July 30, 1946. T. MADLAND 2,405,040

HATCH COVERS AND LOCKING MEANS THEREFOR

Filed June 2, 1944 2 Sheets-Sheet 1

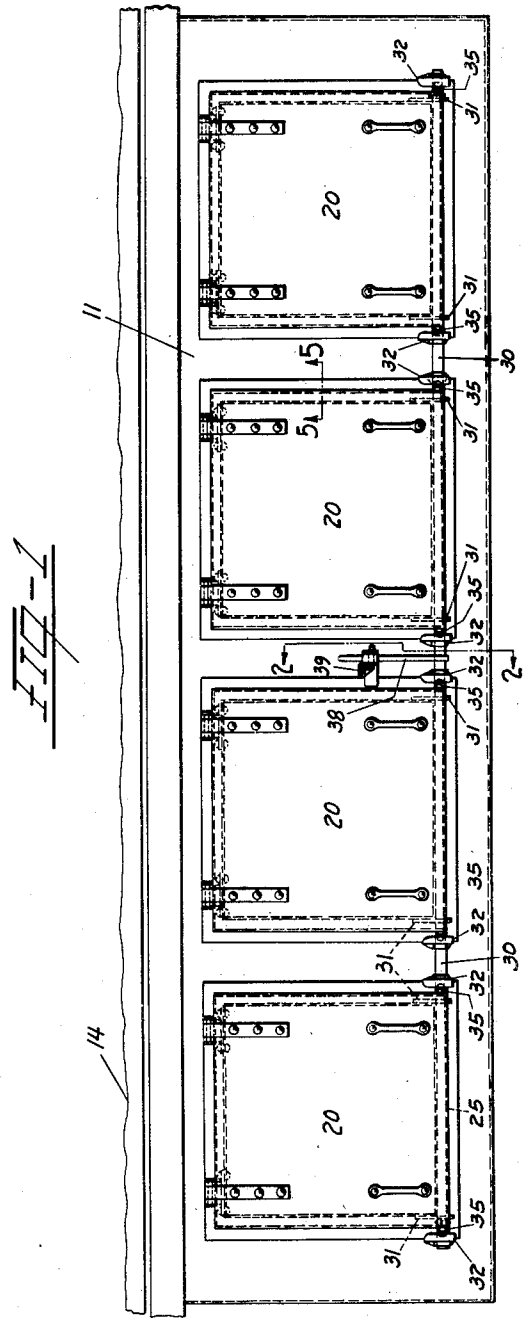


FIG. 1

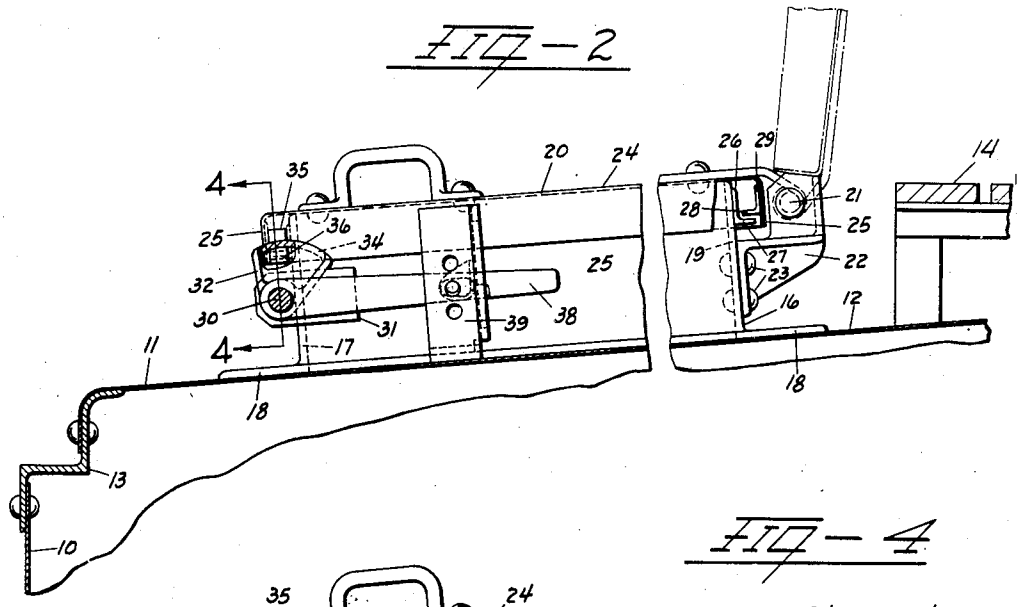
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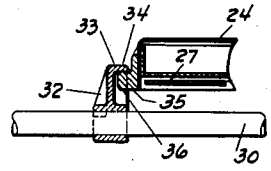
HATCH COVERS AND LOCKING MEANS THEREFOR

Filed June 2, 1944 2 Sheets-Sheet 2

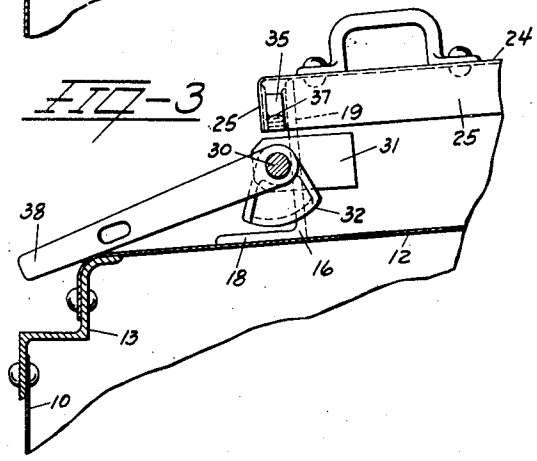
FIG—2



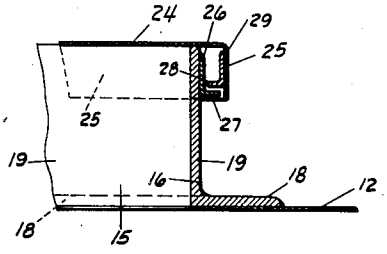
FIG—4



FIG—3



FIG—5



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HATCH COVERS AND LOCKING MEANS THEREFOR

Thorvald Madland, Chicago, Ill., assignor to The Youngstown Steel Door Company, Cleveland, Ohio, a corporation of Ohio

Application June 2, 1944, Serial No. 538,353

9 Claims. (Cl. 105—377)

1

This invention relates to hatch covers and locking means therefor and particularly to hatch covers and locking means for covered railway hopper cars.

It is an object of this invention to provide series of hatch covers for covered railway hopper cars and locking means for said covers wherein substantially direct locking pressure is obtained together with substantial elimination of torsional stresses in the locking means.

A further object is to provide locking means for series of hatch covers which shall embody locking abutments and shafts disposed in substantially vertical alinement.

A further object is to provide locking means for series of hatch covers which shall embody locking abutments secured to the covers and locking detents secured upon rotatably mounted shafts wherein the abutments and detents are so constructed and related that locking engagement does not occur until substantially final rotation of the detents whereby the torsional stresses normally set up in the shafts are substantially eliminated.

A further object is to provide locking means for series of covers for hatch frames which shall embody abutment members secured to the covers and locking detents secured upon shafts rotatably supported in close proximity to the hatch frames and in substantially vertical alinement with the abutment members.

A further object is to provide locking means for series of covers for hatch frames embodying abutment members extending from the sides of the covers adjacent to and within the outer edge of the covers and locking detents secured upon shafts rotatably supported upon the hatch frames in close proximity thereto and in substantially vertical alinement with the abutment members.

Other objects of the invention will become clear as the description thereof proceeds.

In the drawings forming part of this specification:

Fig. 1 is a fragmentary plan view of a roof of a covered railway hopper car provided with hatches including hatch covers and locking means therefor embodying the instant invention.

Fig. 2 is a vertical section with parts broken away taken on line 2—2 of Fig. 1 showing a hatch cover closed and the locking means therefor in locking position.

Fig. 3 is a fragmentary section similar to Fig. 2 showing a hatch cover in closed position and the locking means therefor in unlocked position.

2

Fig. 4 is a vertical section taken on line 4—4 of Fig. 2.

Fig. 5 is a vertical section taken on line 5—5 of Fig. 1.

Referring to the drawings, numeral 10 designates a portion of a covered railway hopper car which is provided with a roof 11 formed of metallic sheets 12 supported at their ends upon substantially W-shaped side plates 13. The roof 11 supports the customary running board 14. A series of hatches 15 are formed in the roof 11 and are disposed in longitudinally spaced relationship as more clearly shown in Fig. 1 of the drawings. It is to be understood that similarly disposed hatches are formed on the portion of the roof which is not illustrated and that the number of hatches in a series may be more or less than illustrated.

A hatch frame 16 is secured to the roof 11 around each of the hatches. As shown each frame is rectangular in section and is formed of angles 17 arranged with one leg 18 supported upon and secured to the roof in any desired manner. The leg 19 of each of the frame angle members extends upwardly and constitutes means for supporting hatch covers 20 pivotally secured thereto as indicated at 21 by means of a plurality of brackets 22 fastened as by means of rivets 23 to the hatch frames.

As more clearly shown in Fig. 2 of the drawings, the hatch covers 20 are preferably formed of sheet metal so as to provide a main body portion 24 having a continuous peripheral flange 25 depending therefrom in spaced relationship to the upstanding leg 19 of the hatch frames. An angle member 26 is secured around the upstanding leg 19 of each of the hatch frames adjacent to the upper edge thereof. One leg 27 of this angle extends outwardly so as to be disposed below the inwardly extending leg 28 of an angle member 29 fastened around the depending flange 25 of each of the covers. By this arrangement the angle members 26 and 29 serve to provide means for preventing moisture and dirt from blowing up between the hatch frame and the peripheral flange of the cover and over the top of the hatch frame into the car.

Means is provided for the purpose of locking the series of hatch covers. As illustrated, this means embodies a continuously extending shaft 30 rotatably supported by the hatch frames 16 by means of a plurality of brackets 31 secured in any desired manner to the frames above the roof. As more clearly shown in Fig. 2 of the drawings, the illustrated mode of support of the shaft places

it in closely proximate relationship to the hatch frames and substantially vertically below the outer portion of each of the hatch covers.

A plurality of locking detents 32 are mounted upon the shaft 30 so as to rotate therewith. With particular reference to Figs. 2 and 4 of the drawings, it will be seen that the detents 32 are provided with a flange 33 the inner surface of which constitutes a cam 34.

Locking abutments 35 are provided on each hatch cover of the series for cooperation with the locking detents in order to fasten the hatch covers in closed position. As more clearly appears from Figs. 1 and 4 of the drawings, each of the locking abutments 35 is secured as by means of welding to the peripheral flange 25 at each side of the hatch covers 20. The locking abutments are disposed within the outer edge of the hatch covers so that they lie substantially vertically above the shaft 30. Each locking abutment is substantially angular in section and the outwardly extending leg 36 thereof is formed with a curved upper surface as indicated at 37.

A lever 38 secured to the shaft is utilized to impart rotation thereto.

The manner of locking the series of hatch covers in closed position will be apparent from the foregoing description taken in connection with the drawings. Assuming that the hatch covers have been closed and the locking means and lever are in the position shown in Fig. 3 of the drawings to lock the hatch covers the lever 38 is grasped and moved in the direction of the running board of the roof. Movement of the lever as indicated imparts rotation to the shaft 30 and to the locking detents mounted thereon. The internal cam 34 formed on each of the locking detents initially clears the outwardly extending leg 36 of each of the locking abutments 35 as it moves into overlapping relationship therewith. By reason of its contour the internal cam 34 gradually approaches the curved surface 37 of the leg 36 of the locking abutment and in the final rotation of the shaft and the locking detent locking engagement between the internal cam and the curved surface 37 is established. As more clearly shown in Fig. 2 of the drawings, this locking engagement lies substantially in vertical alinement with the axis of rotation of the shaft. It will, therefore, be apparent that in view of the occurrence of the locking engagement in the final rotation of the shaft and the detents, and in view of the locking engagement lying substantially vertically above the axis of rotation of the shaft, torsional stresses in the shaft are almost entirely eliminated. In order to maintain locking engagement between the detent and the abutment members, means indicated generally by the reference numeral 39 may be utilized to lock the lever.

It will be apparent that numerous changes and modifications in the details of the invention will be clear to those skilled in the art. It is intended, therefore, that all such modifications and changes be comprehended within this invention, which is to be limited only by the scope of the claims appended hereto.

I claim:

1. In a railway car having a roof, a series of spaced hatches in said roof, hatch frames secured around said hatches, pivotally mounted covers for said hatch frames, a shaft extending in front of said hatch frames, means on said frames rotatably supporting said shaft in close proximity to said frames, locking detents mounted on said shaft, abutment members on said covers, said members extending beyond the sides of said covers substantially vertically above said shaft and means for rotating said shaft and swinging said detents into locking engagement with said abutment members, said engagement between said abutment members and said detents lying in substantially vertical alinement with the axis of rotation of said shaft, said detents engaging said abutment members substantially in the final rotation of said shaft.

2. In a railway car having a roof, a series of spaced hatches in said roof, hatch frames secured around said hatches, pivotally mounted covers for said hatch frames, a shaft extending in front of said hatch frames, means on said frames rotatably supporting said shaft in close proximity to said frames, locking detents having internal cams mounted on said shaft, abutment members having curved surfaces on said covers, said members extending beyond the sides of said members substantially vertically above said shaft and means for rotating said shaft and swinging said cams above and into locking engagement with said curved surfaces on said abutment members, said locking engagement occurring substantially vertically above the axis of rotation of said shaft and substantially in the final swinging movement of said cams.

3. In a railway car having a roof, a series of spaced hatches in said roof, hatch frames secured around said hatches, pivotally mounted covers for said hatch frames, a shaft extending in front of said hatch frames, means rotatably supporting said shaft in close proximity to said frames, locking detents having internal cams mounted on said shaft, abutment members on said covers lying substantially vertically above said shaft and means for rotating said shaft and swinging said cams above and into locking engagement with said abutment members, said engagement occurring substantially vertically above the axis of rotation of said shaft.

4. In a railway car having a roof, a series of spaced hatches in said roof, hatch frames secured around said hatches, pivotally mounted covers for said hatch frames, a shaft, means rotatably supporting said shaft, locking detents having internal cams mounted on said shaft, curved abutment members on said covers lying substantially vertically above said shaft, and means for rotating said shaft and swinging said cams above and into locking engagement with said curved abutment members, said locking engagement occurring substantially vetrically above the axis of rotation of said shaft and substantially in the final swinging movement of said cams.

5. In a railway car having a roof, a series of spaced hatches in said roof, hatch frames secured around said hatches, pivotally mounted covers for said hatch frames, a shaft, means rotatably supporting said shaft in close proximity to said frames, locking detents having internal cams mounted on said shaft, abutment members on said covers lying substantially vertically above said shaft, and means for rotating said shaft and swinging said cams above and into locking engagement with said abutment members.

6. In a railway car having a roof, a series of spaced hatches in said roof, hatch frames secured around said hatches, pivotally mounted covers for said hatch frames, a shaft, means rotatably supporting said shaft substantially inwardly of the outer edge of said covers, locking detents having internal cams mounted on said shaft, abutment

members extending from the sides of said covers substantially inwardly of the outer edge thereof, and means for rotating said shaft and swinging said cams above and into locking engagement with said abutment members.

7. In a railway car having a roof, a series of spaced hatches in said roof, hatch frames secured around said hatches, pivotally mounted covers for said hatch frames, a shaft, means secured to said frames above said roof rotatably supporting said shaft substantially inwardly of the outer edge of said covers, locking detents having internal cams mounted on said shaft, abutment members extending from the sides of said covers substantially inwardly of the outer edge thereof, and means for rotating said shaft and swinging said cams above and into locking engagement with said abutment members.

8. In a railway car having a roof, a series of spaced hatches in said roof, hatch frames secured around said hatches, pivotally mounted covers for said hatch frames, a shaft, means rotatably supporting said shaft substantially inwardly of the outer edge of said covers, locking detents having internal cams mounted on said shaft, abutment members extending from the

sides of said covers substantially inwardly of the outer edge thereof, and means for rotating said shaft and swinging said cams above and into locking engagement with said abutment members, said cams and said abutment members being constructed and associated in such a way that said locking engagement occurs substantially in the final swinging movement of said cams.

9. In a railway car having a roof, a series of spaced hatches in said roof, hatch frames secured around said hatches, pivotally mounted covers for said hatch frames, a shaft, means rotatably supporting said shaft substantially inwardly of the outer edge of said covers, locking detents having internal cams mounted on said shaft, abutment members extending from the sides of said covers substantially vertically above said shaft, and means for rotating said shaft and swinging said cams above and into locking engagement with said abutment members, said cams and said abutment members being constructed and arranged in such a way that said locking engagement occurs substantially vertically above the axis of rotation of said shaft and substantially in the final swinging movement of said cams.

THORVALD MADLAND.