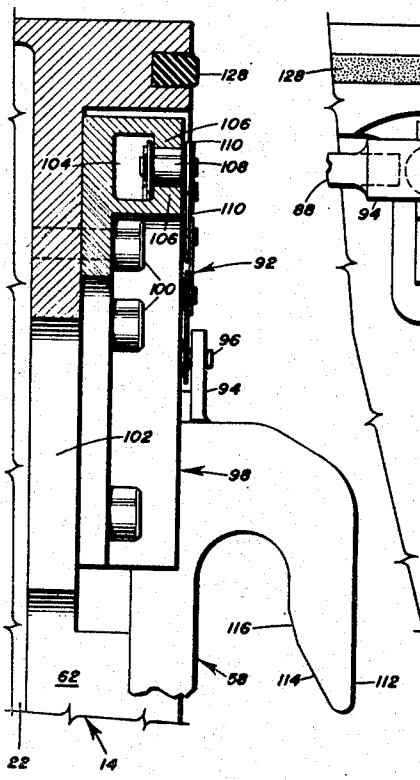



FIG. 4.

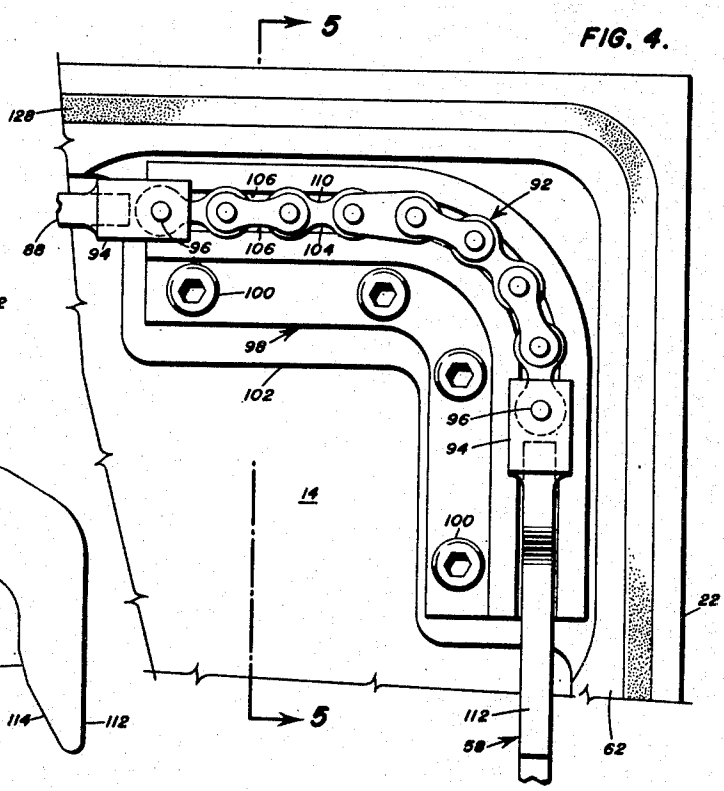



FIG. 6.

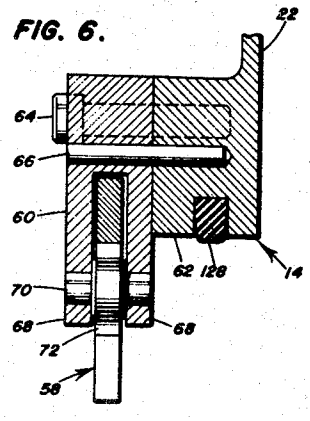



FIG. 7.

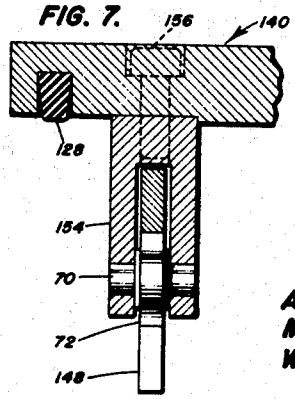
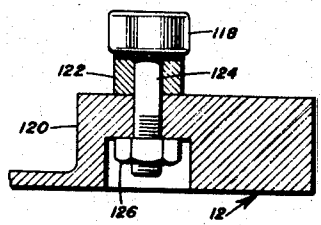



FIG. 8.





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United States Patent Office 3,175,873 Patented Mar. 30, 1965



3,175,873

# PANEL LOCKING MECHANISM FOR CONSOLE TYPE STRUCTURES

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4 Claims. (Cl. 312—296)

This invention relates generally to closure fasteners, and more particularly it pertains to a latch arrangement for use with large panel doors of housings, consoles, cabinets, or similar structures.

Precise instrumentation associated with modern complex mechanism is sometimes required to be located in unfavorable environment. This is especially true for electronic equipment on shipboard where a great deal of trouble is taken to insure sealed protective housings. In addition, on board warships additional hazards are present wherein the doors of ordinary cabinets or housing structures fly open from gunfire concussion.

It is an object of the present invention, therefore, to provide a latched door cabinet or console for protectively enclosing delicate electronic equipment under severe environmental conditions.

Another object of this invention is to provide a closure latch which is effective around the perimeter of doors of a cabinet or console structure.

And yet another object of this invention is to provide a cabinet or console type door which will easily close and seat tightly.

An additional object of this invention is to provide a latch actuating assembly which translates a rotary movement of a handle to a sliding latch movement thereof all about the perimeter of a closure for an opening in a cabinet or console type structure.

These and other objects and attendant advantages of this invention will become more readily apparent and understood from the following specification and accompanying drawings in which:

FIG. 1 is a perspective view of a cabinet or console structure embodying features of this invention with the doors thereof opened and partly broken away to show details of the invention;

FIG. 2 is an enlarged detailed elevation view, partly in cross section taken along the line 2—2 of FIG. 1;

FIG. 3 is a vertical section taken along the line 3—3 of FIG. 2;

FIG. 4 is an enlarged detailed elevation view of the upper right hand corner of the right hand door of FIG. 1;

FIG. 5 is a vertical section taken along the line 5—5 of FIG. 4;

FIG. 6 is an enlarged cross-section taken along line 6—6 of FIG. 1;

FIG. 7 is an enlarged cross-section taken along the line 7—7 of FIG. 1; and

FIG. 8 is an enlarged cross-section of a typical mounting for a latch roller taken along the line 8—8 of FIG. 1.

Referring now to the details of the drawings, two embodiments of this invention are disclosed, with both embodiments thereof being incorporated in the cabinet or console 10 of FIG. 1. These two embodiments of the invention differ very slightly and only in details depending on whether a flat back door 140 or a hollow open-backed front door 14 is involved. In the example chosen for this specification, the control panel console 10 employs both types of doors 14 and 140.

The console 10 consists generally of a rectangular wrap-around case 12 having a peripheral flange 120 which encompasses the front and back openings thereof. The front and back doors 14 and 140 are both mounted on



hinges 16 and arranged to close upon door sealing gaskets 128. These gaskets 128 compress tightly against the flanges 120 in the closed positions of the doors 14 and 140, with the aid of latching mechanisms 18 and 142 to be described subsequently. The open position of each door 14 and 140 is limited by means of hinged stop bars 132.

The latching mechanism 18 of the front door 14, includes a latch actuating assembly 20 which is mounted in an aperture or hole 24 provided in its sidewall 22 as best shown in FIG. 3. An actuating handle 26 of the latch actuating assembly 20 is secured with a lock bolt 32 upon an actuating shaft 28 which extends through this hole 24 to the interior of the door 14. Splines 30, which are provided upon the shaft 28, and located in a matching splined hole 31 in the actuating handle 26 prevent the latter from turning with respect to the actuating shaft 28.

The actuating shaft 28 is journaled in a bearing 36 which is secured in a flanged retainer ring 34 by means of a snap ring 38. Another snap ring 40 secures the retainer ring 34 within the sidewall hole 24. An elastic O-ring 42 effects a seal against the entry of water along the surface of the shaft 28.

The inner end of the actuating shaft 28 is formed into a crank 44 which can oscillate within a cavity 45 provided around the inner end of the sidewall hole 24. An actuating roller 46 is mounted on a stub shaft 48 on the end of crank 44.

A knobbed lock pin 50 is located in the hub of the handle 26 parallel to the longitudinal axis of the splined hole 31. A compression coiled spring 52 which is housed in a cavity 53 of the hub of handle 26, urges this pin 50 inwardly against the retainer ring 34. In the unlatched position of the handle 26 shown best in FIGS. 2 and 3, the lock pin 50 swings in a semi-circular unlatch detent groove 54. This unlatch detent groove 54 allows considerable rotation of the handle 26 but beyond a certain point the unlatch detent groove 54 directs pin 50 into a latch detent hole 56 which point corresponds to the latched position of the latching mechanism 18. The lock pin 50 must then be manually pulled in order that the handle 26 can again be moved.

This rotary movement of the handle 26 through the actuating shaft 28 and crank 44 is translated to a sliding oscillation movement of a vertical latch bar 58, shown best in FIGS. 1, 2, 4 and 6. The latch bar 58 reciprocates in a series of bifurcated guide blocks 60. These bifurcated guide blocks 60 are secured at spaced intervals on the door frame flanges 62 with locating dowels 66 and capscrews 64. The bifurcations or legs 68 of these bifurcated guide blocks 60 embrace a roller 72 mounted on a pin 70. The rollers 72 thus captivate the latch bar 58 with sliding freedom within the spaced legs 68 as shown in detail in FIG. 6.

Referring now to FIGS. 2 and 3, the latch bar 58 is provided with a flat drive plate 74 which carries a traverse slot 76. This flat drive plate 74 is also provided with a pair of vertically extending co-linear slots 78. The traverse slot 76 closely receives the actuating roller 46 while the vertical slots 78 similarly accept a pair of fixed guide rollers 80. Each roller 80 is supported on a roller shaft 84 which is attached to the door side 22 by a nut 86 and spaced inwardly therefrom by means of a spacer 82.

The top and bottom door frame flanges 62 mount additional bifurcated guide blocks 60 within which upper and lower horizontal latch bars 88 and 90 likewise are slidably supported, respectively. Lengths of roller link chain 92 are carried around the top and bottom corners of each door 14 or 140 in chain guides 98. These roller link chains 92 are connected through links 94 and coupling pins 96 to the latch bars 88 and 90 of the respective upper and

lower ends of the vertical latch bar 58 as shown in FIG. 1 and in greater detail in FIG. 4.

The chain guides 98 are secured in position to the structure by means of capscrews 100 inserted through L-shaped mounting flanges 102. The chain guides 98 are each formed with a smooth groove 104 having guide flanges 106 on which the chain rollers 108 ride. The chain links 110 on each side of the guide flanges 106 captivate the roller link chain 92 in the groove 104 as shown best in FIG. 5.

The vertical latch bar 58 as well as the upper and lower latch bars 90 and 92 are provided with latching hooks 112. These latching hooks 112 are each formed with a sloped gathering surface 114 and a sloped wedging surface 116 for engagement with latching rollers 118, shown best in FIGS. 1 and 8. These latching rollers 118 are located at spaced intervals on each peripheral flange 120 of the case 12.

As shown in the detail view of FIG. 8, these latching rollers 118 are mounted together with a spacer 122 upon a roller shaft 124 and are secured in position by a nut 126. Thus, when the latch bar 58 slides, the upper and lower latch bars 88 and 90 move in unison and every hook 112 engages its respective fixed roller 118 in a wedging action to draw the door 14 tightly against the sealing gasket 128 in an extended line contact.

To support the weight of the door 14 especially where heavy instruments or equipment are mounted thereon, a roller bracket 134, shown in FIG. 1, is provided. A roller 136, shafted in this roller bracket 134, engages with a wedge plate 138 as the door 14 closes in a slight lifting and positioning action. A similar roller bracket 158, roller 160, and wedge plate 162 perform the same service for the rear door 140.

Since the rear door 140 illustrated in FIG. 1 is of the flat type, it requires a slightly different arrangement of the previously mentioned latching mechanism 142. Where the vertical latch bar 58 for the front door 14 is a one-piece assembly, it is necessary to modify the vertical latch bar assembly 144 of the rear door 140 so the upper and lower vertical latch bars 146 and 148 are on edge and secure them to the drive plate 150 by means of capscrews 152. Otherwise, the actuating assemblies 20 for the front and rear doors 14 and 140 are identical.

Bifurcated guide blocks 154 for the "on edge" upper and lower latch bars 146 and 148, respectively, as well as for the horizontal bars 88 and 90, respectively, are shown in detail in FIG. 7. These bifurcated guide blocks 154 are end mounted with capscrews 156 to the door 140 differing from the side mounted guide blocks 60 as can be noted by comparing FIGS. 6 and 7. The chain guides 98 and chains 92 for the rear door 140 are identical for both front and rear doors 14 and 140.

Obviously many modifications and variations of the present invention are possible in the light of the above teachings. It is, therefore, to be understood that within the scope of the appended claims the invention may be practiced otherwise than as specifically described.

What is claimed is:

1. In combination, a housing having at least one opening therein with a peripheral flange encompassing said opening, closure means pivotally mounted to said housing for closing said opening therein, means positioned along the periphery of said closure means for sealing said closure means against said peripheral flange encompassing said opening when said closure means is positioned in said opening, first means including a latching bar having a plurality of spaced latching elements and positioned along one side of said closure, second and third means each including a latching bar with spaced latching elements and positioned along sides adjacent, respectively, to said one side of said closure, a plurality of corresponding mating elements each having a low rolling friction mating movable surface and positioned along the corresponding portion of the peripheral flange of the opening



of said housing for engagement with the respective latching elements of all said latching bars, said latching elements having a wedge-shaped portion for receiving said mating elements and for thereby urging said closure to the shut position by movement of said latching bars, means connecting each latching bar of said second and third mean to the latching bar of said first means so that reciprocating movement of the latching bar of said first means can be imparted to the latching bars of said second and third means, whereby three sides of said closure can be latched to said housing, with said connecting means consisting of two roller link chains, one end of each of which is connected to opposite ends of the latching bar of said first means and the opposite end of each roller link chain is connected to the latching bars of said second and third means, respectively, and in addition, guide means are provided for each said roller link chains, each said guide means consisting of a block having an arcuate slot therein adapted to slidably receive the roller portions of its respective roller link chain and another arcuate slot running contiguous with the first arcuate slot but of greater width for receiving the link portions of one side of said roller link chain, whereby said first mentioned slot serves as a rail for the low friction roller surfaces of said roller link chain, and a mechanism for securing said closure to said housing and operatively connected to said first mentioned latching bar including means with a handle for translating rotary movement of said handle into sliding movement of said latching bars so that the latching elements thereof engage their respective mating elements.

2. The combination as recited in claim 1, wherein the corresponding mating elements consist of engaging rollers.

3. In a cabinet composed of a housing having at least one opening therein with a peripheral flange encompassing said opening, closure means pivotally mounted to said housing for closing said opening therein, and a latching device positioned along the periphery of said closure means for sealing said closure means against said peripheral flange encompassing said opening when said closure means is positioned in said opening, said latching device comprising first means including a latching bar having a plurality of spaced latching elements and positioned along one side of said closure, second and third means each including a latching bar with spaced latching elements and positioned along sides adjacent, respectively, to said one side of said closure, a plurality of corresponding mating elements each having a low rolling friction mating movable surface and positioned along the corresponding portion of the peripheral flange of the opening of said housing for engagement with the respective latching elements of all said latching bars, said latching elements having a wedge-shaped portion for receiving said mating elements and for thereby urging said closure to the shut position by movement of said latching bars, means connecting each latching bar of said second and third means to the latching bar of said first means so that reciprocating movement of the latching bar of said first means can be imparted to the latching bars of said second and third means, whereby three sides of said closure can be latched to said housing, with said connecting means consisting of two roller link chains, one end of each of which is connected to opposite ends of the latching bar of said first means and the opposite end of each roller link chain is connected to the latching bars of said second and third means, respectively, and in addition, guide means are provided for each said roller link chains, each said guide means consisting of a block having an arcuate slot therein adapted to slidably receive the roller portions of its respective roller link chain and another arcuate slot running contiguous with the first arcuate slot but of greater width for receiving the link portions of one side of said roller link chain, whereby said first mentioned slot serves as a rail for the low friction roller surfaces of said roller link chain, and a mechanism for securing said closure to said housing and operatively connected to said first mentioned latching bar including

means with a handle for translating rotary movement of said handle into sliding movement of said latching bars so that the latching elements thereof engage their respective mating elements.

4. In the cabinet as recited in claim 3, wherein the corresponding mating elements on said housing consist of engaging rollers.

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