Sept. 1, 1953 R. G. CUDINI 2,650,370

BERTH STRUCTURE

Filed Oct. 7, 1949 4 Sheets-Sheet 1

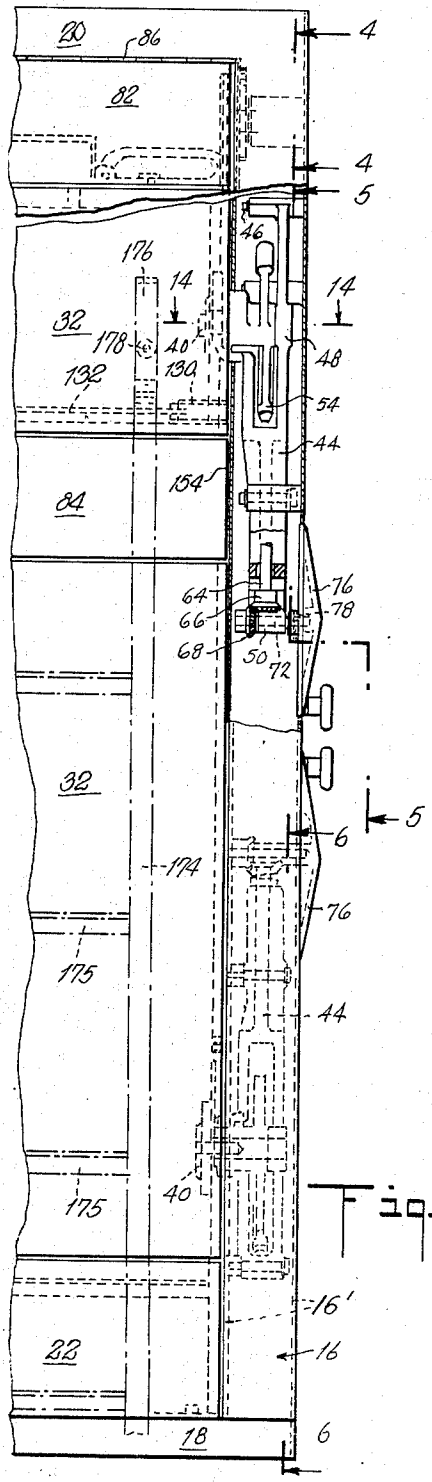


Fig. 3.

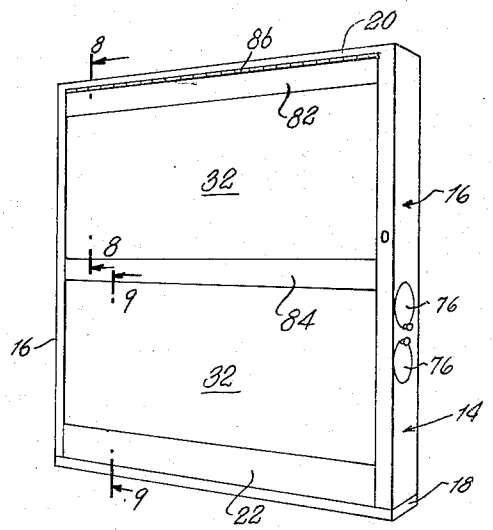


Fig. 1.

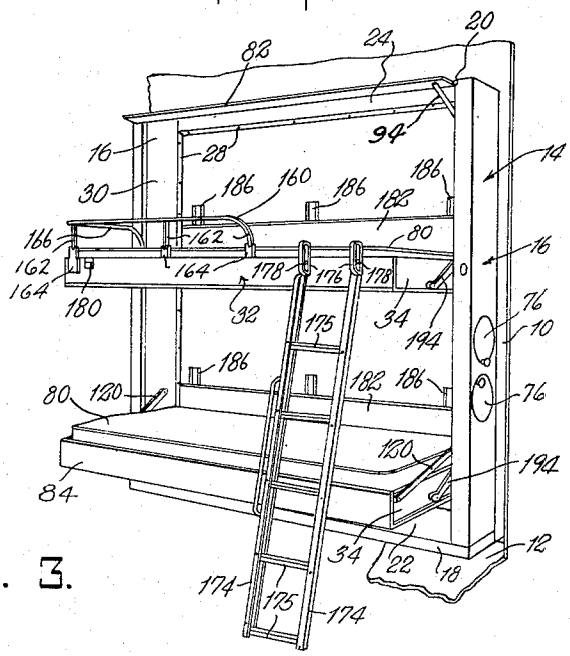


Fig. 2.

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BERTH STRUCTURE

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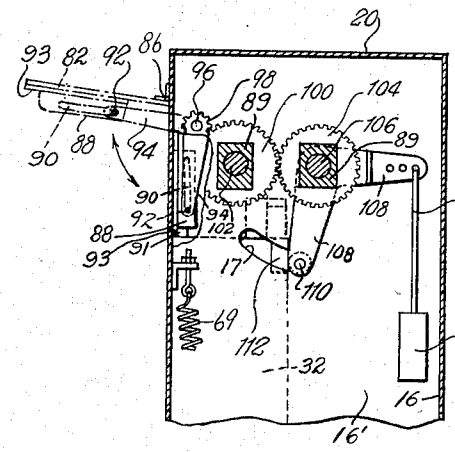


Fig. 4.

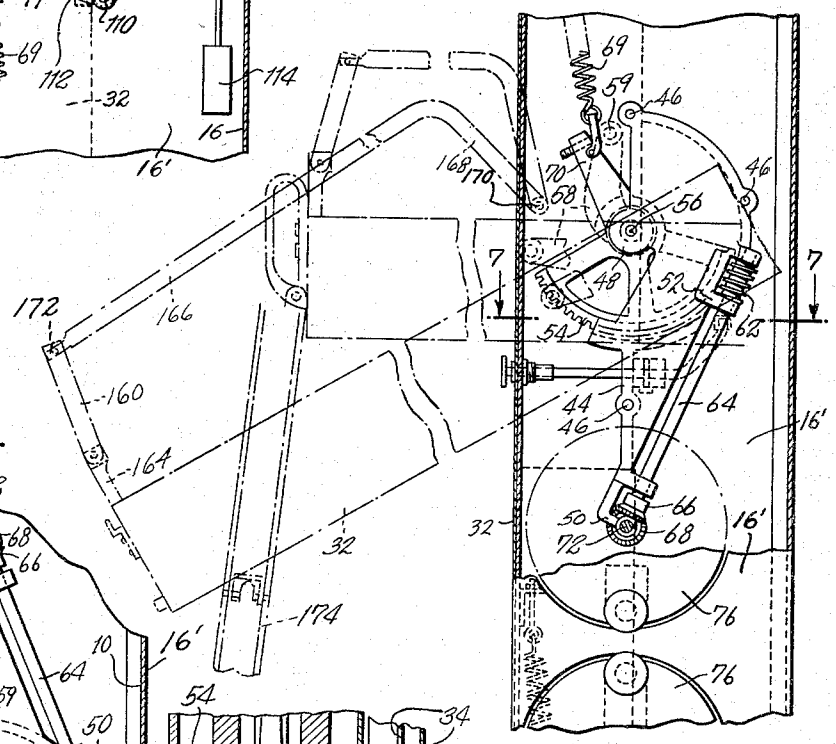
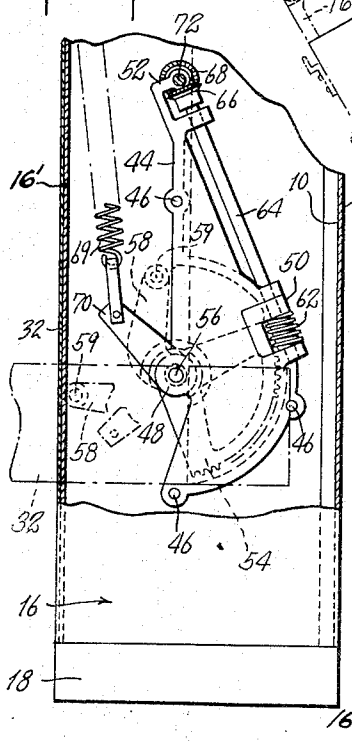


Fig. 6.



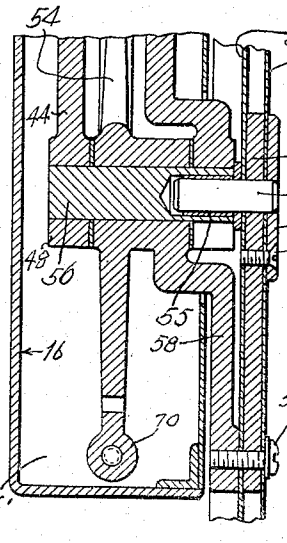


Fig. 5.

Fig. 14.

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BERTH STRUCTURE

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Fig. 7.

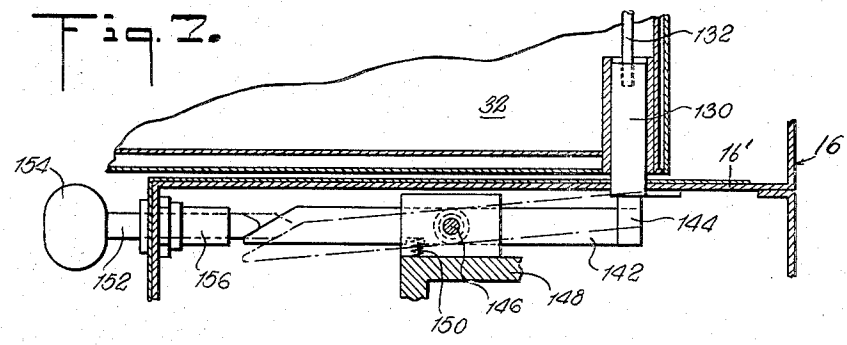
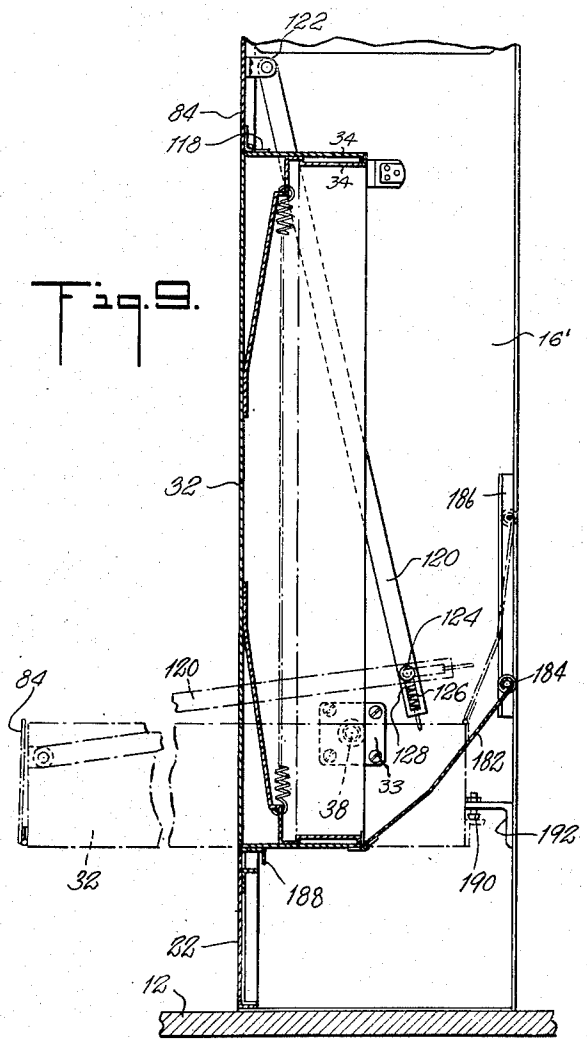


Fig. 9.



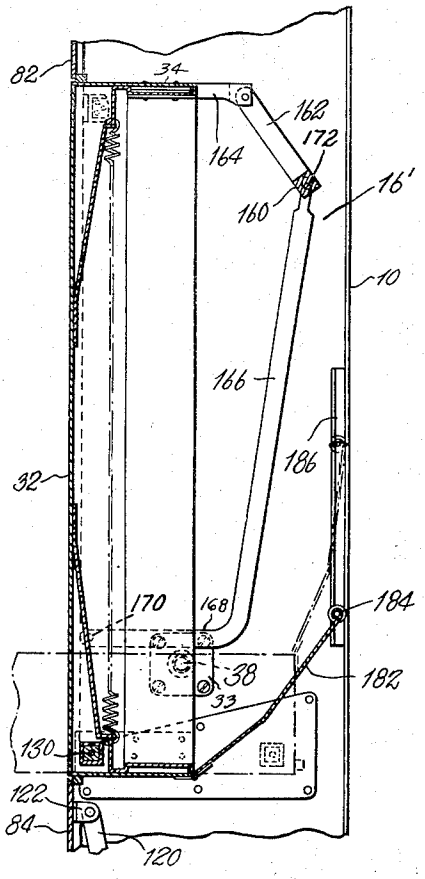


Fig. 8.

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BERTH STRUCTURE

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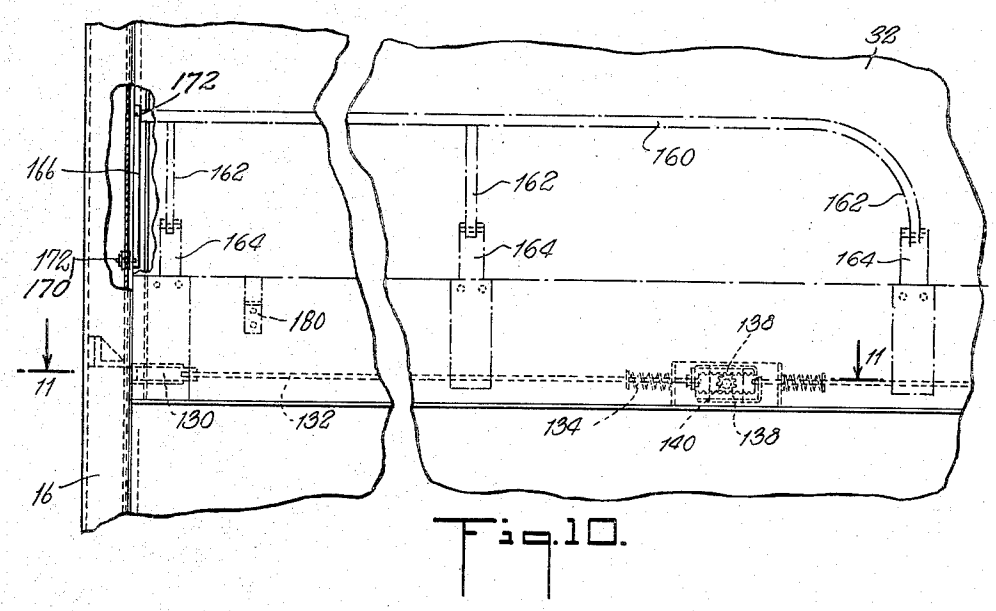


Fig. 10.

Fig. 11.

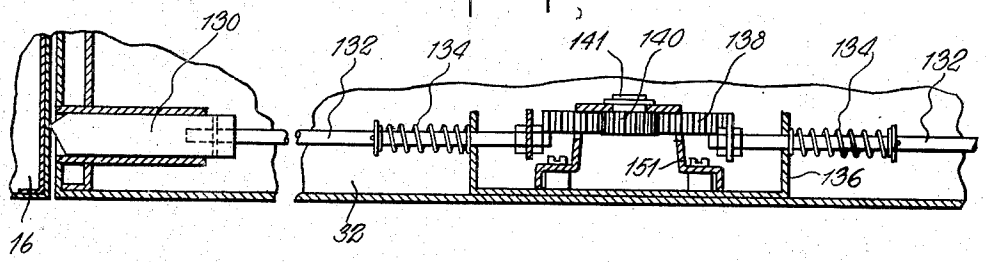


Fig. 12.

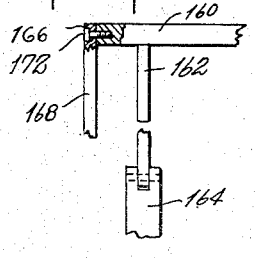
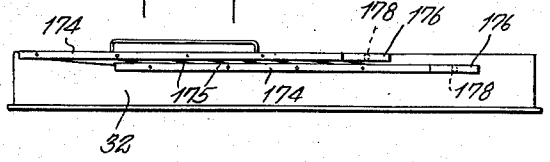


Fig. 13.



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2,650,370

UNITED STATES PATENT OFFICE

2,650,370

BERTH STRUCTURE

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Application October 7, 1949, Serial No. 120,125

18 Claims. (Cl. 5—9)

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This invention relates to berth structures for bedroom use in trains, ships and residences.

An object of the invention is to provide a unitary berth and supporting structure that can be assembled exteriorly of a bedroom to fit accurately in a designated space within the bedroom.

Another object of the invention is to provide mechanism for shifting a pivoted berth between prone and storage positions that can be actuated by an attendant with minimum effort.

Another object of the invention is to provide a mounting for an upper berth of a character such that the berth can be swung downwardly beyond horizontal position in order that the bedclothes can be applied or removed with ease by a person standing on the floor of a room.

A further object of the invention is to provide a closure flap structure for a space between upper and lower pivoted berths that will swing with the lower berth to a position at the front thereof when in prone position.

A still further object of the invention is to provide a flap, for closing a space above a stored berth pivoted in a supporting structure, with associated control mechanism for automatically lifting the flap and operable by the berth to close the flap after it is cleared by the berth when moving to stored position.

Another object of the invention is to provide a lee rail structure for a pivoted berth that will automatically shift toward the berth when being moved to stored position to clear normally interfering wall structure thereabove.

These and other objects of the invention will be apparent to those skilled in the art from a study of the following description and accompanying drawings, in which:

Fig. 1 is a perspective view of a berth structure with pivoted berths in stored position.

Fig. 2 is a view similar to Fig. 1 with the berths in prone position.

Fig. 3 is a front elevation, partly in section, of one end of the casing in which berth actuating mechanism is housed.

Fig. 4 is a sectional view, partly broken away, taken on line 4—4 of Fig. 3 showing the upper flap and operating mechanism.

Fig. 5 is a sectional view taken on line 5—5 of Fig. 3 showing the actuating mechanism for the upper berth.

Fig. 6 is a sectional view taken on line 6—6 of Fig. 3 showing the actuating mechanism for the lower berth.

Fig. 7 is a sectional view taken on line 7—7 of Fig. 5 showing latch releasing mechanism.

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Fig. 8 is a sectional view taken on line 8—8 of Fig. 1 showing details of the upper berth.

Fig. 9 is a sectional view taken on line 9—9 of Fig. 1 showing details of the lower berth.

Fig. 10 is a fragmentary front elevational view of the upper berth and adjacent casing showing the lee rail.

Fig. 11 is a sectional view taken on line 11—11 of Fig. 10 showing the latch mechanism for the upper berth.

Fig. 12 is a fragmentary front elevational view, partly in section, showing the connection between the lee rail sections.

Fig. 13 is an elevational view of one end of the upper berth with the ladder in stored position thereon.

Fig. 14 is a sectional view of the upper berth operating mechanism taken on line 14—14 of Fig. 3.

The illustrated berth structure is formed as an assembled unit to accurately fit a prescribed space and then moved into a room as such or disassembled and then reassembled within the room. A bedroom wall 10 and floor 12 are illustrated and it is to be understood that such room can be in a residence, railroad sleeping car, ship or in various other places where the use of berths is required.

A supporting or carrier structure formed of elements suitably secured together is indicated generally by numeral 14. The carrier structure includes end compartments 16 having transversely spaced walls 16', base 18 and top wall 20'. The carrier structure preferably has a bottom front wall 22 and a top rear wall 24. Walls 16 and 24 are provided with flanges 28 that are secured by suitable means to wall 10 of the room. The end compartments 16 are preferably box-shaped in cross-section.

One or more berth pans 32 are pivotally mounted in the carrier structure to swing into a horizontal prone position for occupancy or into vertical storage position with the bottom walls flush with the front wall faces of the carrier structure. The berth pans are formed with spaced marginal walls 34 at each end and spacer members 36 are fixed between such pairs of end walls, see Fig. 14. Aligned pins 38 project through openings in the end walls 34 and associated spacer members 36 and are welded to plates 40 fixed by screws 42 against the inner faces of the inner members 34. One pivot member of each berth pan is suitably mounted in a bearing plate 33 fixed on the adjacent end wall of the carrier structure and the other pivot member of each berth pan is mounted in the other hollow end

wall of the carrier structure in which mechanism operable for swinging the berth pans is housed.

The mechanisms for swinging the berth pans on their pivots are similar and the same identification will be applied to similar elements thereof. A gear casing 44 is secured in one of the end compartments 16 by bolts 46 and is formed with bearings 48, 50 and 52. The hub of segmental drive gear 54 is rotatably mounted on a cylindrical bearing 56 fixed in bearing 48 and has an arm 58 fixed to the adjacent pan end wall by bolts 59. Berth pivot pin 38 extends into a bearing shell 55 carried in a recess in one end of bearing member 56. Gear 54 meshes with worm gear 62 fixed on one end of shaft 64, and gear 66 on the other end of such shaft meshes with gear 68 on shaft 72. Bearings 50 and 52 on casing 44 support shafts 64 and 72. The shaft 72 extends outside of the end wall of the supporting structure of the berths and has a handle 76 fixed to the projecting end thereof by pin 78. Gear 54 is formed with an arm 70 and berth counterbalance spring 69 is connected at its ends to arm 70 and the adjacent side wall of the carrier structure. The mechanisms for pivoting the upper and lower berths are substantially identical except of course they are arranged to operate in reverse directions to obtain similar berth swinging motion.

Rotation of handle 76 will rotate shaft 72 therewith and through gear 68, shaft 64 and gear 66 will drive gear 54 and berth carrier arm 58 to swing the berth on its pivot. This form of gearing is of a self-locking character such that the berth with the spring counterbalance will remain in any position of its pivotal arc when operation of the handle ceases and, at the same time, it is very sensitive to interference to movement of the berth as such resistance will be immediately felt by the operator so that he can cease operation of the mechanism upon such occasions. Such interference can be caused by mattresses 80 in the berths, by the bedclothes (not shown) or other paraphernalia that might be caught between the berths and the walls of the supporting structure. The gearing is also of a reduction character such that little manual effort is required to swing the berths on their pivots.

In order to permit freedom of pivotal movement of the berths it is necessary that they be spaced apart when in vertical stored position and also that they must be spaced beneath the top wall of the supporting structure at the free end of the upper berth. It is contemplated to close these spaces with flaps 82 and 84 and to automatically operate such flaps so that they will be flush with the bottoms of the berth pans when in stored position and moved away from such position to permit clearance when the berths are being moved away from stored position. The mechanism associated with the berths for operating the flaps are different.

The upper flap 82 is secured to the top wall by piano hinge 86. One end of the flap has an angle member 88 fixed thereto in one portion of which slot 90 is formed for receiving pin 92 fixed to actuator arm 94 fixed on shaft 96. Shaft 96 extends through and is suitably mounted on the inner end wall of one of the end compartments 16 and has fixed thereto, within the end compartment, gear 98 that meshes with idler gear 100 suitably mounted on shaft 102. Drive gear 104 meshes with gear 100 and is fixed on shaft 106 which also has bell crank 108 fixed thereto. Shafts 102 and 106 are mounted in

journals 89 fixed to the adjacent faces of walls 16'. One arm of the bell crank carries a roller 110 adapted to be engaged by an abutment 112 on one end of the upper berth pan and the inner end wall 16' is provided with an arcuate slot 17 through which the roller projects. The other arm of the bell crank has a rubber coated weight 114 suspended therefrom by rod 116. As the upper berth moves into stored position, abutment 112 will engage roller 110 to swing the bell crank anti-clockwise causing gear 104 to rotate anti-clockwise and gear 100 to rotate clockwise which last mentioned gear in turn will drive gear 98 anti-clockwise to swing arm 94 downwardly to close the flap due to the sliding pin connection therewith. As the berth moves away from the bell crank, weight 114 will move gear 104 clockwise and idler gear 100 will move gear 98 clockwise to raise the flap sufficiently for the berth to clear the same. The unanchored end of angle member 88 terminates short of the adjacent end of flap 82 so that the portion 93 of the flap can engage stop member 91 on the end of pan 32 to limit inward swinging of the flap beyond a position flush with the bottom of the berth pans when in stored position.

The lower flap 84 is pivotally connected to the bottom portion of the front wall of the lower berth by hinge 118 and a link 120 is pivotally secured to bracket 122 fixed to the inside free end of the flap. This link is secured to the inner face of the adjacent carrier end wall structure by a headed pin 124 which extends through slot 126 adjacent the end thereof remote from the flap. Spring pressed plunger 128 bears against pin 124 and exerts a pressure against the link away from the end connected to the flap whereby the flap will be maintained in closed position with relation to the opening between the berths. As flap 84 is hinged to the lower berth, it will move therewith and will be swung on its hinge 118 by the link connection so that it will lie parallel with the front of the berth when the berth is in prone position. Thus, when the berth is in stored position, flap 84 will lie flush with the bottoms of the two berths and will close the opening therebetween and when the lower berth is in prone position, the flap will lie in advance of the front wall of the lower berth in parallel relation therewith. The link retains the flap in substantially vertical position in any position of berth movement.

The mechanism for actuating the upper berth is of such a nature that, when desired, the berth can be moved to below horizontal prone position so that the attendant can apply or remove the bedclothes while standing on the floor and without undue reaching or the use of a stool or ladder, such position being shown in dotted lines in Fig. 5. When the upper berth has reached prone horizontal position, detents 130 will engage in openings in the end wall structures as they are fixed to rods 132 normally urged in such engaging relation by spring 134 bearing against the bracket 136 fixed to the inside of the berth, see Figs. 7 and 10. Rods 132 are fixed to spaced rack members 138 that engage with gear 140 having a bearing shaft 141 carried by bracket 151. Release mechanism is associated with one of the detents to remove the same from locking position in the opening in the end wall of the supporting structure when it is desired to move the upper berth below horizontal position. Such release mechanism includes a lever 142 having head 144 at one end for engaging the detent 130. This

lever 142 rocks on pin 146 carried by bracket 148 fixed in the end wall structure of the supporting structure and spring 150 is arranged between such bracket and lever so that the lever head 144 is normally urged away from the detent. An actuator for the lever in the form of a camming rod 152 extends through the front wall of the end structure of the bearth carrier structure and the outer end thereof is enlarged to form a knob 154 by means of which the rod can be manipulated. When the knob is pushed to its innermost position, the camming rod 152 will rock the lever 142 so that the head 144 will press detent 130 out of the opening in which it extends when locking the berth in horizontal position. As the two detents are interconnected to operate simultaneously in opposite directions, they will both be withdrawn when the release mechanism is actuated to disengage the associated detent. The camming rod 152 is slidably mounted in sleeve 156 suitably secured to the inside face of the front of the end wall of the supporting structure carrying the berths.

The upper berth is provided with a lee rail structure formed of sections mounted and connected in such manner that the rail sections will shift while swinging the berth into and out of the mounting structure to clear normally interfering parts thereof. Front lee rail section 160 has depending legs 162 fixed thereto that are pivotaly mounted on brackets 164 fixed to and projecting above the front wall of the upper berth. The end lee rail section 166 has a rear leg 168 mounted at its lower end on pivot 170 fixed to the adjacent end wall of the carrier structure. The forward end of rail section 166 is connected to an end of rail section 160 by pivot pin 172. As the end section of the lee rail is mounted on pivot 170 fixed to the carrier structure and is pivotally connected to the pivotally mounted front rail section 160, the front rail section will be swung downwardly and inwardly relative to the berth as the berth swings toward stored position in the supporting structure. As the upper berth is swung downwardly to horizontal position for occupancy, the end lee rail section, through its pivotal connection with the carrier structure and the front rail section, will cause the front rail section to swing in an upward and outward direction relative to the pan so that the legs 162 will be in vertical position when the berth is in prone horizontal position. Thus, the lee rail structure shifts its position, to clear flap 82, which is moving relative thereto while the berth is being swung between vertical and horizontal positions.

The upper berth is provided on its front face with means for anchoring a ladder either in position for use or in stored position. The ladder is formed of side members 174 and rungs 175 pivotally connected together. The legs are provided at their upper ends with looped head members 176. The loops are pivotally secured on the front side of the upper berth by bolts 178 so that the ladder can be swung to a vertical or horizontal position. When the ladder is swung to horizontal position, the side members will lie in close proximity and one leg can be held by clip 180 secured on the side of the berth. When in stored position, the ladder will swing up or down with the berth so that it will be housed in the berth supporting structure behind flap 82.

Bedclothes retainers 182 are hinged along one edge to the rear side of the berth pans and are provided at their opposite edge with rollers 184 engaging in vertical guides 186 fixed to room wall 10.

Brackets 188 are provided on the lower berth for engaging abutments 190, adjustably carried by brackets 192 fixed to the supporting structure, to limit downward pivoting of the berth beyond horizontal. The berths are supported by links 194 secured to their ends and to the adjacent end walls of the supporting structure.

The invention may be modified in various respects as will occur to those skilled in the art and the exclusive use of all modifications as come within the scope of the appended claims is contemplated.

What is claimed is:

1. In a berth structure, a supporting carrier structure having top and side walls, a berth pan pivotally mounted between the side walls to be swung downwardly into horizontal position or upwardly into stored vertical position with its bottom wall flush with the front of the top and side walls of the carrier supporting structure, a front flap adapted to cover the space in the supporting structure between the front of the top wall and the upper end of the berth pan bottom when in stored position, means for pivotally mounting the flap to the top wall, means operable to swing said flap to and from closure position, means for automatically actuating said flap swinging means to open the flap, and means projecting into the path of movement of said berth pan and operable thereby when moving to stored position for actuating the flap swinging means to close the flap.

2. In a berth structure, a supporting carrier structure having top and side walls, a berth pan pivotally mounted between the side walls to be swung downwardly into horizontal position or upwardly into stored vertical position with its bottom wall flush with the front of the side and top walls, a front flap adapted to cover the space in the supporting structure between the front of the top wall and the upper end of the berth pan bottom when in stored vertical position, means for pivotally mounting the flap to the top wall, gear means operable to swing said flap to and from closure position, a weight connected to the gear means for automatically actuating the same to swing the flap into open position, and means projecting into the path of movement of said berth pan and operable thereby when moving to stored position for actuating the gear means to close the flap.

3. In a berth structure, a supporting carrier structure having top and side walls, a berth pan pivotally mounted between the side walls to be swung downwardly into horizontal position or upwardly into stored vertical position with its bottom wall flush with the front of the top and side walls of the carrier supporting structure, a front flap adapted to cover the space in the supporting structure between the front of the top wall and the upper end of the berth pan bottom when in stored position, means for pivotally mounting the flap to the top wall, gear means operable to swing said flap to and from closure position, means for automatically actuating said gear means to normally open said flap, and means projecting into the path of movement of said berth pan and operable thereby when moving to a stored position for actuating the gear means to close the flap.

4. In a berth structure, a supporting carrier structure having top and side walls, a berth pan pivotally mounted between the side walls to be

swung downwardly into horizontal position or upwardly into stored vertical position with its bottom wall flush with the front of the top and side walls of the carrier supporting structure, a front flap adapted to cover the space between the front of the top wall and the upward end of the berth pan bottom when in stored position, means for pivotally mounting the flap to the top wall, gear means operable to swing said flap to and from closed position, a bell crank connected to actuate one of the gears in said gearing, and means engaging said bell crank normally acting to effect opening movement of the flap, said bell crank projecting into the path of movement of said berth pan and operable thereby when moving to stored position for actuating the gear means to close the flap.

5. In a berth structure, a supporting carrier structure having top and side walls, a berth pan pivotally mounted between the side walls to be swung downwardly into horizontal position or upwardly into stored vertical position with its bottom wall flush with the front of the top and side walls of the carrier supporting structure, a front flap adapted to cover the space between the front of the top wall and the upward end of the berth pan bottom when in stored position, means for pivotally mounting the flap to the top wall, said flap having a slotted end flange, an arm, a pin in the slot to which one end of the arm is pivotally mounted, gear means connected with the arm and operable to swing the same, means normally urging the gear means in a direction to shift the arm into position opening the flap, and means associated with the gear means projecting into the path of movement of said berth pan and operable thereby when moving to stored position for actuating the gear means to move the arm into flap closing position.

6. In a berth structure, a supporting carrier structure having top and side walls, a berth pan pivotally mounted between the side walls to be swung downwardly into horizontal position or upwardly into stored vertical position with its bottom wall flush with the front of the top and side walls of the carrier supporting structure, a front flap adapted to cover the space between the front of the top wall and the upward end of the berth pan bottom when in stored position, means for pivotally mounting the flap to the top wall, means including gearing operable to swing said flap to and from closed position, a bell crank connected with the gearing, means engaging one arm of the bell crank to actuate the gearing in a direction effecting opening of the flap, and an abutment on the berth pan for engaging and operating the other arm of the bell crank to cause actuation of the gearing to close the flap when the berth pan is moving to stored position.

7. In a berth structure spaced supporting walls, upper and lower berth pans pivotally mounted in aligned relation on said walls and swingable into vertical stored relation between said walls or into horizontal prone position, said berth pans being spaced when in stored position, a flap for closing the space between said berth pans pivotally carried by the lower pan, and means connected to said flap and one of said walls for retaining said flap in vertical position.

8. In a berth structure, spaced supporting end walls, upper and lower berth pans pivotally mounted in vertically aligned relation on said walls and swingable into vertical stored relation between said walls or into horizontal prone position partially outside of said walls, said berth pans being spaced vertically when in stored position, a flap for closing the space between said pans when in vertical stored position, hinge means connecting the flap to the bottom portion of the front side of the lower pan, and means connecting the flap with one of the walls and operative to retain the flap in vertical position in any position of the pan.

9. In a berth structure, spaced supporting end walls, upper and lower berth pans pivotally mounted in vertically aligned relation on said walls and swingable into vertical stored relation between said walls or into horizontal prone position partially outside of said walls, said berth pans being spaced vertically when in stored position, a flap pivoted to the outside bottom portion of the front wall of the lower pan, and a link member pivoted to an end of said flap and to one of said walls for holding the flap in vertical position regardless of the lower pan position.

10. In a berth structure, spaced supporting end walls, upper and lower berth pans pivotally mounted in vertically aligned relation on said walls and swingable into vertical stored relation between said walls or into horizontal prone position partially outside of said walls, said berth pans being spaced vertically when in stored position, a flap pivoted to the bottom portion of the outer side wall of the lower pan, said flap having its ends projecting beyond the ends of the pan, a slotted link member pivotally connected to one extending end of the flap, pivot means fixed to one of the walls and extending through the slot in said link member, and pressure means carried by and urging said link member in a direction to maintain the flap in vertical position.

11. In a berth structure for a room, supporting walls, a berth pan pivoted to walls in the upper portion of the room, gearing operable to swing the pan between vertical stored position and a position below horizontal, means restraining swinging movement of the pan below horizontal position, and means operable to release said restraining means to permit swinging of the pan below horizontal position.

12. In a berth structure for a room, supporting walls provided with openings, a berth pan pivoted to the walls in the upper portion of the room, said pan being swingable between vertical stored position and a position below horizontal, detent means carried by the pan and adapted to project automatically into the wall openings when the pan is in horizontal position to restrain the pan from swinging downwardly, a lever in a wall operable to release the detent means from the openings, and means extending outwardly from the front of the wall carrying the lever operable to actuate the lever.

13. In a berth structure for a room, supporting walls provided with openings, a berth pan pivoted to the walls in the upper portion of the room, gearing in one of the walls operable to swing the pan between vertical stored position and a position below horizontal, detent means carried by the pan and adapted to project automatically into the wall openings when the pan is in horizontal position to restrain further downward swinging of the pan, a lever in one of the walls operable to release said detent means from the wall openings, and a cam rod project-

ing from the front of the wall carrying the lever and operable to rock the lever for releasing the detent means from the wall openings and thereby permit the mechanism to operate for swinging the berth pan below horizontal position.

14. A unitary bed structure comprising a housing having hollow end walls, a top wall and lower front wall, upper and lower berth pans between and pivotally mounted on said end walls, said pans being swingable into aligned vertical stored position between the end walls with their bottoms flush with the front surfaces of the housing and into horizontal position for occupancy, said pans being spaced when in stored position and the upper pan being spaced from the top wall when in stored positions, shiftable flaps for closing said spaces, and means operable by said pans for shifting the position of said flaps.

15. An actuator mechanism for swinging a pivotally mounted berth pan comprising a casing having fixed bearings, a driven gear rotatably mounted on a casing bearing and having pan actuating arm means, a driven shaft mounted in a casing bearing, a drive shaft mounted in a casing bearing, a gear fixed on said drive shaft, a gear on said driven shaft meshing with the gear on said drive shaft, a gear fixed on said driven shaft meshing with said driven gear, and a handle on said drive shaft operable to actuate said gearing.

16. An actuator mechanism for swinging a pivotally mounted berth pan comprising a fixed gear casing, a driven member rotatably carried by the casing having a worm gear sector and a pan actuating arm fixed to the berth pan, a driven shaft carried by the casing, a worm gear fixed to said shaft meshing with said worm gear sector, a driven shaft carried by the casing, a bevel drive gear fixed on the drive shaft, a bevel gear fixed on the driven shaft meshing with the drive gear, handle means on the drive shaft operable to actuate the associated pan swinging mechanism, said gears being of the reduction type and sensitive to interference, and a berth pan counterbalancing spring anchored at one end and fixed at its other end to said driven member.

17. In a berth structure, supporting end wall

means, a berth pan pivotally mounted at its end on the wall means, upstanding brackets fixed on the front side of the pan, a lee rail having a section above the front side of the pan and an end section above an end of the pan, means pivotally connecting the rail sections together, arms fixed to the front lee rail section and pivotally connected to the brackets, and means pivotally anchoring the end lee rail section to the adjacent wall means, said front lee rail section being swung toward or away from the berth pan by the anchored lee rail end section as the berth pan is swung on its pivots.

18. A prefabricated unitary bed structure for a predetermined space in a room comprising a housing having hollow end wall structures, a top wall, an upper front wall and a bottom front wall, upper and lower berth pans between and pivotally mounted on said end wall structures, said pans being spaced vertically when moved to stored position and said upper pan being spaced from said upper front wall when in vertical stored position, gearing structures in one end wall structure operable to swing the berth pans into vertical stored position or horizontal position, flaps for closing the space between said berth pans and the space above the upper berth when in vertical position, and means in said end wall structure operated by swinging movement of the berth pans for actuating the flaps to close spaces between the berth pans and between the upper berth pan and the front top wall when the pans are swung to vertical stored position.

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