March 30, 1954 G. D. STOUGH 2,673,530

CARGO BRACE STRUCTURE

Original Filed July 23, 1951 2 Sheets-Sheet 1

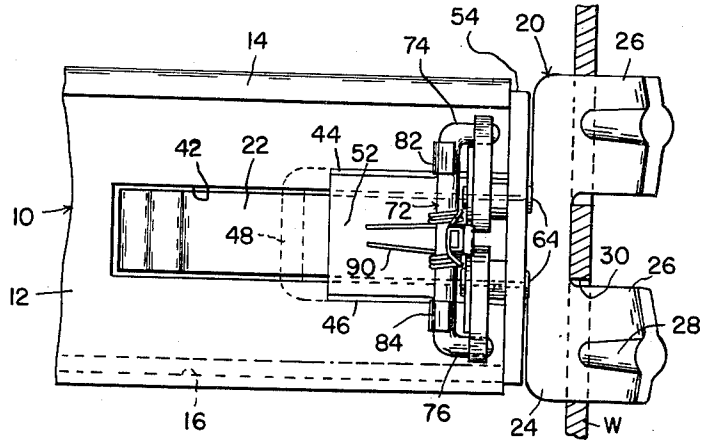

FIG. 1.

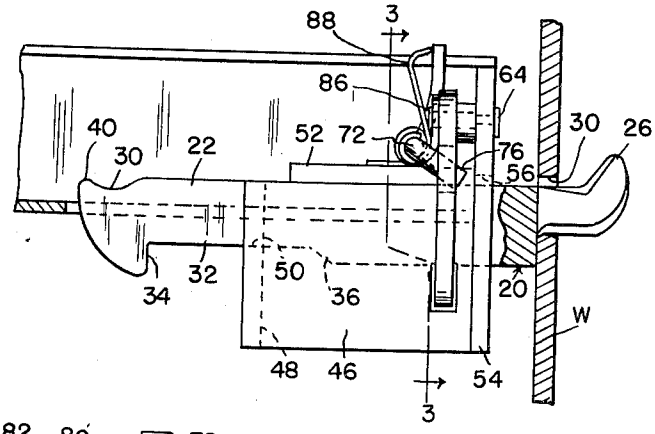

FIG. 2.

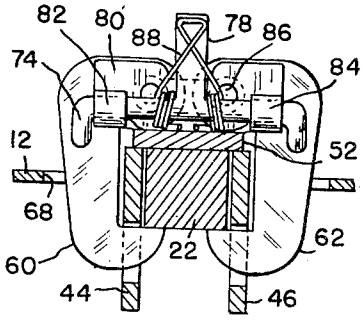

FIG. 3.

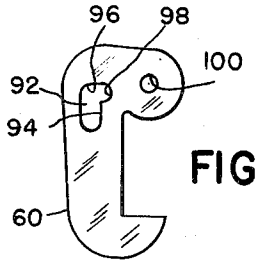

FIG. 4.

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Original Filed July 23, 1951

2 Sheets-Sheet 2

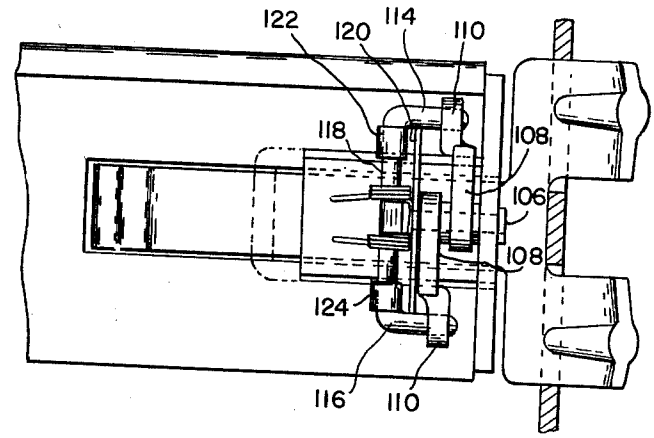

FIG.5.

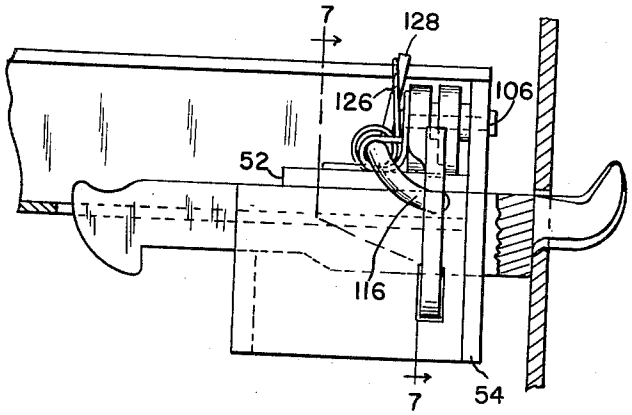

FIG.6.

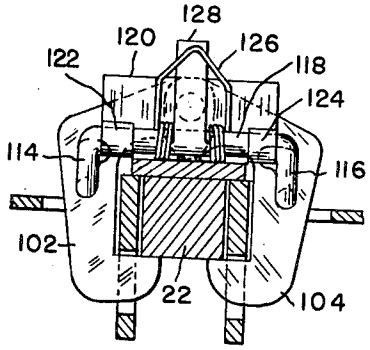

FIG.7.

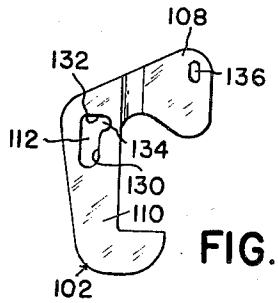

FIG.8.

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Patented Mar. 30, 1954

2,673,530

UNITED STATES PATENT OFFICE

2,673,530

CARGO BRACE STRUCTURE

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Original application July 23, 1951, Serial No. 238,099, now Patent No. 2,652,004, dated September 15, 1953. Divided and this application July 28, 1952, Serial No. 301,360

11 Claims. (Cl. 105—369)

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The present invention relates to cargo brace structure comprising an elongated cross bar having at opposite ends thereof movable supporting heads adapted to fit into and interlock in openings provided in a pair of confronting spaced apart side walls. Cargo braces of this type are widely used in railroad cars, trucks, airplanes and the like, for bracing cargo against movement during transit.

The present invention is an improvement over the structure disclosed in my prior Patent No. 2,567,658 granted September 11, 1951. The present application is a division of my prior copending application Serial No. 238,099 filed July 23, 1951, and entitled "Cargo Brace Structure," now Patent No. 2,652,004, September 15, 1953.

It is an object of the present invention to provide a cargo brace comprising an elongated bar, a supporting head carried at one end of the bar with provision for rocking movement about an axis transverse to the length of the bar, and preferably for movement longitudinally of the bar, in conjunction with latch means operable to retain the movable head in supporting position against rocking movement, movable lock means locking said latch means in latched position, means for moving said lock means to unlocked position, and means operable by movement of said lock means to unlocked position to move said latch means to unlatched position.

More specifically, it is an object of the present invention to provide in apparatus of the character described, a pair of movable latch members mounted for rocking movement toward and away from the movable head, a lock yoke having arms engageable with said latch members, means for moving said arms in one direction to cam the latch members to latched position and to lock them in latched position, and movable in the other direction to first unlock said latch members and then to swing them to release or unlatched position.

Other objects and features of the invention will become apparent as the description proceeds, especially when taken in conjunction with the accompanying drawings, wherein:

Figure 1 is a plan view of a head supporting assembly carried at one end of a cross bar showing a portion of the supporting wall in section.

Figure 2 is a side elevation partly in section of the head supporting structure.

Figure 3 is a section on the line 3—3, Figure 2.

Figure 4 is an elevational view of a single latch member.

Figure 5 is a plan view of a head supporting

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assembly in a different embodiment of the invention.

Figure 6 is a side elevation partly in section of the structure shown in Figure 5.

Figure 7 is a section on the line 7—7, Figure 6.

Figure 8 is an elevational view of a single latch member employed in the assembly illustrated in Figures 5–7.

Reference will now be made to the embodiment of the invention illustrated in Figures 1–4. In these figures the cross bar is illustrated generally at 10 and as disclosed in my prior Patent No. 2,567,658, may comprise a transverse horizontal web 12 having an upstanding flange 14 at one side thereof and a depending flange 16 at the other side thereof. If desired, the cross bar may be completed by elongated wood bars respectively seated in the spaces between the central web 12 and the flange 14 and between the central web 12 and the flange 16. Cross bars of this type are well known and have the advantage of presenting wood exterior surfaces throughout their length for engagement with cargo.

At one end of the cross bar, and preferably at both ends thereof, there is mounted a supporting head 20 which as illustrated herein comprises an elongated shank 22 terminating at its outer end in a laterally extending portion 24 provided at opposite ends thereof with a pair of upwardly curved hooks 26. Each of the hooks 26 is provided with a central thickened rib 28 and the hooks are shaped to be received in openings 30 formed in the walls W. It will be observed that in operative position, as best seen in Figure 2, the ends of the hook portions 26 extend above the upper surfaces of the openings 30 and that accordingly, the hooks 26 cannot be withdrawn from the openings except in conjunction with a swinging movement of the heads 20 in clockwise relationship relative to the cross bars 10.

The shanks 22 of the heads 20 are provided with reduced portions 32 terminating adjacent the rear of the heads 20 in shoulders 34 and terminating forwardly of the head in inclined shoulders 36. The inner or rear ends of the heads 20 are provided with transversely extending recesses 38 leaving abutment shoulders 40 for a purpose which will presently be described.

The transverse web 12 of the cross bar is provided with an elongated slot 42 in which the head 20 is movably received.

The movable head 20 is supported in a housing comprising a pair of side walls 44 and 46 interconnected by a rear wall 48. The side walls occupy lateral extensions in the slot 42 and ex-

tend both above and below the horizontal web 12 of the cross bar. However, the rear wall 48 is cut away and terminates in a shoulder 50, as best seen in Figure 2, on which the reduced portion 32 of the head is supported. A plate 52 is connected to the upper edges of the side walls 44 and 46 and overlies the intermediate portion of the shank 22 of the head 20. The housing structure is completed by an end plate 54 which may be welded or otherwise secured to the forward edges of the side walls 44 and 46 and the forward edge of the plate 52, as well as the adjacent end surfaces of the cross bar. The end plate 54 is provided with a vertical slot 56 in which the forward end of the shank portion 22 of the head is movable.

With the parts in the position illustrated in Figure 2, it will be observed that weight applied to the cross bar 10 is supported by the hook portions 26 of the head, thereby tending to rock the head 20 in a counterclockwise direction about the pivot axis established by shoulder 50. Such counterclockwise rotation however is prevented by engagement of the shank 22 with the plate 52 which engages the upper surface of the shank of the head outwardly of the shoulder 50. It will further be observed that the shoulder 50 of the rear wall 48 constitutes a fixed pivot support about which the head 20 may rock. Thus, in order to withdraw the head 20 from the openings 30 in the wall W the end of the cross bar structure is raised and the head 20 will thereupon rotate relative to the end of the cross bar in a clockwise direction, thus permitting withdrawal of the hooks 26 from the openings 30. When the head 20 is withdrawn from the opening 30 it is retained in assembly with the cross bar by engagement between the shoulder 34 and the rear wall 48 and also simultaneous engagement between the shoulder 40 and the inner end of the top plate 52.

It will also be observed that in the assembled relationship illustrated in Figure 2, the head is longitudinally movable with respect to the cross bar and will therefore accommodate relative approach and separation between a pair of opposed walls W.

In order to prevent inadvertent separation between the cross bars and the walls W, latch means are provided associated with the head which prevent movement of the head relative to the cross bar in the direction which is required to effect removal of the head from the openings in the wall. This means comprises a pair of latch members 60 and 62. The latch members are pivoted to pivot pins 64 carried by the front plate 54. The web 12 of the cross bar is provided with slots 68 through which the latch members extend providing for limited movement thereof, this movement however being sufficient to permit withdrawal of the hook portions 70 of the latch members from beneath the shanks 22 of the head 20.

Means are provided which are effective to lock latch members 60 and 62 in the latching position shown in Figure 3. This means comprises a yoke member 72 having laterally extending arms 74 and 76 provided intermediate the arms 74 and 76 with an actuating finger piece 78. The yoke 72 is carried on the plate 52 by a pivot support 80 having ears 82 and 84 constituting hinge or pivot supports for the intermediate portion of the yoke 72. The support 80 may conveniently be secured in place by the inner ends 86 of the pivot pins 64. It will be observed that the axis

of the pivot support provided by the ears 82 and 84 is somewhat below the axes of the pivot pins 64, the arrangement being such that the arms 74 and 76 may be moved between positions above and below the horizontal plane containing the axes of the pivot pins 64.

Spring means 88 are provided including an upwardly looped portion engaging the rear surface of the finger piece 78 and in inwardly extending portion 90 resting upon the upper surface of the plate 52. The spring is designed so as to apply a clockwise torque to the yoke 72 tending to move its locking arms 74 and 76 downwardly to the locking position best illustrated in Figure 2.

As best seen in Figure 4, the latch members 60 and 62 are provided with generally L-shaped openings 92, these openings having parallel surfaces 94, downwardly facing surfaces 96, and the opening including a horizontal inward extension 98. The ends of the locking arms 74 and 76 are received in the openings 92 and perform a variety of functions therein. It will be appreciated that the parallel locking surfaces 94 are located below the opening 100 provided in the latching members 60 and 62, which opening receives the pivot pins 64. Accordingly, when the arms 74 and 76 engage the surfaces 94 they mechanically block movement of the latch members outwardly to latch release position. As the finger piece 78 is depressed, thereby raising arms 74 and 76, the arms first pass out of engagement with the surfaces 94 thereby unlocking the latch members 60 and 62 for movement toward release position. Thereafter, arms 74 and 76 engage the downwardly facing surfaces 96 of the latch members and apply torque to the members causing the members to swing outwardly relative to each other from latched position to release position. Outward movement of the members is permitted by reason of the inwardly extending portions 98 of the openings 92.

Moreover, it will be observed that when the finger piece 78 is released, while the latch members are in outer released position and the lock arms 74 and 76 are in elevated position, the forces applied by the spring 88 to the finger piece 78 will develop forces tending to move the arms 74 and 76 downwardly. This results in applying torque to the latch members 60 and 62 tending to swing them inwardly to the latched position. When the latch members have reached latched position arms 74 and 76 are in alignment with the vertically elongated portions of the openings 92 and the arms will thereupon move downwardly into locking position in which they again engage the surfaces 94.

Reference is now made to the embodiment of the invention illustrated in Figures 5–8. This embodiment of the invention incorporates many parts which are identical with the embodiment of the invention previously described, to which parts like reference numerals have been applied. The description of the embodiment of the invention illustrated in Figures 5–8 will for the most part be limited to the elements which are different from generally corresponding elements in the first described embodiment of the invention.

In this case latch elements 102 and 104 are constructed and arranged so that they may be suspended from a single pivot pin 106 carried by the front plate 54. To accomplish this the upper portions 108 of the latch members 102 and 104 are laterally offset from the lower portions 110.

Each of the latch elements 102 and 104, as indicated in Figure 8, includes an opening 112 into which extend the locking arms 114 and 116. The arms 114 and 116 comprise a yoke and are connected by a transverse portion 118 mounted in a pivot support 120 having ears 122 and 124. The pivot support 120 may be secured by welding or the like to the upper surface of the plate 52. A spring 126 engages a finger piece 128 rigidly connected to the transverse portion 118 of the yoke. The spring biases the finger piece 128 in clockwise direction as seen in Figure 6, thus urging the locking arms 114 and 116 downwardly to locking position.

As in the embodiment described above, the openings 112 are of generally L-shape and include inner vertical locking surfaces 130, latch opening surfaces 132, and inward extensions 134. It will be observed that the openings 112 are substantially below the elongated openings 136 by means of which the latch members are connected to the pivot pin 106.

Locking arms 114 and 116 extend into the openings 112 and when engaged with the surfaces 130 of the openings positively lock the latch members 102 and 104 against relative outward movement toward unlatched position. However, when the finger piece 128 is depressed and the arms 114 and 116 are raised to come into contact with the surfaces 132, thereby applying torque to the latch members 102 and 104 tending to swing the lower ends thereof apart the shank 22 of the head is thus released for downward swinging movement. This outward swinging movement of the latch members 102 and 104 is permitted by reason of the inward extensions 134 of the openings 112.

The drawings and the foregoing specification constitute a description of the improved cargo brace structure in such full, clear, concise and exact terms as to enable any person skilled in the art to practice the invention, the scope of which is indicated by the appended claims.

What I claim as my invention is:

1. A cargo brace adapted to extend between a pair of spaced apart walls comprising a bar, an elongated supporting head connected to said bar adjacent but inwardly from an end thereof for pivoting movement about an axis transverse to the length of said bar and adapted to engage in an opening in one of said walls, an abutment on said bar above and engageable with said head intermediate its pivot axis and the end of said bar, a latch member pivoted to said bar and including a latch portion adapted to underlie said head outwardly from said pivot axis to support said head against downward swinging movement, and manually releasable lock means carried by said bar and including a portion engageable with said latch member upon movement in locking direction to prevent movement of said latch member, said latch member and lock means including engageable parts effective to move said latch portion from beneath said head upon continued movement of said lock means in unlocking direction.

2. A cargo brace adapted to extend between a pair of opposed walls comprising a bar, a supporting head pivotally supported at one end of said bar and releasably engageable with means on one of said walls, an abutment on said bar above said head and located between the pivot support of said head and the outer end thereof, a pair of latch jaws on said bar outwardly of the pivot support of said head and disposed on opposite sides of said head to swing toward and away from said head to latch or release said head, a lock for said latch jaws comprising a yoke pivoted to said bar including arms straddling said jaws to prevent outward movement thereof, and abutment surfaces on said jaws engageable by said arms on movement of said yoke to release position effective to swing said jaws outwardly to release position upon movement of said lock in unlocking direction.

3. A cargo brace adapted to extend between a pair of opposed walls comprising a bar, a supporting head mounted at one end of said bar for movement longitudinally thereof and for rocking movement about an axis transverse thereto and releasably engageable with means on one of said walls, an abutment on said bar above said head and located between the pivot support of said head and the outer end thereof, a pair of latch jaws on said bar outwardly of the pivot support of said head and disposed on opposite sides of said head to swing toward and away from said head to latch or release said head, a lock for said latch jaws comprising a yoke pivoted to said bar including arms straddling said jaws to prevent outward movement thereof, and abutment surfaces on said jaws engageable by said arms on movement of said yoke to release position effective to swing said jaws outwardly to release position upon movement of said lock in unlocking direction.

4. A cargo brace adapted to extend between a pair of opposed walls comprising a bar, a supporting head pivotally supported at one end of said bar and releasably engageable with means on one of said walls, an abutment on said bar above said head and located between the pivot support of said head and the outer end thereof, a pair of latch jaws on said bar outwardly of the pivot support of said head and disposed on opposite sides of said head to swing toward and away from said head to latch or release said head, a lock for said latch jaws comprising a yoke pivoted to said bar including arms straddling said jaws to prevent outward movement thereof, and spaced abutment surfaces on each of said jaws engageable by one of said arms to effect movement of said jaws by said arms in either direction.

5. A cargo brace adapted to extend between a pair of opposed walls comprising a bar, a supporting head pivotally supported at one end of said bar and releasably engageable with means on one of said walls, an abutment on said bar above said head and located between the pivot support of said head and the outer end thereof, a pair of latch jaws on said bar outwardly of the pivot support of said head and disposed on opposite sides of said head to swing toward and away from said head to latch or release said head, a lock for said latch jaws comprising a yoke pivoted to said bar including arms straddling said jaws to prevent outward movement thereof, spaced abutment surfaces on each of said jaws engageable by one of said arms to effect movement of said jaws by said arms in either direction, and resilient means urging said lock to locking position and thereby urging said jaws to latching position.

6. A cargo brace adapted to extend between a pair of opposed walls comprising a bar, a supporting head mounted at one end of said bar for movement longitudinally thereof and for rocking movement about an axis transverse thereto and releasably engageable with means on one of said walls, an abutment on said bar above said head and located between the pivot

support of said head and the outer end thereof, a pair of latch jaws on said bar outwardly of the pivot support of said head and disposed on opposite sides of said head to swing toward and away from said head to latch or release said head, a lock for said latch jaws comprising a yoke pivoted to said bar including arms straddling said jaws to prevent outward movement thereof, spaced abutment surfaces on each of said jaws engageable by one of said arms to effect movement of said jaws by said arms in either direction, and resilient means urging said lock to locking position and thereby urging said jaws to latching position.

7. A cargo brace comprising a bar, an elongated supporting head pivoted to said bar adjacent the end of said bar for movement about an axis transverse to said bar and located inwardly from the end of said bar and releasably engageable with means on one of said walls, an abutment on said bar above said head and located between the pivot support of said head and the outer end thereof, latch elements on said bar at opposite sides of said head and located intermediate the end of said bar and said pivot axis, said elements being mounted for swinging movement toward and away from each other and including latch portions shaped to engage beneath said head to latch said head in predetermined position, a locking device comprising a yoke pivoted to said bar for rocking movement about an axis transverse to said bar, said yoke including a pair of lock arms engageable with outwardly facing surfaces of said latch elements to prevent outward swinging movement of said latch elements, abutment surfaces on said latch elements engageable by said lock arms on movement thereof in an unlocking direction effective to swing said latch elements outwardly to unlatched position, resilient means effective to urge said locking device toward locking position and to urge said latch elements from unlatched to latching position, and a finger piece for actuating said locking device.

8. A cargo brace adapted to extend between a pair of spaced apart walls having aligned openings therein, said brace comprising a bar having a supporting head at one end thereof, said head comprising a shank and upwardly extending hook means located beyond the end of said bar and movable into and out of a selected opening in a wall, a pivot member on said bar engaging said shank intermediate the ends thereof to support said head for swinging movement about an axis transverse to said bar, abutment means on said bar overlying said shank intermediate said pivot member and the end of said bar to limit upward movement of said head, pivot means on said bar located above said head and intermediate said pivot member and the end of said bar, a pair of latch members carried by said pivot means for swinging toward and away from said shank, abutments on said latch members movable into positions beneath said shank to prevent downward swinging of said head, a latch lock device pivotally mounted on said bar for rocking movement about an axis transverse to said bar, said latch members having camming and locking surfaces engageable by said arms upon downward movement of said arms to cam said latch members inwardly and to lock said latch members in latched position, and additional cam surfaces on said latch members engageable by said arms upon upward movement of said arms to swing said latch members outwardly to release position.

9. A cargo brace as defined in claim 8 in which said arms have operably connected thereto spring means urging said arms downwardly.

10. A cargo brace as defined in claim 8 in which the camming and locking surfaces on said latch members are formed by generally L-shaped openings into which said arms extend.

11. A cargo brace as defined in claim 8 in which said arms are interconnected by a cross member having an operating finger intermediate the ends thereof.

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No references cited.