March 6, 1945. E. R. SCHROEDER 2,370,998

SAFETY LOCK LEVER

Filed Sept. 25, 1941 2 Sheets-Sheet 1

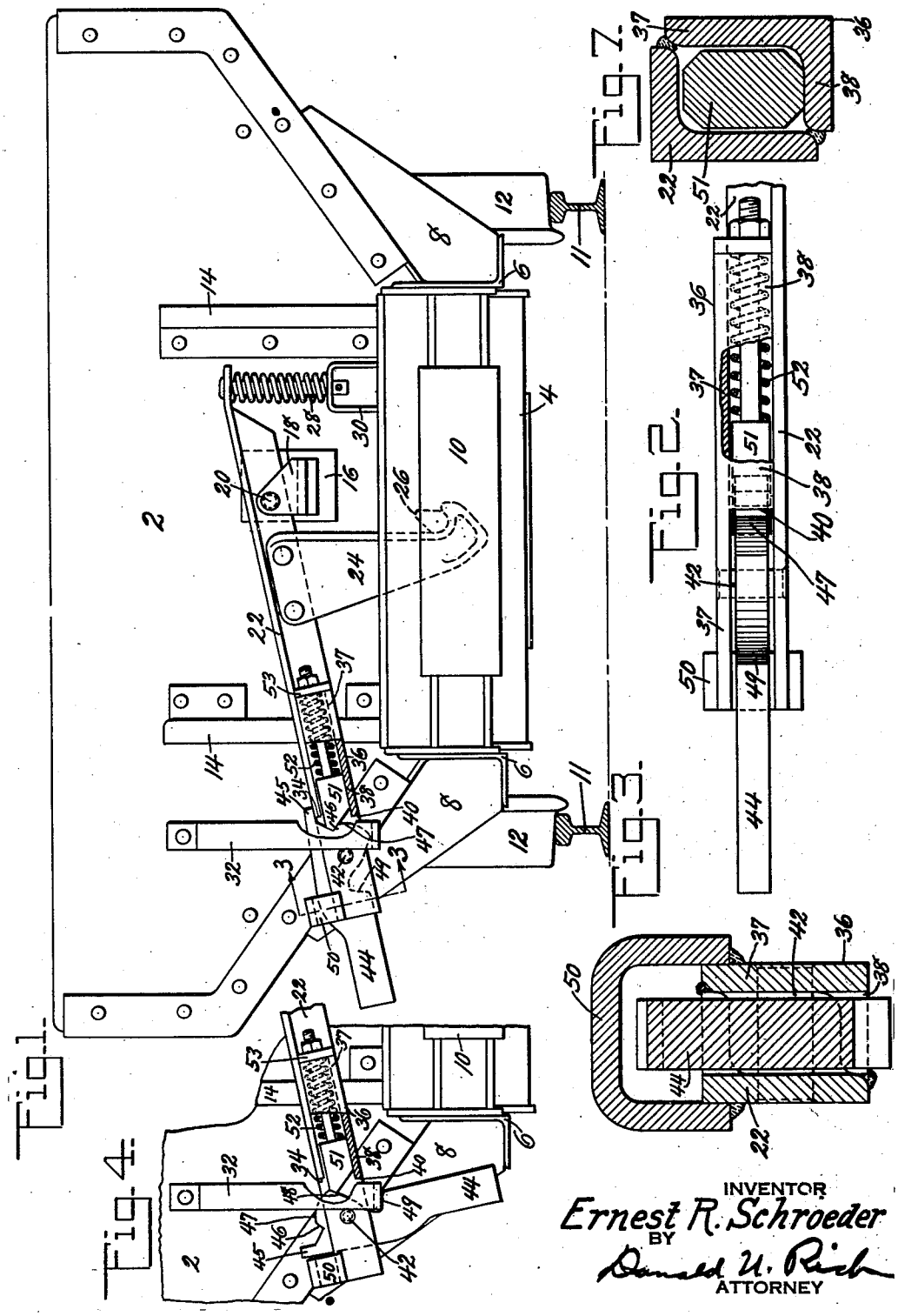


Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Fig. 7.

INVENTOR
Ernest R. Schroeder
BY
Donald U. Rich
ATTORNEY

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Fig. 5.

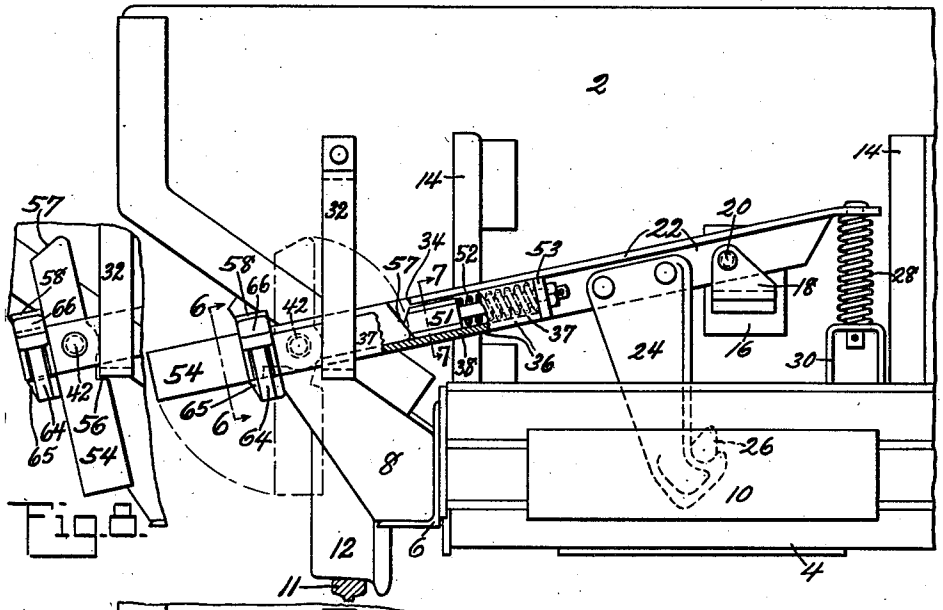


Fig. 8.

Fig. 9.

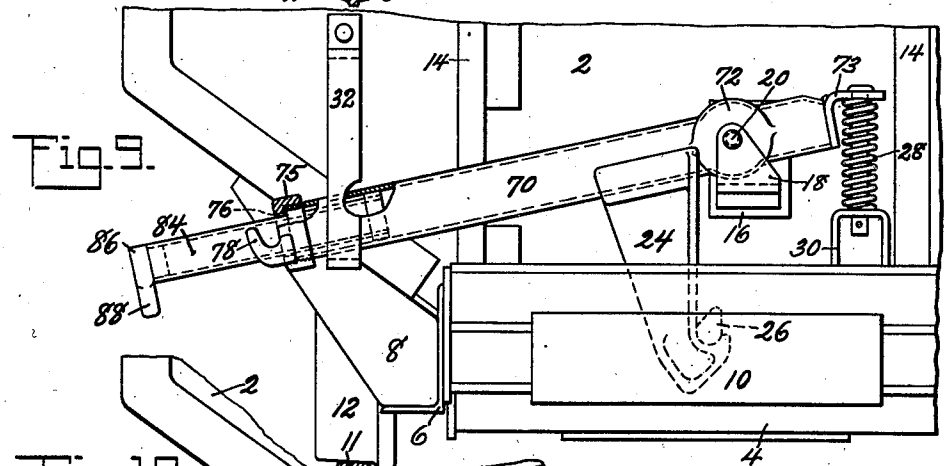


Fig. 10.

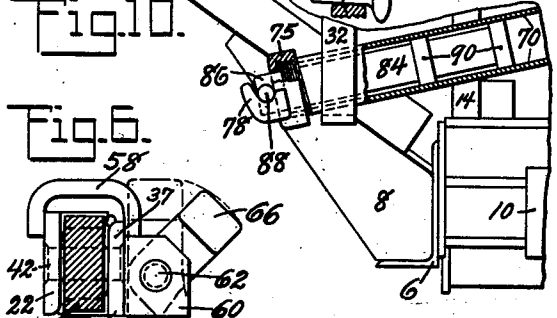
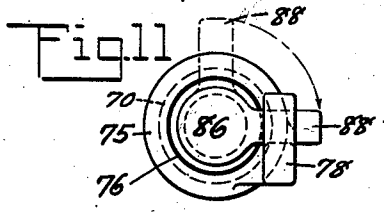


Fig. 6.

Fig. 11



INVENTOR
Ernest R. Schroeder
BY
Daniel U. Rich
ATTORNEY

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SAFETY LOCK LEVER

Ernest R. Schroeder, Hawthorne, N. J., assignor to American Car and Foundry Company, New York, N. Y., a corporation of New Jersey

Application September 25, 1941, Serial No. 412,334

6 Claims. (Cl. 105—311)

This invention relates to lock levers in general and in particular to lock levers for use on drop bottom mine cars.

Practically all drop bottom mine cars as now built are provided with doors hung on transversely extending hinge axes and with at least the rearmost door held in raised position by means of a latch or lock lever carried by the end wall or end sill structure of the car. In order to make these cars automatic the lever controlling the lock extends to the side of the car sufficiently to be raised by proper trackside equipment, thus releasing the lock and dropping the door. Since it is necessary for the arm to project to the side of the car, obviously this lever will strike any trackside obstructions and be easily bent or in some cases moved to an unlatched position releasing the door in the mine with consequent delay, tying up the entire mine operation. Certain cars of the automatic drop bottom type have been constructed with latching dogs engaging the lock lever to prevent its being raised, but these have not been satisfactory for they did not in any way prevent the bending of the lock trip lever. It is an object, therefore, of the present invention to provide a lever for operating the door latch, which lever has a movable end portion movable to a position within the clearance limits of the car.

A further object of the invention is the provision of a multi-part latch lever for drop bottom cars with parts of the lever movable to positively lock the lever against accidental release.

A still further object of the invention is the provision of a jointed latch lever for drop bottom mine cars with a part of the lever movable from an operative to an inoperative position in which it locks the lever against accidental movement.

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

Figure 1 is an end view of a drop bottom mine car with the improved latch lever applied thereto;

Fig. 2 is an enlarged inverted plan view of a portion of the improved latch lever with parts broken away to better disclose the construction;

Fig. 3 is a sectional view taken substantially on line 3—3 of Fig. 1;

Fig. 4 is a partial end view similar to Fig. 1 but showing the latch lever in the locked position;

Fig. 5 is a partial end view of a drop bottom mine car showing a slightly modified form of latch lever;

Figs. 6 and 7 are sectional views taken substantially on lines 6—6 and 7—7 respectively of Fig. 5;

Fig. 8 is a partial end view of the lever of Fig. 5 but showing the lever in locked position;

Fig. 9 is a partial end view of a drop bottom mine car with a still further modification of the latch lever applied thereto;

Fig. 10 is a partial end view of the lever of Fig. 9 but showing the lever in collapsed position and located wholly within the clearance limits of the car, and

Fig. 11 is an end view of the latch lever of Figs. 9 and 10.

Referring now to the drawings in detail, it will be seen that the various forms of latch levers have been applied to the end wall 2 of a drop bottom mine car having a drop door 4 hinged in any suitable manner to the side sills 6. The side sills have attached thereto, as is customary, braces or gussets 8 supporting the side wings of the car and giving them added rigidity. Any suitable type of end construction and bumper 10 is attached to the side sills to complete the frame of the car and to permit of its operation in train. The car is supported upon track rails 11 by means of wheels 12, as is customary. The car end walls are suitably braced by members 14 and carry, in the present case, a plate 16 to which is attached an offset plate 18, both plates being pierced to receive a pivot pin 20 upon which the inner part 22 of the latch lever is pivoted. The latch lever has attached thereto in any suitable manner a hook portion 24 adapted to engage under and support a tongue 26 carried by the drop bottom door. The hook is constantly urged toward door supporting position by means of a compression spring 28 interposed between the inner end of the lever and a bracket 30 fastened to the end structure of the car. In order to support the lever when the door is open, as well as to guide the lever in its vertical movements, a combined guide and support strap 32 is attached to the end wall structure of the car. The construction as described so far is more or less standard, yet subject to slight variations, such as supporting the door latch lever upon an end sill element independently of the end wall of the car.

In the form shown in Figs. 1 to 4 inclusive, the main part of the latch lever 22 is formed by an angle member extending outwardly substantially to the clearance limits of the car and having the upper flange thereof cut off as at 34, leaving the

end portion of the lever a flat plate, as clearly shown in the figures. In order to stiffen the end portion of the main part of the latch lever a short length of angle 36 is provided, having one leg 37 extending vertically and welded to the upper leg of the main lever angle and the other leg 38 directed toward the main lever angle and welded thereto, all as clearly shown in the figures and in particular in Fig. 3. The lower horizontal leg of angle 36 is cut away as at 40, thus leaving two legs of the angle extending outwardly and producing spaced plates adapted to be pierced and receive the pivot pin 42 upon which the latch lever extension 44 may swing. The latch lever extension is provided with a tongue 45 adapted to engage the upper horizontal leg of the main latch lever and also is provided with an inclined surface 46 and merging into a rounded portion 47 terminating in a flat portion 48, this flat portion being arranged at an angle to the longitudinal plane of the extension and merging into a ledge 49 adapted, when the extension is in folded position, to engage under the guide and support strap 32, all as clearly shown in Fig. 4. In order to reinforce the plate like extensions of the main latch lever, as well as to assist the projection 45 in holding the latch lever extension in operative position, a U-shaped strap 50 is welded or otherwise secured to the plate like extensions of the main lever. This U-shaped strap also, as shown in Fig. 4, forms a stop preventing excessive inward swinging of the latch lever extension when it is in folded position and would prevent a jamming of the mechanism such as would occur if the main latch lever were in raised position and the extension accidentally folded. Control and retention of the lever extension in its operative and inoperative or locked positions is obtained by means of a plunger 51 riding in the box like portion of the main latch lever and urged outwardly by a compression spring 52 bearing against the plunger and against a plate 53 welded or otherwise secured to the angles 22 and 36.

As clearly seen from the preceding description, the main part of the latch lever and the latch lever extension will be in the positions shown in Fig. 1 when the car approaches the dumping station. In this position the extension 44 is held substantially in alignment with the main part of the latch lever through engagement of plunger 51 with inclined surface 46 and upward thrust of the pivoted extension necessary to unlatch the door will be resisted by the pivot 42, extension 45 and, if necessary, U strap 50. With the parts in the position shown in Fig. 1 the car latch lever will to all intents and purposes operate identically with those levers now applied to the bulk of drop bottom cars. When, however, the car is being returned to the mine or is moving through the mine under load, the pivoted latch lever extension 44 may be folded either by an operator kicking the extension downwardly or automatically folded by a trackside mechanism bearing down on the surface of extension 44 outwardly of pivot 42. Application of downward pressure by any means to the pivoted extension 44 will cause inclined surface 46 to force the plunger 51 toward the center of the car, after which the plunger will ride over the curved surface 47 until it reaches the angular portion 48. After reaching the angular portion 48 the compressed spring 52 will, through plunger 51, force the latch lever extension to swing in a counterclockwise direction as viewed in the figures, thus bringing ledge 49 beneath the guide and support strap 32, in which position the plunger holds the extension, thereby locking the main latch lever against vertical movements which would unlatch the door. In this position also substantially all parts of the latch lever are located wholly within the clearance limits of the car and protected against distortion since they cannot strike trackside obstructions during movements of the car through the mine or mine workings. When it is desired to put the latch in a position for automatic release, or to manually release the latch, it is only necessary for an operator to lift upwardly, that is, cause clockwise rotation of the latch lever extension from the position of Fig. 4 to the position of Fig. 1.

In the form or modification shown in Figs. 5 to 8 inclusive, the main latch lever is constructed substantially identical to that previously described in connection with Figs. 1 to 4 inclusive and accordingly the same reference numerals have been applied thereto. In this form, however, the lower horizontal leg of angle 36 is extended outwardly substantially to the pivot pin 42 before it is cut off to permit swinging of the latch lever extension 54. The latch lever extension in this modification is substantially a flat plate except for a locking notch 56 and an inclined nose 57, which inclined nose is adapted to engage an incline of the plunger 51 carried within the box like portion of the main latch lever. The spaced plate like end portions of the main latch lever are again reinforced by a U-shaped strap 58 welded or otherwise secured thereto and having one leg extended downwardly a considerable distance over leg 37 of angle 36 and having attached thereto outwardly directed plates or ears 60 which are pierced to receive a pivot pin 62 as clearly shown in Fig. 6. The pivot pin 62 has attached thereto a pivot catch 64 having hooked end 65 and a weighted upper end 66. The weighted end is provided to constantly urge the catch into a position in which it supports and retains the latch lever extension in the operative position shown in Figs. 5 and 6. When, however, the catch is moved to the broken line position of Fig. 6, the pivoted extension 54 is released and will drop by gravity into the position shown in Fig. 8, after which release of the catch will cause the weighted end to swing the catch into the full line position of Figs. 6 and 8, in which position it positively retains the latch lever extension 54 in position with hooked ledge 56 beneath the guide and support strap 32. Here again the U-shaped reinforcement 58 prevents excessive swinging of the latch lever extension in a counterclockwise direction, thereby preventing jamming of the mechanism in case catch 64 is accidentally released when the latch lever is in raised position.

When the lever parts are in the position shown in Fig. 5 by full line, the latch lever extension 54 in effect forms a rigid extension for the main part of the latch lever, since it is held against counterclockwise rotation by the catch 64 and against clockwise rotation about the pivot pin 42 through engagement of the inner part of the latch lever extension with the lower flange 33 of angle 36. The plunger 51, of course, assists catch 64 in retaining the pivoted latch lever extension in the operative position as shown in full line by Fig. 5. When it is desired to return the car to the mine or mine workings catch 64 is moved to the broken line position of Fig. 6, after which the pivoted latch lever extension 54 may be forced in a counterclockwise direction to the full line position of Fig. 8. In this position the latch

lever is locked against vertical movement through engagement of the folded extension with the supporting strap 32 and the folded extension is in turn locked in position by means of catch 64 against unauthorized movement. In the folded position the latch lever extension 54 is positively held in a position wholly within the clearance limits of the car. Movement of catch 64 to the broken line position of Fig. 6 will release pivoted latch lever extension 54 and it may then be swung clockwise from the position of Fig. 8 to the full line position of Fig. 5, again placing the latch lever in condition for operation by trackside equipment.

In the modification shown by Figs. 9 to 11 inclusive the latch lever 70 is of tubular formation with a flattened portion 72, by means of which the lever is pivoted on pivot pin 20. The inner end of the tubular latch lever is closed by means of a plate 73 welded or otherwise secured thereto and adapted to coact with spring 23 in retaining the latch hook 24 in engagement with the door projection 26. The outer end of the tubular latch lever is threaded and has secured thereon a modified cap 75, which cap is provided with a central opening 76 and a projecting hook like finger 78. A cylindrical latch lever extension 84 of either tubular or solid construction is mounted to slide within the tubular main latch lever. This latch lever extension in the present case is of tubular form and has attached to its outer end a plug member 86 having a finger 88 formed thereon, which finger is adapted to rest within the hook like member 78 of the main part of the latch lever cap as clearly shown in Figs. 10 and 11. The inner portion of the latch lever extension is provided with spaced bearing rings 90 closely fitting the inside of the tubular main latch lever part in order that the extension may not tilt within the tubular latch lever part.

With the parts in the position shown in Fig. 9 the latch lever and its extension will operate in much the same manner as the standard latch now used on the bulk of drop bottom mine cars. When, however, the car is to be sent into the mine or traverse the mine workings, the latch lever extension 84 is pushed into the tubular main part of the latch lever and finger 88 turned so as to engage in the hook like projection 78 of cap member 75, thus retaining the latch lever extension in the position shown in Fig. 10. In this position the latch lever is located within the clearance limits of the car making it impossible for the same to contact trackside obstructions. Release of the latch lever extension is accomplished by merely rotating finger 88 out of the hook like member 78 and pulling outwardly, thus placing the extension in the position shown in Fig. 9.

From the preceding description of the various modifications and their operations, it will be seen that the latch lever extension, when in an operative position, will cause the latch lever to operate in substantially an identical manner with the present standard type of latch lever. When, however, the latch lever extension is placed in an inoperative position, that is, an inoperative position so far as release of the drop bottom door is concerned, then the latch lever parts are wholly within the clearance limits of the car and trackside obstructions can not bend or distort the lever. Also, in the forms shown in Figs. 1 to 8 inclusive, when the latch lever extension is in its inoperative position so far as release of the door is concerned, then the main part of the latch lever is locked by the extension against accidental releasing movement.

While the invention has been described more or less in detail, with specific reference to certain modifications, it will be obvious to persons skilled in the art that various other modifications and rearrangements of parts may be made and all such modifications and rearrangements of parts are contemplated as fall within the scope of the appended claims defining my invention.

What is claimed is:

1. In a drop bottom mine car adapted to run on tracks, a drop bottom door hingedly carried by the car, a latch assembly carried by the car and normally engaging the door to retain the same in closed position and movable to a position releasing the door for opening, said assembly including a main latch lever located wholly within the clearance limits of the car, and a latch lever extension movably carried by the main latch lever adjacent the outer end thereof, said latch lever extension being movable from a first position within the clearance limits of the car to a second position in which it projects beyond the clearance limits of the car, and said assembly also including a plunger carried by said main latch lever and slidable longitudinally thereof to automatically retain said latch lever extension in said first and said second positions.

2. In a drop bottom mine car, a drop bottom door hingedly carried by the car, a latch assembly pivotally carried by the car and having a part normally engaging the door to retain the same in raised position and movable to release the door for opening, said assembly including a main latch lever part located wholly within the clearance limits of the car, a latch lever extension pivotally carried by the main latch lever part, said extension being swingable from a folded position within the clearance limits of the car to an operative position forming an extension of the main lever part and projecting beyond the clearance limits of the car, a plunger carried by said main latch lever part and slidable longitudinally thereof, and a spring constantly urging said plunger into engagement with said latch lever extension to automatically retain the same in the operative position.

3. In a drop bottom mine car, a drop bottom door hingedly carried by the car, a latch assembly pivotally carried by the car and having a part normally engaging the door to retain the same in raised position and movable to release the door for opening, said assembly including a main latch lever part located wholly within the clearance limits of the car, a latch lever extension pivotally carried by the main latch lever part, said extension being swingable from a folded position within the clearance limits of the car to an operative position forming an extension of the main lever part and projecting beyond the clearance limits of the car, and a catch means pivotally carried by said main latch lever part and swingable transversely thereof to positively retain said latch lever extension in the operative and in the folded positions.

4. In a drop bottom mine car, a drop bottom door hingedly carried by the car, a latch assembly pivotally carried by the car and having a part normally engaging the door to retain the same in raised position and movable to release the door for opening, said assembly including a main latch lever part located wholly within the clearance limits of the car, a latch lever extension pivotally carried by the main latch lever part, said exten-

sion being swingable from a folded position within the clearance limits of the car to an operative position forming an extension of the main lever part and projecting beyond the clearance limits of the car, said latch lever extension when in folded position engaging a fixed part of the car to lock the latch assembly against movement, and a catch means pivotally carried by said main latch lever part and swingable transversely thereof to positively lock said latch lever extension in folded position.

5. In a drop bottom mine car, a drop bottom door hingedly carried by the car, a latch assembly pivotally carried by the car and having a part normally engaging the door to retain the same in raised position and movable to release the door for opening, said assembly including a main latch lever part located wholly within the clearance limits of the car, a latch lever extension pivotally carried by the main latch lever part, said extension being swingable from a folded position within the clearance limits of the car to an operative position forming an extension of the main lever part and projecting beyond the clearance limits of the car, said latch lever extension when in folded position engaging a fixed part of the car to lock the latch assembly against movement, a spring urged plunger carried by said main latch lever and slidable longitudinally thereof to yieldingly retain said latch lever extension in operative position, and a catch means pivotally carried by said main latch lever part and swingable transversely thereof to positively retain said latch lever extension in folded position and in engagement with said fixed part of the car.

6. In a drop bottom mine car, a drop bottom door hingedly carried by the car, a latch assembly pivotally carried by the car and having a part normally engaging the door to retain the same in raised position and movable to release the door for opening, said assembly including a main latch lever part located wholly within the clearance limits of the car, a latch lever extension pivotally carried by the main latch lever part, said extension being swingable from a folded position within the clearance limits of the car to an operative position forming an extension of the main lever part and projecting beyond the clearance limits of the car, a spring urged plunger carried by said main latch lever and slidable longitudinally thereof to yieldingly retain said latch lever extension in the operative position, and a catch carried by the main latch lever and swingable transversely thereof to lock said latch lever extension in said operative position in which it projects beyond the car clearance limits.

ERNEST R. SCHROEDER.