United States Patent [19]

Nagy et al.

[11] **3,797,411**

[45] **Mar. 19, 1974**

[54] **TROUGH HATCH OPERATING ARRANGEMENT**

[75] Inventors: **Ernest J. Nagy**, Munster; **William R. Shaver**, Griffith; **Ronald W. Marsh**, Michigan City, all of Ind.

[73] Assignee: **Pullman Incorporated**, Chicago, Ill.

[22] Filed: **Dec. 11, 1972**

[21] Appl. No.: **313,905**

[52] **U.S. Cl.** **105/377**

[51] **Int. Cl.** **B61d 39/00**

[58] **Field of Search** 105/377; 292/256.5, 241; 220/44, 24; 296/100; 52/45

[56] **References Cited**

UNITED STATES PATENTS

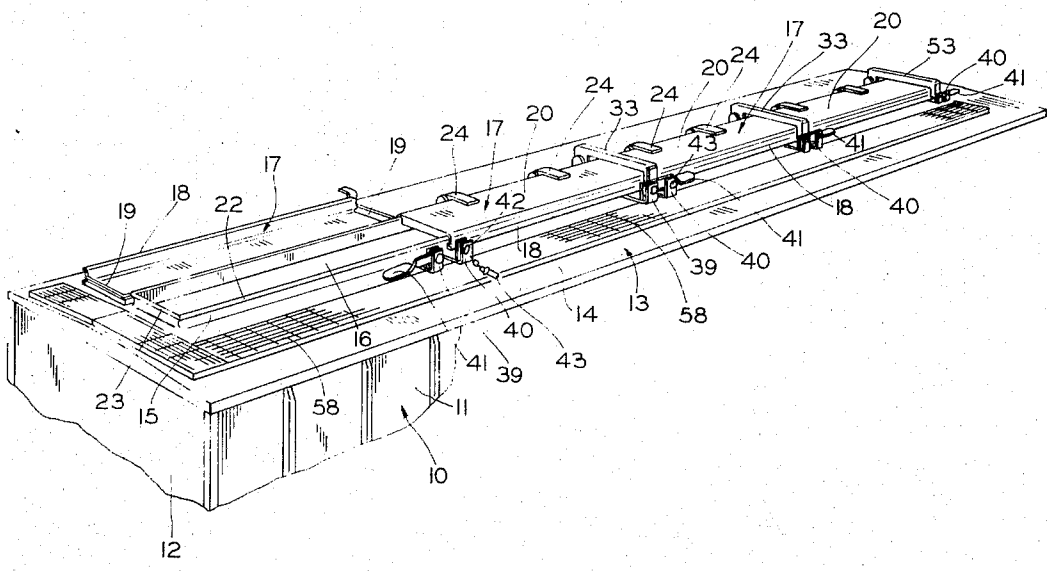
2,372,369	3/1945	Ditchfield	105/377
2,547,859	4/1951	Duffie et al.	105/377
3,522,774	8/1970	Beezhold	105/377
3,523,506	8/1970	Williams et al.	105/377
3,599,576	8/1971	Vickerman	105/377
3,605,639	9/1971	Ingram	105/377
3,664,270	5/1972	Stark	105/377

Primary Examiner—Robert J. Spar
Assistant Examiner—Richard A. Bertsch
Attorney, Agent, or Firm—Hilmond O. Vogel

[57] **ABSTRACT**

A hopper type railway car is provided with a longitudinally extending hatch opening having a plurality of longitudinally spaced covers movable from open to closed positions. The covers are adapted to overlie rectangular coamings defining each of the openings, with said covers being hingedly connected to the roof of the railroad car and including operating means for moving the covers laterally, initially from a closed position, thereby disengaging locking means whereby the covers may then be hingedly moved to open position. The operating means is actuated by holddown members which provide leverage for initiating a caming mechanism effective to provide for said lateral movement and also seal and lock the covers in a closed position.

8 Claims, 12 Drawing Figures



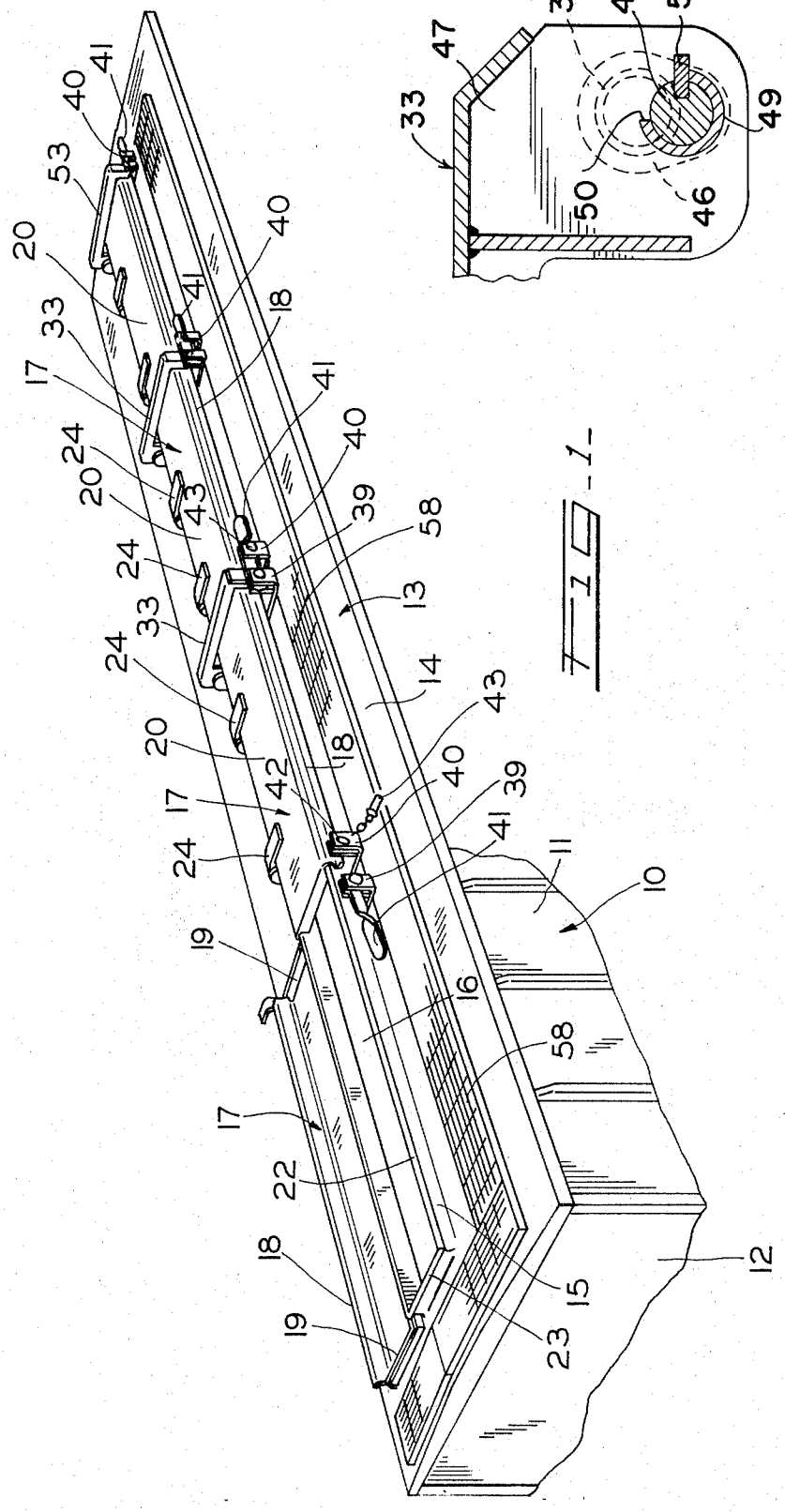

41
40
53
20
40
41
18
33
17
41
24
20
43
40
39
58
24
13
33
24
14
43
20
18
42
40
17
39
24
41
11
10
19
16
58
17
22
18
15
12
19
23

FIG-1

32
48
51
47
33
49
50
46

FIG-12

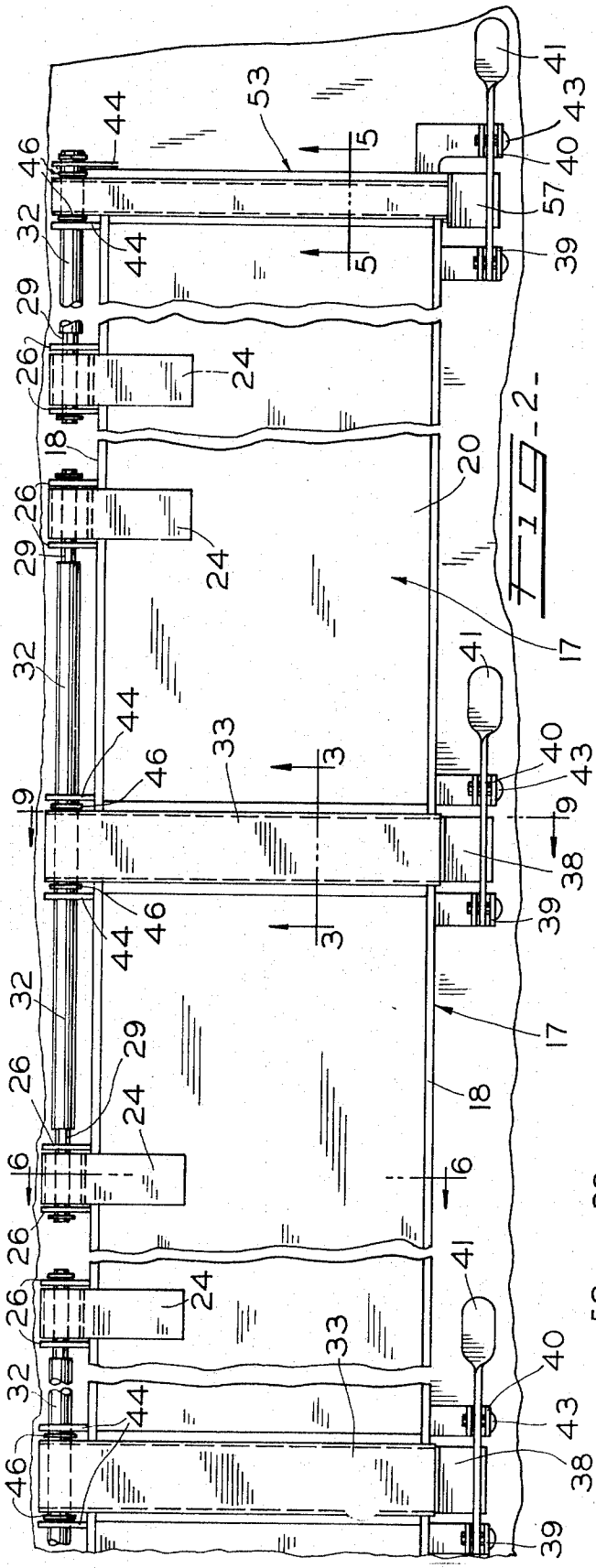


FIG. 2

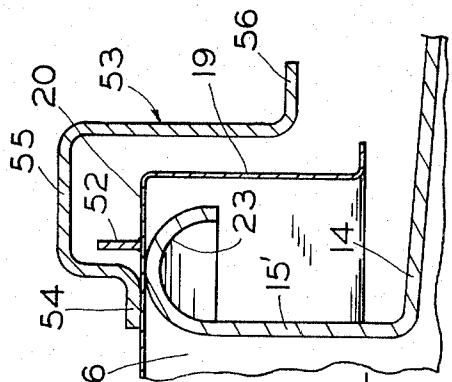


FIG. 5

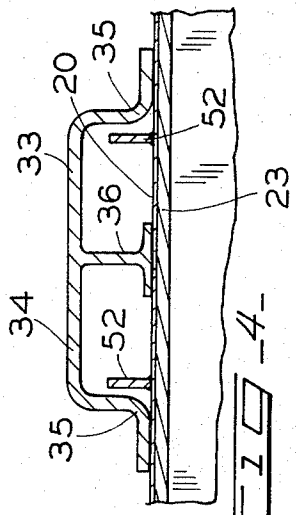


FIG. 4

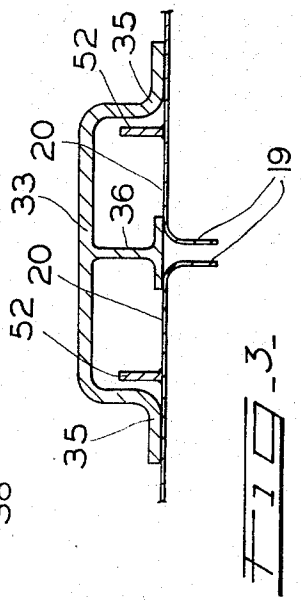
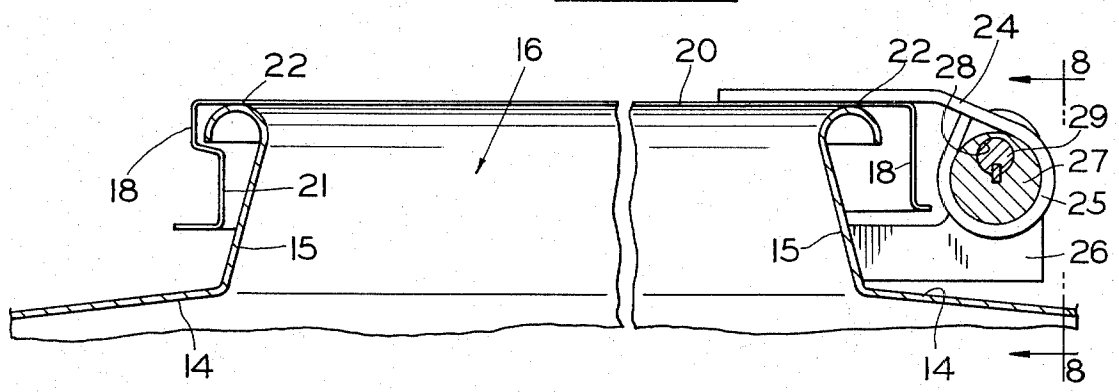


FIG. 3

FIG. 6



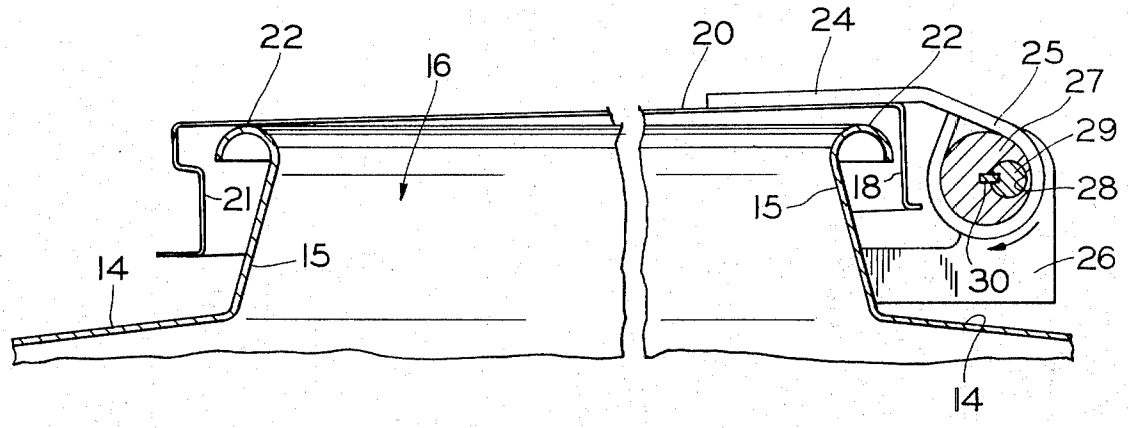


FIG. 7

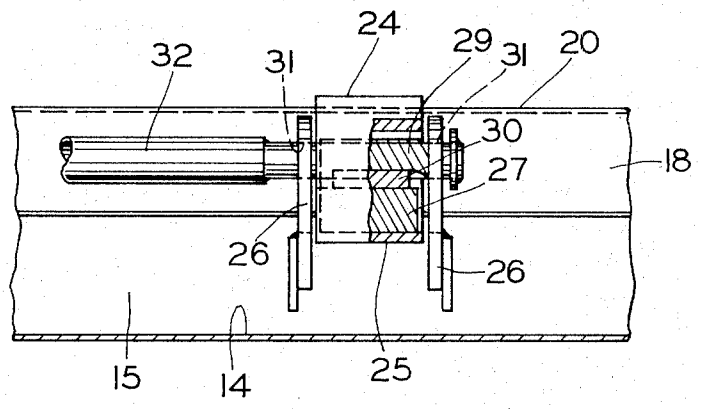


FIG. 8

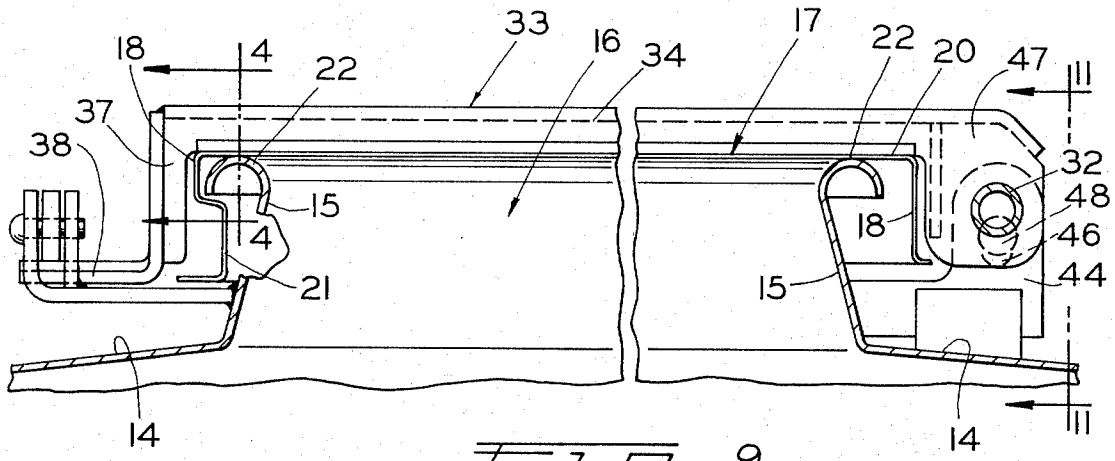


FIG. 9

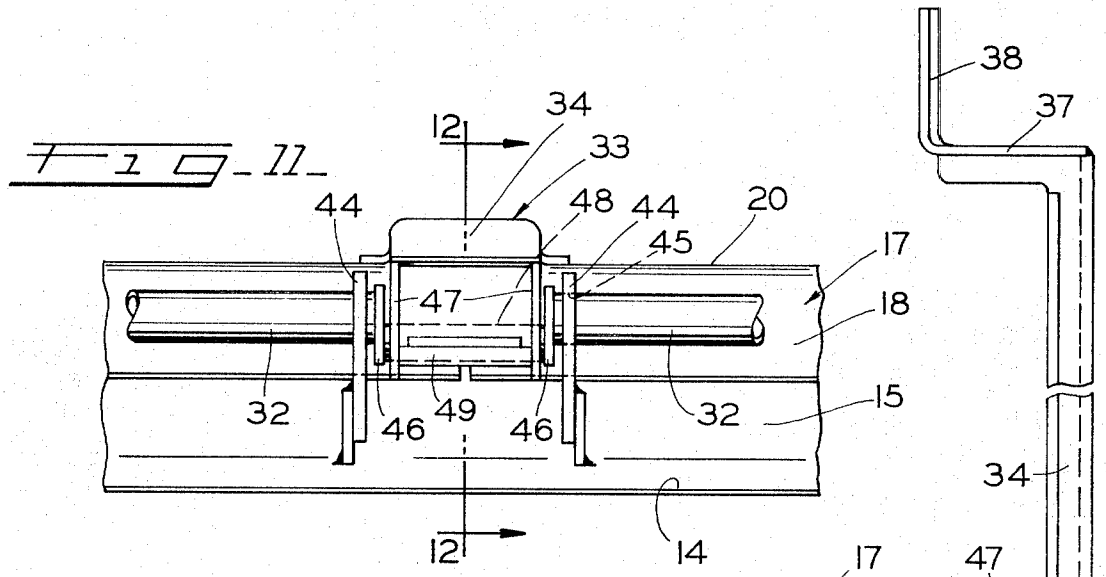


FIG. 11

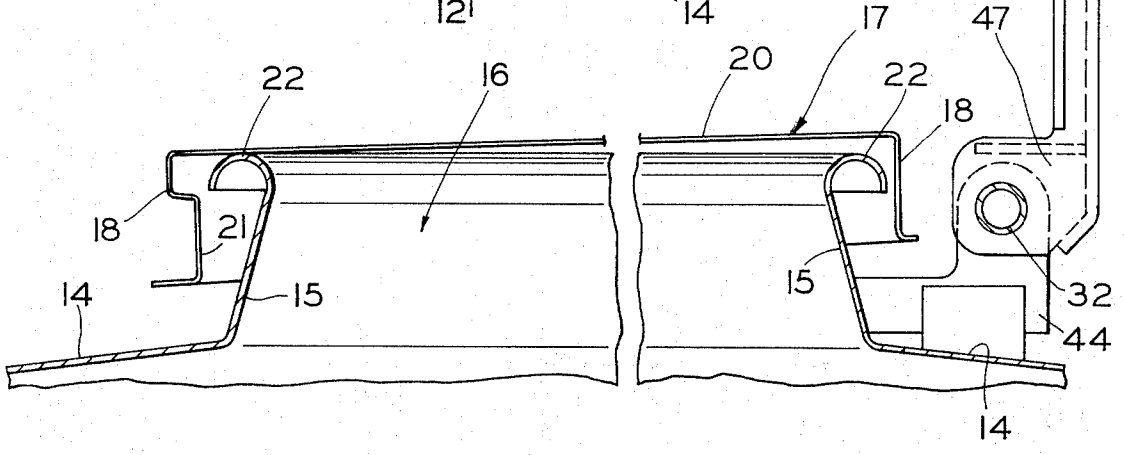


FIG. 10

TROUGH HATCH OPERATING ARRANGEMENT

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to hopper type cars having longitudinally extending hatch openings with covers therefor and more specifically relates to operating mechanism for locking and unlocking the hatch covers from the openings.

2. Description of the Prior Art

Actuating devices for longitudinal hatch openings and covers are disclosed in U.S. Pat. Nos. 3,175,518, Mar. 30, 1965; 3,176,630, Apr. 6, 1965; 3,259,078, July 5, 1966 and 3,522,774, Aug. 4, 1970. The aforementioned patents disclose longitudinal hatch openings in the roof of hopper cars which are closed by means of a plurality of hatch covers individually moved between open and closed positions, the covers being hingedly mounted on the roof of the car and including suitable holddown and locking arrangements which tightly seal the covers in position. Laterally movable covers are disclosed in U.S. Pat. Nos. 2,372,369, Mar. 27, 1945 and 2,547,859, Apr. 3, 1951.

SUMMARY OF THE INVENTION

The present invention resides in an improved locking arrangement for locking longitudinal hatch covers over a longitudinal opening provided in the roof of a hopper car. The hatch opening is provided with a coaming which has upwardly projecting arcuate flanges overhanging the roof of the railway car. The hatch covers in turn also include rectangular vertical walls which in the closed position of the cover overlap the coaming. At least one of the vertical walls of each hatch cover is provided with inwardly extending projections along one side thereof which in the closed position project inwardly and underneath the flanged coaming to prevent hinged movement of the covers to an open position and to provide an effective weather seal by virtue of its interengagement or underlying relation of the projection with respect to the coaming flange. A camming mechanism is provided which is actuated by the holddown lever to initially move the hatch cover laterally from the closed position to permit disengagement of the inward projection of the cover and of the coaming flange, thereby permitting the cover to be raised to its open position. Each hatch cover is provided with holddown arms adjacent opposite ends thereof and with camming arrangements so that one end of each cover may be initially moved laterally and the other end may then be sequentially moved in the same manner to provide for disengagement or locking action of the hatch covers relative to the hatch opening.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of the upper end of a hopper car showing a hatch and hatch cover arrangement;

FIG. 2 is an enlarged plan view showing longitudinally adjacent hatch covers with operating mechanism therefor;

FIG. 3 is a cross sectional view taken substantially along the line 3—3 of FIG. 2 showing a holddown arm in closed position;

FIG. 4 is a cross sectional view taken substantially along the line 4—4 of FIG. 9;

FIG. 5 is a cross sectional view taken substantially along the line 5—5 of FIG. 2;

FIG. 6 is a cross sectional view taken substantially along the line 6—6 of FIG. 2;

FIG. 7 is a view similar to FIG. 6 showing another position of a hatch cover in relation to the hatch opening;

FIG. 8 is a cross sectional view taken substantially along the line 8—8 of FIG. 6;

FIG. 9 is a cross sectional view taken substantially along the line 9—9 of FIG. 2;

FIG. 10 is a view similar to FIG. 9 showing a hatch cover in a partially open position with a holddown in disengagement;

FIG. 11 is a sectional view taken substantially along the line 11—11 of FIG. 9; and

FIG. 12 is a cross sectional view taken substantially along the line 12—12 of FIG. 11.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to drawings, a railway car **10** is provided with sides **11** and ends **12** supporting a roof structure **13.** The roof structure **13** may comprise a plurality of interconnected roof sheets **14.** The roof structure **13** is provided with longitudinally extending and horizontally spaced side coamings **15** which at opposite ends of the car are interconnected by vertical end coamings **15'**, as shown in FIG. **5.** The coamings **15** and **15'** provide an elongated hatch opening **16** extending longitudinally and centrally substantially the length of the roof **13.** The hatch opening **16** may be closed by a plurality of hatch covers generally designated at **17.** The hatch covers **17** each include vertical side walls **18** and end walls **19** suitably interconnected with a top sheet **20.** As best shown in FIGS. **6, 7, 9** and **10,** one of the vertical side walls **18** is provided with an inwardly projecting portion or configuration designated at **21.** The projecting portion **21** in the closed and locked position of the hatch cover, as shown in FIG. **9,** underlies and extends inwardly with respect to a longitudinal arcuate flange portion which extends longitudinally coextensive with the coaming **15** and projects outwardly with respect thereto. Each of the covers **17** is suitably supported for hinging movement relative to the hatch opening **16** by means of hinge brackets **24** which are secured to the top sheet **20** and which each include a journal loop **25** or cam follower. Hinge brackets **26** disposed on opposite sides of the journal loop **25** are secured to the coaming **15** and supported by the roof **13.** A cylindrical cam **27** is rotatably supported within each journal loop **25.** Each cam **27** is provided with a longitudinally extending bore **28** which is eccentric or offset laterally with respect to the axis of the cam **27.** A pair of shafts or rods **29** project through the bores **28** and are keyed to the cams **27,** as indicated at **30.** This is particularly shown in FIG. **8.** The brackets **26** are provided with aligned openings **31** through which the shafts **29** project, the same being secured within a pair of rotatable pipes **32** which extend in longitudinally spaced relation along one side of the hatch cover.

Holddown arms **33** of channel shaped construction are positioned over adjacent ends of covers, as best shown in FIG. **2.** In other words, holddown arms **33,** as best shown in FIG. **3,** are disposed at adjacent ends or vertical walls **19** of adjacent covers **17.** As shown in FIG. **5,** at opposite ends of the longitudinal openings

16, laterally extending combing 15' interconnects the ends of the longitudinally extending side coamings 15. The holddown arms at the ends of the opening will be described later, it being understood that adjacent ends of the hatch covers 17 are associated with the type of holddown arms 33, as shown in FIGS. 3 and 4. The holddown arms 33 include horizontal strap portions 34 having, as best shown in FIGS. 3 and 4, flanges 35 which are adapted to engage the top surfaces 20 of the hatch cover 17 in clamping relation. An inverted T-shaped member 36 on each arm 33 also is adapted to engage the upper ends of adjacent end walls 19 of the cover 17 to secure the same downwardly over the hatch opening 16. The ends of the strap portions 34 are provided with a downwardly extending vertical wall portion 37, having connected thereto a flange member 38.

As best shown in FIGS. 1 and 2, brackets 39 and 40 are provided on longitudinally spaced sides of the holddown arms 33, a lock lever 41 being pivotally supported on the brackets 39, and in the locked position being held therein by means of removable pins 43 which extend through holes 42 in the lock brackets 40. Each of the holddowns 33 is hingedly supported by means of hinge brackets 44 suitably connected to the roof 13. As best shown in FIG. 11, the brackets 44 are disposed on opposite sides of the holddown arm 33 and portions of the pipes 32 extend through openings 45 adjacent to vertical plates 47, secured to the end of the strap portion 34. The pipes 32 have connected thereto fingers 46 which, as best shown in FIGS. 9 and 11, project downwardly and which have connected thereto a short section of rod or cylindrical bar 48. As best shown in FIG. 12, the bar 48 is offset laterally relative to the axis of the pipes 32. A sleeve 49 is rigidly secured at its ends to the vertical plates 47 and is rotatable relative to the rod bar 48. The sleeve 49 also includes a slot 50 extending substantially the length thereof. A key 51 is rigidly connected to the rod bar 48.

At opposite ends of the hatch opening there is provided a special holddown 53 of the type disclosed in FIG. 5. The end holddown 53 includes a flange 54 connected to a channel shaped part 55 having a lower flange 56. Each of the end holddowns 53 is provided with a lock flange 57 similar to the flange 58 of the holddown arms 33. As best shown in FIG. 4, the top sheet 20 of each of the covers is provided with laterally extending vertical wall portions 52 which cooperate with the flanges 35 and 54 to seal the hatch covers in the closed position against the entrance of water, etc. The holddowns 34 and 53 each function identically insofar as their relation to shafts 32 is concerned. The end holddowns 53, of course, have only one shaft 32 extending therefrom.

OPERATION

In FIG. 1 the elongated trough of hatch opening 16 is covered by three of the hatch covers 17. The portion of the opening 16 on the left has the hatch covers 17 moved to an open position. The closed position is also shown in FIGS. 2, 6 and 9. Assuming that the hatch covers are in the closed position, as shown in FIG. 9, and the operator now wishes to open them, the following takes place. The operator disengages the lock arm 41 of one of the end holddown arms 53. He thereupon moves the one end holddown arm in a clockwise position, as indicated in FIG. 10. Movement of the arm 53 to the position shown in FIG. 9 provides for rotation of the sleeve 49 of the mechanism at one end hatch cover. The lost motion connection provided by the slot 50 permits the arm to move freely to the vertical position. He now moves the arm further in a clockwise manner and since the end of the slotted portion 50 is in engagement with the key 51, the rod 48 is rotated, thus, rotating the shafts 32. The arm is now rotated another 90° to a position substantially horizontal with the roof and as the holddown arm is thus rotated, this provides for rotation of the shafts 29 which project into the cylindrical cam 27 at the end of the cover. The cylindrical cam 27 is now moved also counterclockwise and because of its offset relation relative to the loop or follower 25, the cover end is moved to the position shown in FIGS. 7 and 10 from the position shown in FIGS. 6 and 9. In FIGS. 6 and 9 the inwardly projecting portion 21 of the wall 18 is disposed underneath and in overlapping ralation relative to the longitudinal projecting arcuate flange 22 of the coaming 15. In the open position the inwardly projecting portion 21 is moved outwardly so that the cover may now be hingedly moved to a completely open position as shown in the left hand cover of FIG. 1. The operator now goes to the other end of the same end hatch cover which has been laterally moved only at one end or now actuates the holddown arm 33 in the same manner which now causes the other end of the hatch to be moved laterally to the position desired. In other words, one end of each cover is moved laterally outwardly or inwardly as desired between open and locked positions and then the other end of the hatch cover is moved in a similar manner, whereupon the operator may simply raise the hatch cover to its open position. Thus, the lateral movement of each end of each cover is sequential. He then goes to the next cover and then to the cover at the end, operating them in the same manner until they are all in open position. For closing the hatch covers, the rotation of the holddown arms 33 is merely in a counterclockwise manner and the reverse operation occurs for moving the hatch covers 17 back to the closed position shown in FIG. 9. The covers are sufficiently flexible over their lengths and with respect to their connections and dimension tolerances, permitting one end to be laterally moved before the other.

Thus, it is apparent that the holddown arms serve the purpose of holding the covers in their locked positions and at the same time are used as actuating arms for moving the covers laterally from an effectively closed to an open position. This provides for double security insofar as effective closure of the hatch covers is concerned and protects the cargo from the elements since an effective sealing action is provided in view of the interengaging actions of the projecting portions of the cover and coaming. Also, as best shown in FIG. 13, all the covers in the open position may be moved flat on the running boards 58 supported on the roof around the hatch openings.

What is claimed is:

1. A railway car including a roof having an elongated hatch opening extending longitudinally,

first vertical coaming walls extending about said opening,

a least one of said walls having an outwardly projecting ledge overhanging said opening,

a pair of hatch covers having ends positioned relatively longitudinally in adjacent relation for covering said opening,

said covers including second vertical walls in the closed covering position being positioned outwardly and extending downwardly in overlapping relation relative to said first walls, certain of said second vertical walls having inwardly projecting portions adapted to underlie said ledge, the improvement of a hinge and locking arrangement for each cover, each comprising:

a pair of first hinge brackets connected to each cover inwardly from the ends of said cover,

a second pair of hinge brackets supported on said roof,

first and second shafts rotatably supported on said second brackets,

an enlarged cylindrical cam member rotatably supported on each said first hinge bracket,

said shafts being eccentrically connected respectively to said cam members,

a first holddown arm connected to said first shaft for rotation therewith,

said first arm being connected to one end of one of said covers and including clamping means engaging said cover,

a second holddown arm at the opposite end of said first cover,

said second arms being connected for rotation with said second shaft,

said second arms including horizontally spaced second clamping means engaging said adjacent ends of said covers,

means locking said arms to said roof to clamp said covers in closed position,

said arms being swingable upwardly from said locked position to rotate said shafts whereby said covers are moved laterally relative to said opening and thereby move said inwardly projecting portions outwardly from said ledges and said covers may be hingedly moved to an open position.

2. The invention in accordance with claim **1**, said holddown arms being sequentially movable whereby said opposite ends of said cover are moved laterally sequentially.

3. The invention in accordance with claim **1**, said holddown arms having a lost motion connection with said shafts.

4. The invention in accordance with claim **3**, said lost motion connection providing initial movement of said arms to an upright position prior to rotation of said shafts.

5. The invention in accordance with claim **1**, said first hinge brackets having cam follower means associated with each cam.

6. The invention in accordance with claim **1**, said holddown arms including portions overlapping said ends of said cover to seal said ends with respect to said opening.

7. The invention in accordance with claim **6**, said portions including flanges on said clamping means.

8. The invention in accordance with claim **1**, said covers and holddown arms being movable approximately 180° to lie flat on said roof in an open position.

* * * * *