April 9, 1946. J. A. CROCKER, JR 2,398,289

ROLLING HATCH BEAM CONSTRUCTION

Filed Jan. 10, 1945 4 Sheets-Sheet 1

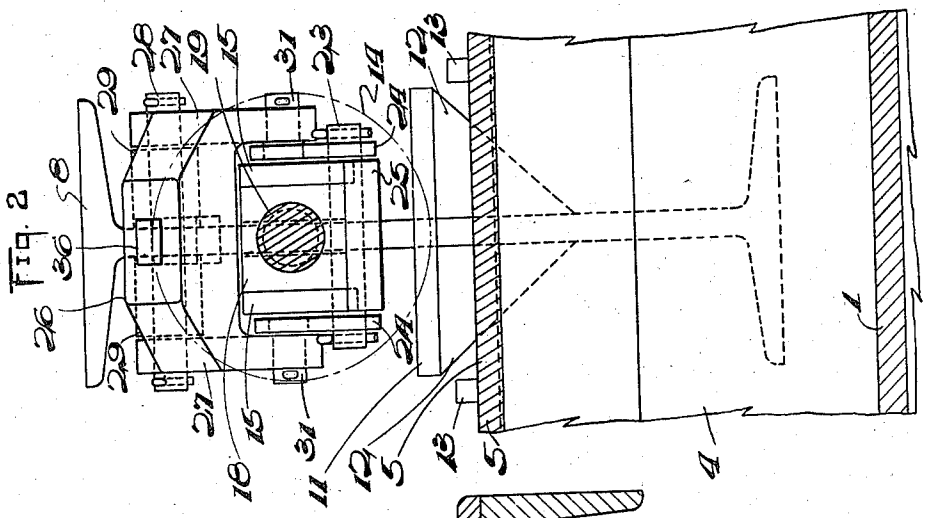


Fig. 2

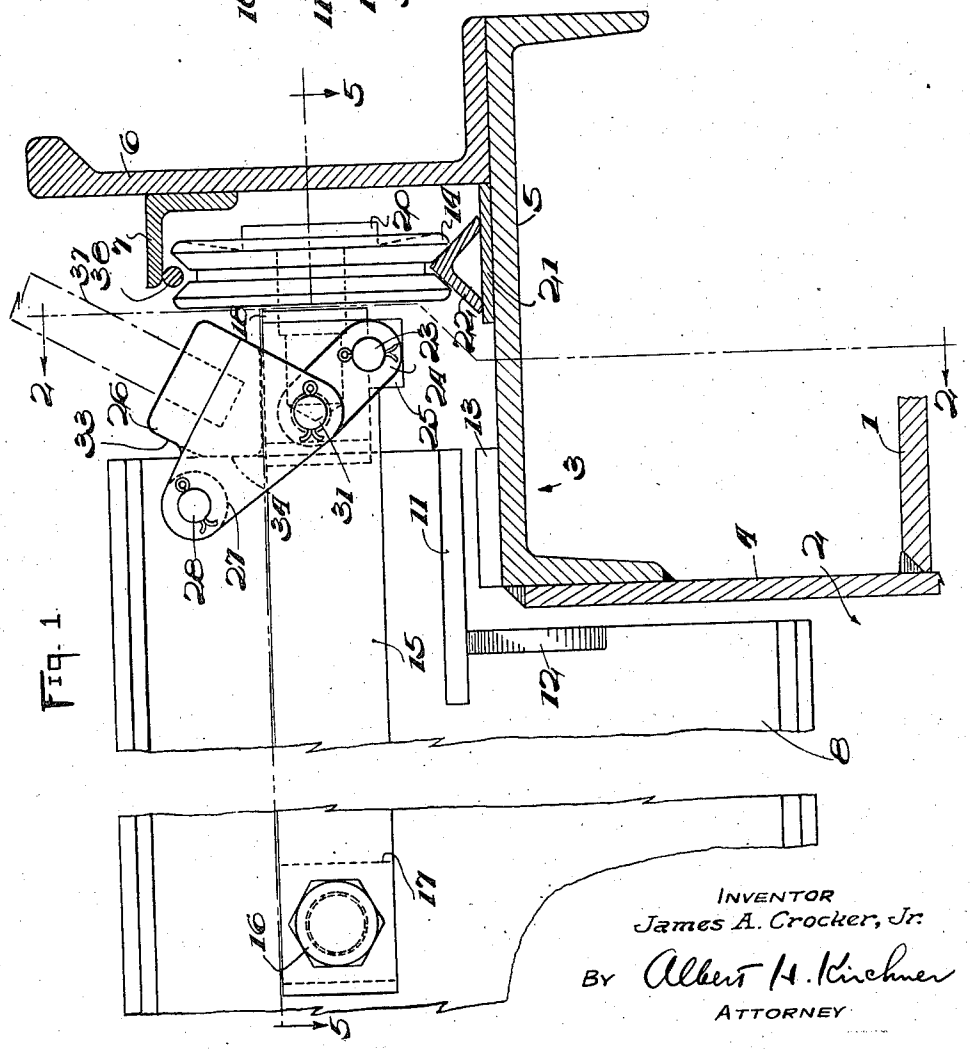


Fig. 1

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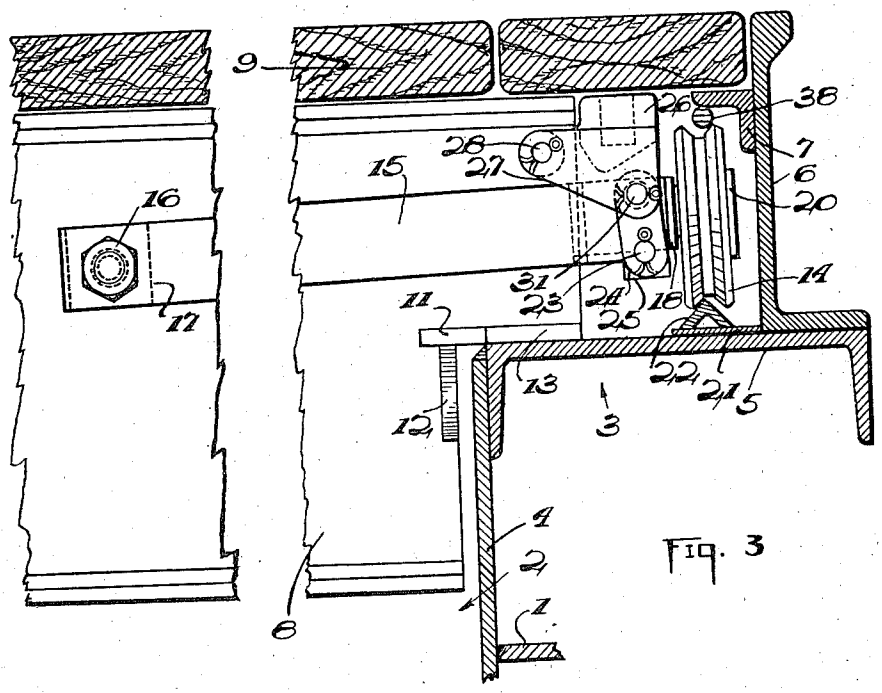


Fig. 3

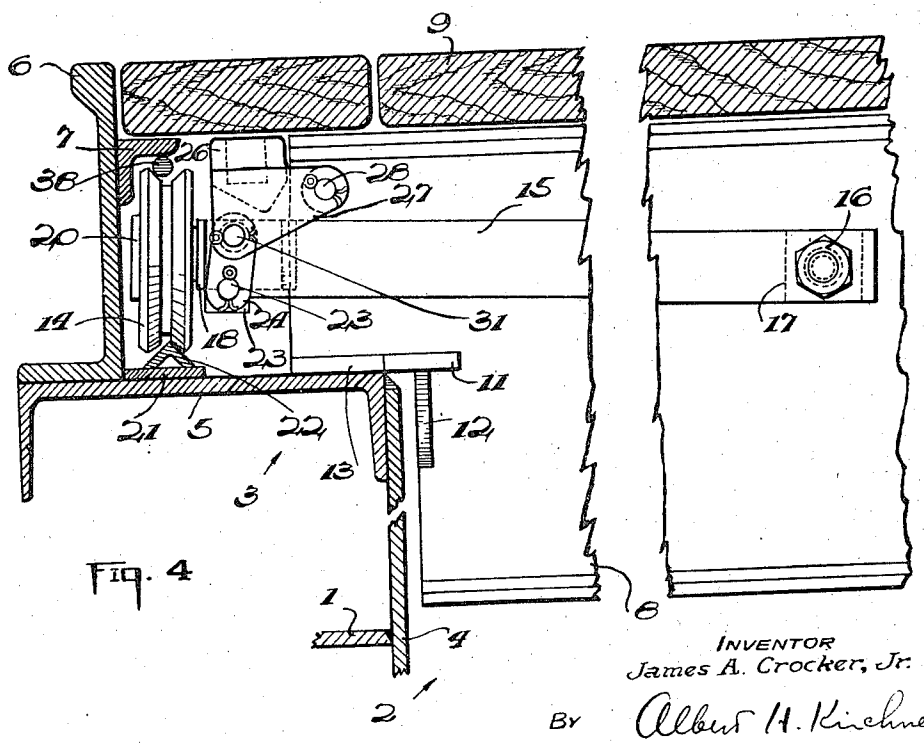


Fig. 4

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ROLLING HATCH BEAM CONSTRUCTION

Filed Jan. 10, 1945 4 Sheets-Sheet 3

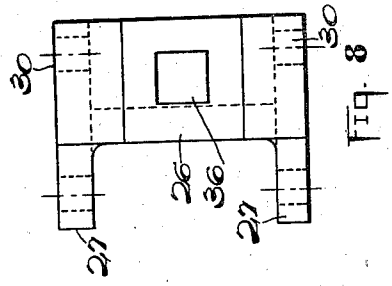


Fig. 8

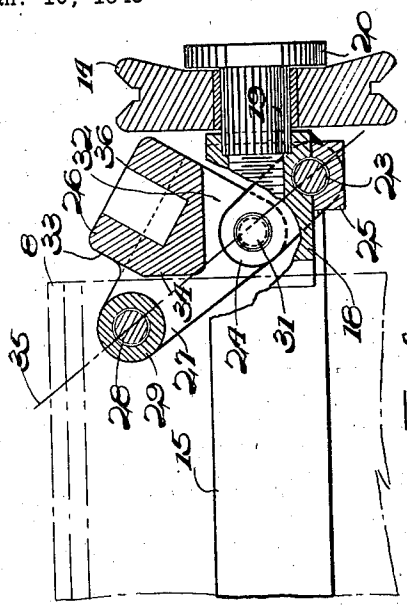


Fig. 6

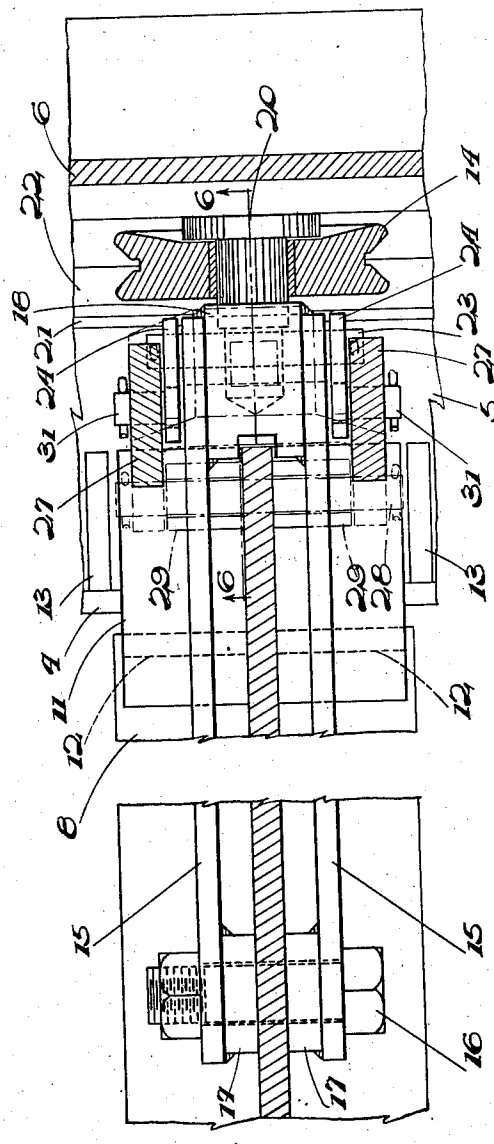


Fig. 5

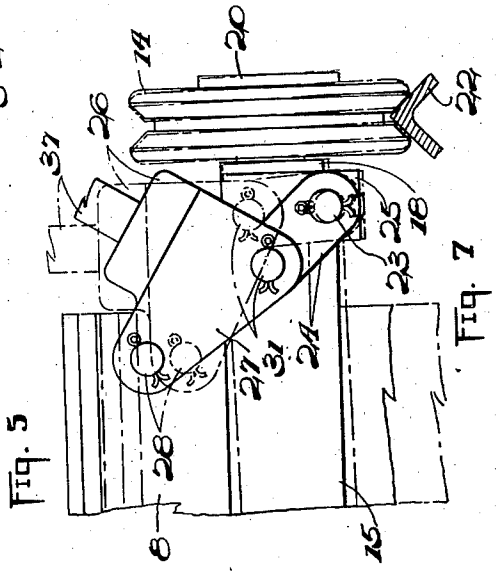


Fig. 7

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ROLLING HATCH BEAM CONSTRUCTION

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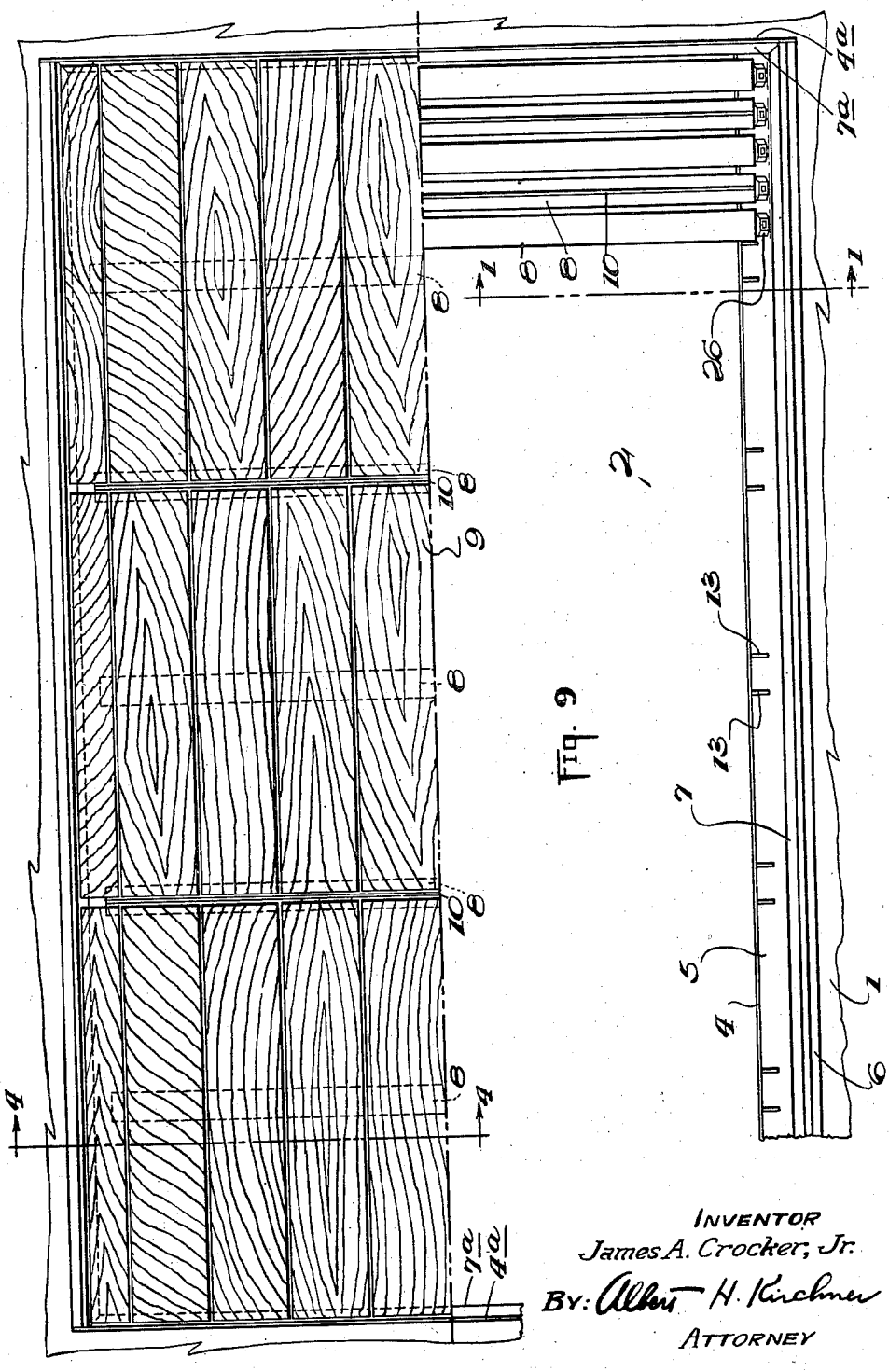


Fig. 9

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Patented Apr. 9, 1946

2,398,289

UNITED STATES PATENT OFFICE

2,398,289

ROLLING HATCH BEAM CONSTRUCTION

James A. Crocker, Jr., Mobile, Ala., assignor to Waterman Steamship Corporation, Mobile, Ala., a corporation of Alabama

Application January 10, 1945, Serial No. 572,116

8 Claims. (Cl. 114—201)

The present invention relates to rolling hatch beams or "strongbacks" and more particularly contemplates improvements in the type of construction disclosed by Deegan U. S. Patent No. 2,332,306 and Lemon U. S. Patent No. 2,332,386.

The hatchways of ships comprise openings in the decks which must normally be maintained closed or covered. In ships of appreciable size the hatchways of each hold are vertically aligned openings provided through the topmost or weather deck and through the lower decks. It is desirable to incorporate great strength in the hatch covers for all decks, particularly in those used for the lower decks since these latter are frequently used to support heavy cargo placed directly on them. The weather deck hatch cover is generally covered only by a tarpaulin to keep water out of the hold but this hatch cover also is best made stout enough to support deck cargo whenever required.

In the preferred types of hatch cover construction in which the present invention may be incorporated, each hatchway is surrounded by a coaming which may take the form of a wall rising two or three feet from the weather deck or as little as a few inches from a lower deck, and heavy wooden battens are laid across the coaming to close the hatchway and provide support for a superposed tarpaulin and/or for cargo. It is necessary to support the battens on the coaming by beams which will reduce the length from one side of the coaming to the other which each batten would otherwise be required to span, and it is to these beams that this invention particularly relates. Since the beams are the important strength-providing members of the complete hatchway covers, they are best made of iron or steel and are quite massive and heavy. Their weight makes it difficult to move them from their normal batten-supporting positions across the hatchway to some removed position in which the hatchway will be open to permit cargo to be passed through it. In some cases deck machinery or other power means has been used to move or remove the hatch beams, but the present invention is concerned with beams of that preferred type which can be moved by manual effort alone from operative positions straddling the hatchway to a collected position at one end of the hatchway, thus leaving the greater part of the area of the hatchway open. Beams of this type are provided with end rollers adapted to run along the coaming so that it becomes an easy matter for one or two deck hands to move the beams on their rollers.

It will be apparent that such beams must be made rollable only at the time they are to be moved and that they must at all other times be held securely against rolling. For this purpose the Deegan and Lemon patents hereinabove identified provide means for selectively projecting and retracting the beam rollers, but those constructions have not proved to be as generally satisfactory as could be desired. A primary object of the present invention is to provide a roller projecting and retracting mechanism which will be superior to those of the Deegan and Lemon patents, and indeed to all other prior art devices known to me, in simplicity of construction, ease, certainty and speed of operation, low cost of manufacture, economy of material required for manufacture, durability, and general proof against failure and breakdown.

An incidental object of a preferred embodiment is to make the roller automatically self-locked in projected position by the operation of moving it from retracted to projected position, so that the beam can then be rolled without requiring a distinct and separate locking operation to prevent the possibility of its accidentally falling back to retracted position during rolling of the beam.

Another object is to render the roller operable betwen its two positions by a very simple and conveniently made movement of a lever through an unprecedentedly short angular swing.

A further object is to make the primary actuating member, which removably receives the operating lever, contribute incidentally to support of the battens in the position which such member assumes when the roller is retracted and the beam is in normal operative position supporting the battens.

Another object is to provide improvements in the roller trackways which will effectively keep both rollers of a given beam on their trackways even though one end of the rolling beam tend to advance beyond the other so that the beam tends to skew.

Other objects and corresponding advantages of the new construction will be sufficiently apparent to those skilled in the art from the present disclosure of an embodiment of the invention which has been found to give satisfactory service in actual use and which is therefore at present preferred by me. In this connection it is to be understood that this disclosure is made by way of exemplification of the invention and is not to be regarded as requiring limitation of the inventive principles to all the details here shown and

described, except to the extent that such limitations may be required by the state of the prior art or may be expressly stated by the appended claims.

In the accompanying drawings, which show the preferred embodiment:

Figure 1 is a vertical cross section taken through the coaming at one side of the hatch, along the line 1—1 of Fig. 9, showing in side elevation one end portion of a beam incorporating the present invention, with the beam raised for rolling;

Fig. 2 is a vertical cross section taken transversely through the roller shaft or pin, along the line 2—2 of Fig. 1, showing a beam and one of its two appurtenant roller-operating mechanisms in end elevation;

Fig. 3 is a cross sectional view generally similar to that of Fig. 1 but differing therefrom by showing the beam lowered to the position which it assumes when the hatch is closed;

Fig. 4 is a view taken along the line 4—4 of Fig. 9, generally like that of Fig. 3 but showing the structure at the opposite side of the hatch;

Fig. 5 is a horizontal cross section, taken along the line 5—5 of Fig. 1, showing one end portion of the beam with its related roller and roller operating mechanism;

Fig. 6 is a vertical cross section, taken along the line 6—6 of Fig. 5, diametrically through the roller and centrally through the roller operating mechanism;

Fig. 7 is a side elevational view of the parts shown in Fig. 6;

Fig. 8 is a top plan view of the primary actuating member of the roller operating mechanism; and

Fig. 9 is a general top plan view of a hatchway, with the upper portion of the figure showing the hatch closed with the beams and battens in place, and with the lower half of the figure showing the hatch open with the battens removed and beams rolled to stowed position at one end.

Referring now to these drawings, the structure provided by the present invention is intended to be applied to any of the decks 1 of a ship of any sort of construction, although the disclosure is made in terms of a ship having metal decking and underframing. The hatchway 2 in such deck is generally rectangular in plan and is surrounded by a coaming 3 including at each of two opposite sides a lower vertical wall plate 4, a lower ledge member 5 extending horizontally outwardly from the top margin of the plate 4 and here shown made of inverted channel iron stock, and an upper vertical wall plate 6 rising from the outer margin of the lower ledge member 5 and here shown made of a lower flanged plate preferably having its upper edge beaded for strength and trim. It will be understood that the hatchways and consequently the coaming structures are generally of rectangular shape, as shown in Fig. 9, and that two of each of the above enumerated coaming members are provided for each hatch, one set being arranged along each of two opposite sides of each hatch, preferably the port and starboard sides, and that all the members are welded or otherwise secured to each other and to the decking or deck framing. For a purpose hereinafter to be explained, each upper wall plate 6 is best provided with an upper ledge member 7 inwardly extending from a zone near its top edge and conveniently made, as shown in the drawings, of a length of angle iron. The ends of the coaming, i. e., those walls of shorter length shown at the right and left hand edges of Fig. 9, which generally comprise the fore and aft ends of the hatch, need not be provided with ledges 5 but may each consist in effect of a flat plate 4a rising straight from the hatchway and equal approximately to the combined heights of the plates 4 and 6, and having an inwardly directed ledge 7a at the level of the upper ledge 7.

The general principles of batten-supporting movable hatch beams are best shown in Fig. 9, from which it will be seen that a plurality of beams 8, such as the five here used, are disposed in regularly spaced relation across the width of the hatch with their ends supported by the ledges 5 and with heavy wooden battens 9 extending along the length of the hatch, across and supported by the beams. For ease in handling it is convenient to use battens that are shorter than the length of the hatch. A typical arrangement is that shown by Fig. 9 in which the hatch may be assumed to be approximately twenty-four feet long and the battens approximately eight feet long. Five beams adequately support these battens in side to side abutment so as to cover the hatch completely and provide a strong foundation for a tarpaulin or for cargo. It will be noted that in this arrangement each batten is supported centrally by a beam and at each end by a beam or the coaming ledge 5. For convenience in placing and holding the battens, each of the second and fourth beams is provided along the length of its top with an upstanding rib 10 (shown only in Fig. 9) which divides and positions the ends of the battens which the beam supports.

The lower half of Fig. 9 indicates how the beams are moved to stowed position at one end of the hatch, after the battens have been removed, in order clear the hatchway for passage of cargo. In the present type of construction, like that of the Deegan and Lemon patents, this movement of the beams is accomplished by rolling them by means of rollers provided one on each end of each beam which ride along the lower ledges 5 of the coaming. The present invention is concerned principally with the means for mounting these rollers and for moving them between operative and inoperative positions, and the details of this arrangement will now be described.

The opposite ends of each beam are provided with seats for resting on the ledges 5 of the coaming. These seats may be simply the bottom surfaces of the end portions of the beams, but I prefer to form them by notching out the lower end corners of the beams, as shown in the drawings. As there indicated, each beam element is a length of I-beam which is notched out by cuting through its web and lower flange at each lower end corner and welding in the vertex of the notch a horizontal seating plate 11 supported by a pair of gussets 12. When the beam is in lowered position, as shown in Figs. 3 and 4, the seating plates rest on the ledges 5, preferably between small cleats 13 which are welded to the ledges to serve as spacing stops for the beams, and when the beam is in raised position, as shown in Figs. 1 and 2, the notches and seating plates clear the ledges 5 and the cleats 13 so that the beam can be moved along the ledges as by means of the rollers 14.

These rollers are mounted in pairs on each beam, one roller at each end of the beam, and the rollers are made movable with relation to the beam so that the beam can be raised and lowered on the roller at each of its ends. A convenient mounting arrangement comprises pivoting a pair of parallel arms 15 by the bolt 16 passed through

the web of the beam near each of its end portions so that each pair of arms extend lengthwise of the beam and project slightly beyond the beam end. Spacers 17 between the beam web and the two arms are provided to separate the arms so that their projecting ends are far enough apart to embrace a roller support in the form of a block 18 which is welded or otherwise secured to the arm ends and which may be tapped and counterbored to receive the end of a pin or shaft 19 having a head 20 which mounts the roller 14. Since the shaft 19 is not normally intended to be removed from the roller supporting block 18, a drive fit may be substituted for the screwthreading, or a dowel may be added to lock the shaft in the block.

This roller, which may be of any suitable antifriction, lubricated or self-lubricating type, is best made peripherally grooved or flanged and runs along a trackway laid along the ledge 5, here shown as consisting of a floor plate or strip 21 to which are welded the flange edges of an angle iron 22 the vertex of which is thereby mounted uppermost for interfitting the tread groove of the roller.

It will be apparent that with the roller kept constantly on the rail 22, the adjacent beam end can be raised or lowered by swinging the pair of arms 15 about their common pivot 16. This swinging movement is accomplished and controlled by the toggle-jointed link mechanism which will now be described.

Pivoted by the pin 23 to each side of the lower portion of the roller support 18 are a pair of short links 24. In the illustrated construction the roller support is shown conveniently made of an oblong block of mild steel or the like which is approximately square in cross section, so that a small cap piece is used to give it enough effective thickness to bear the pin 23. An operating member in the form of a block 26, shown in plan in Fig. 8, is bifurcated with the fairly widely separated inwardly extending short arms 27 which are pivoted by the bolt 28 to the web of the beam very near the end of the beam at a point above the arms 15, and spacers 29, like the spacers 17, separate these arms from the web of the beam. The outer end portions of the arms 27 are perforated near the bottom of the block 26, at 30, to pass two short axially aligned pins 31 which pivotally connect the links 24 to the block so that these links are by the pins 31 toggle-jointed to the arms 27 of the block which arms are therefore, in effect, link elements of a toggle mechanism 24, 31, 27. The block 26 is appropriately shaped, with a wide slot 32 to pass and straddle the roller support 18 and with the obliquely related upper and lower inner surfaces 33 and 34 respectively formed on its main or bridging portion which may abut the end edge of the beam web and thereby limit the range of swinging movement of the block about its pivot 28. The angle of the lower surface 34 is so chosen with relation to the line of centers connecting the apertures in the block which receive the pin 28 and the two pins 31 that when the block is swung down to its lowered position, as shown to best advantage in Fig. 6, the center of toggle-joint pins 31 will be below or beyond the line 35 connecting the centers of the pins 23 and 28. In other words, the toggle link members 24 and 27 will have moved past dead center and the mechanism will be held in the Fig. 6 position by the weight of the beam 8 and any load imposed thereon.

The main or bridging portion of the block 26 has a socket 36 formed through its upper surface for reception of an operating handle or lever 37 (Figs. 1 and 5) and the height of this portion of the block is best made such that when the block is swung to its upper limit, as shown in Figs. 3 and 4, the top surface of the block will be substantially co-planar with the top surfaces of the beam 8 and the upper ledge 7. It will be evident from Figs. 3 and 4 that this relation provides good support for a batten 9 in what would otherwise be an open space between the coaming and the end edge of a beam.

A rail 38, conveniently made in the form of a round rod, may be welded to the under side of the upper ledge 7 to interfit with the flanged or grooved roller and thereby not only prevent derailment but also limit skewing movement of the roller resulting from any tendency of the roller at one end of a beam to advance beyond the roller at the other end.

In operation, the normal, closed-hatch position of the parts is shown in the upper half of Fig. 9 and in Figs. 3 and 4. At each end of each beam the operating block 26 is in its upper position, with the surface 33 abutted against or disposed close to the end edge of the beam, which results in the toggle mechanism being collapsed and the beam being lowered so that the seating plate 11 rests on the lower ledge 5 between a pair of cleats 13 and all the weight of the beam, the placed battens 9 and all superposed load is transmitted directly through the beam web to the ledge 5. No part of this load is carried by the rollers or their supports or the arms 15. When it is desired to open the hatch the battens are first removed, then an operating handle 37 is inserted in the exposed socket 36 of the operating member 26 at each end of a selected beam, either simultaneously by two operators or successively by one, and the members 26 are swung down by outboard pulls on the handles through the relatively small angle of approximately 30 degrees indicated in Fig. 7 to the position shown in Figs. 1 and 6 and in full lines in Fig. 7. This expands the toggle mechanism and locks it beyond the dead center position, as has been explained, so that the arms 15 are lowered relatively to the beam or, more accurately speaking, the beam is raised on the rollers 14 to elevate the bearing plates 11 from the spaces on the ledge 5 between the cleats 13. The beam is now supported on the rollers at its opposite ends and it can be propelled along the track 22 to one end of the hatch, as shown in the lower half of Fig. 9. In this rolling movement the upper rails 38 assist in guiding the rollers so that neither can advance much beyond the other; hence the beam can be pushed from along one side only of the hatch without danger of such skewing as might otherwise result in jamming or binding. When all the beams have been rolled to one end, the hatchway is open and the beams may, if desired or thought necessary, be there lowered onto the ledge and locked in place for secure stowing by interfitting beyond the endmost cleat 13 (see Fig. 9) or beyond a special cleat provided for this purpose.

The parts are restored to closed position of the hatch by a reversal of the foregoing operation, as will be obvious.

It is believed that from the foregoing the details of a preferred embodiment of the invention will be sufficiently evident to those skilled in the art, and that it will be apparent that the illustrated details may be modified considerably with-

out departing from the spirit of the invention as pointed out by the appended claims.

I claim:

1. A rolling hatch beam construction comprising a hatch beam, a roller support movably mounted on an end portion of the beam, and toggle-jointed links pivotally connected to the support and to the beam with the links angularly related to each other when the beam is in lowered position and adapted to be swung toward alignment to raise the beam.

2. A self-locking rolling hatch beam construction comprising a hatch beam, a roller support movably mounted on an end portion of the beam, and toggle-jointed links pivotally connected to the support and to the beam with the links angularly related to each other when the beam is in lowered position and adapted to be swung past aligned relation of the links to lock the beam in raised position.

3. A rolling hatch beam construction comprising a hatch beam, a pair of arms pivoted to the web of the beam and extending in parallelism beyond an end of said web, a roller support connecting the projecting ends of the arms, a bifurcated block mounted above the roller support and having its arms pivoted to the web of the beam near the named end thereof, and a pair of links each having one end pivoted to the roller support and each having its other end pivoted to the block whereby said links and the arms of the block are toggle-jointed, so that swinging the block about its arm pivots will raise and lower the beam with relation to the roller support.

4. A self-locking rolling hatch beam construction comprising a hatch beam, a pair of arms pivoted to the web of the beam and extending in parallelism beyond an end of said web, a roller support connecting the projecting ends of the arms, a bifurcated block mounted above the roller support and having its arms pivoted to the web of the beam near the named end thereof, and a pair of links each having one end pivoted to the roller support and each having its other end pivoted to the block whereby said links and the arms of the block are related as to toggle-jointed members, so that swinging the block about its arm pivots will raise and lower the beam with relation to the roller support, said block having a surface between its arms adapted to abut the end edge of the beam web when the toggle-jointed members have swung past dead center in raising the beam, thereby locking the beam in raised position.

5. A self-locking rolling hatch beam construction comprising a hatch beam, a roller support movably mounted on an end portion of the beam, toggle-jointed links pivotally connected to the support and to the beam with the links angularly related to each other when the beam is in lowered position and adapted to be swung past aligned relation of the links to lock the beam in raised position, and a member socketed to receive an operating handle formed integral with one of said links with the socket thereof extending vertically upwardly when the beam is in lowered position and extending outwardly and upwardly at an acute angle to the vertical when the beam is locked in raised position, whereby the range of angular movement of said socketed member and handle is substantially less than ninety degrees.

6. A rolling hatch beam construction comprising a hatch coaming, vertically spaced horizontal ledges disposed along opposite sides of the coaming and extending inwardly of the hatchway, a hatch beam extending across the hatchway and having downwardly facing seats formed on its end portions for resting on the lower ledges, a roller mounted on each end of the beam for running along the adjacent lower ledge, and toggle-jointed link means for raising each end of the beam relatively to the adjacent roller to lift the beam seats from the lower ledges, one element of said means including a member having an upper surface which is co-planar with the top of the beam and the upper ledge of the coaming when the beam seat is resting on the lower ledge whereby said member, upper ledge and beam all provide support for a batten.

7. A rolling hatch beam construction comprising a hatch beam, a roller support mounted on each end portion of the beam, and means for moving the beam up and down with relation to said roller supports, said means comprising toggle-jointed members connected to each roller support and to the beam and including a member accessible from a point adjacent to the top of the beam at an end thereof and movable angularly downwardly and outwardly from the beam end to raise the beam.

8. A self-locking rolling hatch beam construction comprising a hatch beam, a roller support mounted on each end portion of the beam, and means for moving the beam up and down with relation to said roller supports, said means comprising toggle-jointed members connected to each roller support and to the beam and including a member accessible from a point adjacent to the top of the beam at an end thereof and movable angularly downwardly and outwardly from the beam end to raise the beam, said member having a surface adapted to abut the end of the beam and prevent further movement of the members when the members are swung past aligned relation in raising movement of the beam.

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