Oct. 19, 1943. J. J. OLEKSIW 2,332,396

DOOR OPERATING AND LOCKING MECHANISM

Filed Dec. 6, 1939

Fig. 4.

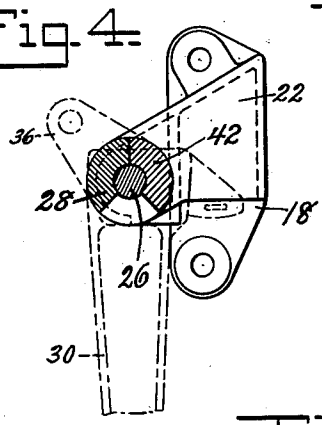


Fig. 3

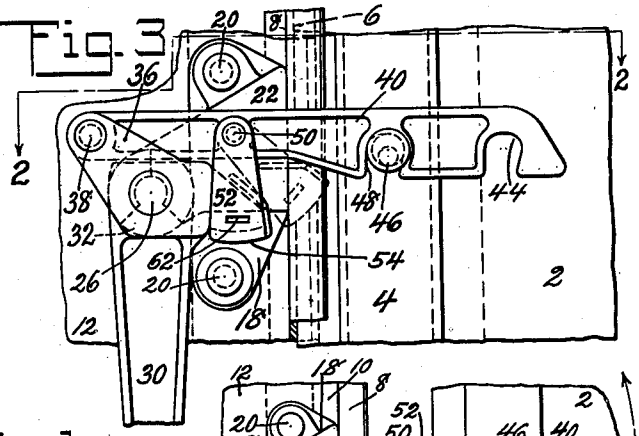


Fig. 1.

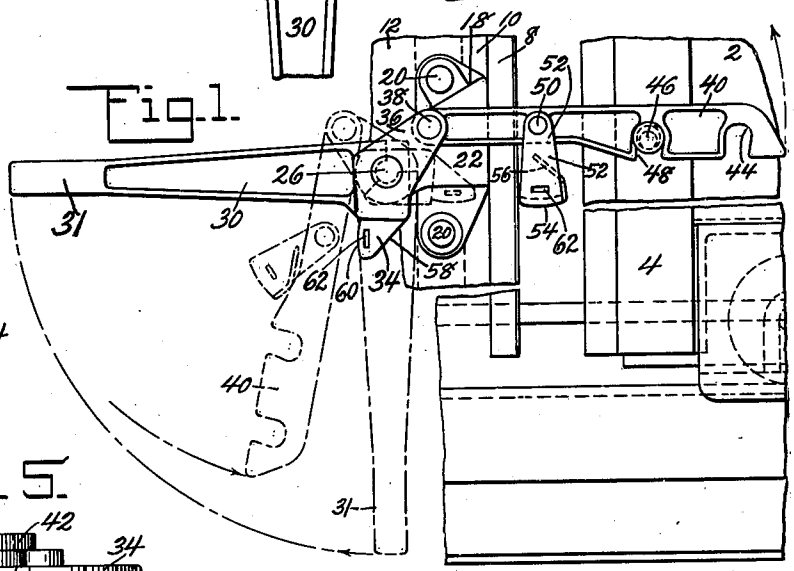


Fig. 7.

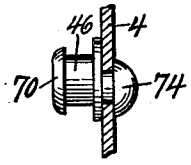


Fig. 5.

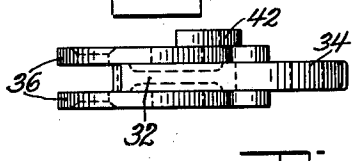


Fig. 2

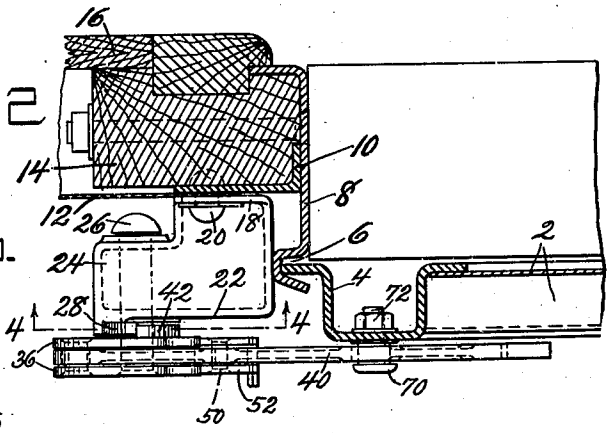


Fig. 8.

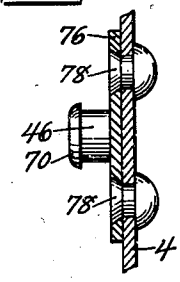
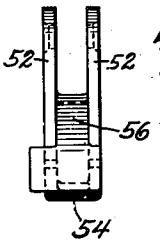


Fig. 6.



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2,332,396

DOOR OPERATING AND LOCKING MECHANISM

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Application December 6, 1939, Serial No. 307,757

6 Claims. (Cl. 268—44)

This invention relates to improvements in door operating and locking mechanism in general and in particular to such a mechanism for use on sliding car doors.

In the majority of present day applications of locking and operating mechanism to sliding doors the locks and starting mechanisms are applied as separate structures and must be operated independently. In a few instances the locking and operating mechanisms have been combined into the one structure but these have in the main proved unsatisfactory due to their complicated nature or to the fact that they were not automatic in operation. It is an object, therefore, of the present invention to provide a door operating and locking mechanism which is automatically locked without a conscious effort on the part of the operator.

A further object of the invention is the provision of a combined door opening, closing and locking mechanism which will become automatically locked when the parts are moved in such a direction as to close the door.

A still further object of the invention is the provision of a combined door opening, closing and locking mechanism which may be utilized to open or close the door or lock the door in a partially open position.

Yet another object of the invention is the provision of an improved door operating and locking mechanism in which all moving parts are permanently connected together thereby preventing any possibility of loss of parts.

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 drawing, in which

Figure 1 is an elevational view of the improved operating and locking mechanism with the parts shown in door opened position;

Fig. 2 is a sectional view taken substantially on line 2—2 of Fig. 3;

Fig. 3 is an elevational view similar to Figure 1 but showing the parts in door closed and locked position;

Fig. 4 is a sectional view taken substantially on line 4—4 of Fig. 2 and with the operating lever indicated by line and dash outline;

Fig. 5 is a plan view of the door operating and locking lever;

Fig. 6 is an enlarged end view of the locking link or dog;

Fig. 7 is an enlarged sectional view showing a slightly modified form of hasp lug, and

Fig. 8 is a sectional view similar to Fig. 7 but disclosing a still further form of hasp lug.

Referring now to the drawing in detail, it will be seen that the improved door operating and locking mechanism has been applied to a railway car structure having a sliding door formed with panel 2 and front stile 4. The front stile is shown as of flanged channel formation with one flange adapted to engage within a sealing recess 6 formed adjacent the outer edge of a door framing angle member 8. This door framing member is secured to the door post 10 which in turn is secured to the sheathing 12 and carries the wooden door post 14 and lining 16. It is, of course, obvious that the specific form of door or car structure is immaterial and that the operating and locking mechanism now to be described could be applied to any structure using sliding doors.

In the present instance the operating and locking mechanism is carried by a bracket 18 riveted or otherwise secured as at 20 to the car side wall structure adjacent the door opening and so formed as to provide an outer surface 22 closely adjacent the plane of the door opening. The bracket is also formed with a projecting portion 24 provided with openings through which a rivet, bolt or other means 26 may extend. The bracket is also formed with a stop 28 projecting outwardly from the surface 22 immediately adjacent the openings for pin 26.

The outer end of pin 26 has rotatably mounted thereon operating lever 30, formed with a handle portion 31, hub 32 and locking projection 34. The operating lever is also formed with spaced ears 36 extending upwardly and rearwardly from the hub portion and formed at their outer ends with an opening adapted to receive rivet or pin 38 by means of which the hasp 40 is pivotally connected to the operating lever. The innermost of the spaced ears has formed thereon adjacent the hub portion a stop 42 adapted to cooperate with the stop 28 on the bracket and prevent more than 90 degrees of rotation of the operating lever. The hasp, as previously stated, is pivoted at one end upon pin 38 between upstanding ears 36 of the operating handle and is formed on its outer end with recess 44 adapted to engage a hasp lug 46 carried by the sliding door structure when it is desired to hold the door in either partially opened position or to permit greater movement of the door toward closed position under control of the operating mechanism. The hasp is also formed with a similar recess 48 intermediate its ends and which recess is adapted to engage the

hasp lug to hold the door in fully closed position or to permit movement of the door toward or away from closed position. The hasp is also formed with an opening intermediate its ends adapted to receive pin **50**, upon the ends of which is pivotally mounted the locking link or dog. This locking link or dog is formed with spaced side portions **52** joined together adjacent their lower edge by a curved end wall **54** and by a projecting shroud wall **56**. As is clearly shown by the drawing, the projection **34** of the operating lever is formed with an inclined upper surface **58** and a lower curved surface **60** which is adapted to engage with the curved end wall **54** of the locking link or dog, while the shroud wall **56** of the locking link overlaps the inclined surface of the projection. The projection **34** of the operating lever and the side walls **52** of the locking link or dog are formed with aligned openings **62** through which a suitable seal (not shown) may be inserted. It will be apparent that the shroud wall of the locking link or dog will prevent excessive swinging movement of the locking link, while at the same time prevent unauthorized tampering or breaking of the seal in a position where it could not be readily observed.

As shown in Figs. 1 to 3 inclusive, the hasp lug **46** is formed with an eccentric shank portion adapted to be engaged by the hasp and with the head portion **70** preventing the hasp from sliding off the shank portion. The hasp lug is secured to the door stile by means of a nut **72** threaded on the inner end of the lug. It will be obvious that by loosening the nut and turning the eccentric shank of the hasp lug adjustment may be obtained between the hasp and the door, thus insuring tight closure throughout the life of the car. Usually this adjustment is not necessary and in such cases the hasp lug may be made as shown in Fig. 7, in which case the lug is secured to the door stile or other part of the door structure by riveting the inwardly projecting portion as at **74**. In some cases it may be desirable to use a still further modified form of hasp lug as shown in Fig. 8. In this form the hasp lug with its head is formed on a base plate **76** and the unit is attached to the door stile or other structure by means of countersunk rivets **78**.

The operation of the mechanism is as follows and assuming the parts to be in the position shown by full line in Fig. 3: The operator will swing the locking link or dog upwardly to the line and dash position permitting the projection **34** of the operating lever to clear the lower wall **54** of the locking dog. Rotation of the operating lever upwardly through approximately 90 degrees will cause the parts to assume the position shown by full line in Fig. 1 with a powerful leverage being exerted through ears **36** to hasp **40** and through the hasp lug to the door, thereby causing it to assume a partially opened position. With the door in partially opened position the operator can then lift hasp **40** free of the hasp lug, thus clearing the door and permitting it to be moved to fully opened position. If it is desired to lock the door in partially opened position, then it is only necessary to lift the hasp off the hasp lug and engage opening **44** with the hasp lug and move the parts to the position shown in Fig. 3. When it is desired to close or lock the door the parts will be moved from the line and dash position of Fig. 1 to the full line position, after which a counter-clockwise rotation of the operating lever will pull the door closed. During the closing of the door by rotation of the operating lever the inclined surface of the lever lug **34** will engage the lower wall **54** of the locking link or dog causing it to swing to one side and upon completion of the rotative motion of the operating lever this locking link or dog will swing back to the full line position shown in Fig. 3 thereby locking the door in closed position.

That the door is fully locked will be evident since the locking link or dog by engagement with the projection **34** prevents any relative movement between the operating lever and the hasp and any rotative movement of the operating lever in a direction to lift the hasp from the hasp lug is prevented by the stop **42** engaging the stop **28** of the supporting bracket as clearly shown in Fig. 3. Excessive rotation of the operating lever in an unlocking direction is also prevented by this same lug **42** again engaging the stop **28** as clearly shown in Fig. 1. It will thus be seen that the door is securely locked in either an open or closed position and that the same mechanism is utilized to force the door toward open position or to pull the door toward closed position. It will also be seen that all moving parts are more or less permanently connected together thereby preventing any loss and that the parts are so positioned and arranged as to cause the locking link to automatically engage the projection **34**, thus automatically locking the door when the door is pulled to closed position. The operating mechanism has been shown as mounted on the car structure with the hasp lug carried by the door since this is the desirable position to prevent damage to the lock mechanism, but it is obvious that where desired the position of the parts may be reversed and the lug placed on the car structure with the operating mechanism carried by the door. The only necessary requirement is that certain parts be carried by one of the relatively movable structures, while the other part is carried by the other of the relatively movable structures.

While the invention has been described more or less in detail with specific reference to the drawings, it will be obvious that various modifications and rearrangements of parts will be possible and all such modifications and rearrangements of parts are contemplated as will fall within the scope of the appended claims defining my invention:

What is claimed is:

1. In a railway car door opening, closing and locking mechanism the combination of an operating lever including a locking projection, said operating lever being pivotally carried by the car structure for swinging movements in a plane substantially parallel to the plane of the door, a hasp pivotally carried by said lever for swinging movement in a plane substantially parallel to the plane of the door, a hasp lug carried by the door and freely engageable by said hasp to open or close and lock the door, and lock means swinging substantially in the plane of said lever and automatically connecting said hasp and lever by engagement with said locking projection to prevent relative motion therebetween when said hasp and lever have been moved to door locking position.

2. In a railway car door opening, closing and locking mechanism the combination of an operating lever including a locking projection, said operating lever being pivotally carried by the car structure for swinging movements in a plane substantially parallel to the plane of the door, a hasp pivotally carried by said lever for swinging

movement in a plane substantially parallel to the plane of the door, a hasp lug carried by the door and engageable by said hasp to open or close and lock the door, lock means swinging substantially in the plane of said lever and automatically connecting said hasp and lever by engagement with said locking projection to prevent relative motion therebetween when said hasp and lever have been moved to door locking position, and stop means limiting the rotation of said lever beyond the door locked position.

3. In a door operating and locking mechanism the combination of an operating lever pivotally mounted on a supporting structure for swinging movement in a plane substantially parallel to the plane of the door, a hasp pivotally carried by said lever for swinging movement substantially in the plane of movement of the lever, a hasp lug engageable by said hasp to control certain of the door movements, and means connecting said operating lever and an intermediate portion of said hasp to prevent relative movement therebetween when said lever and hasp are in door locking position, said means including a projection extending from said lever and a link suspended from said hasp and adapted to engage said projection, and additional means carried by said lever and supporting structure and cooperating to prevent movement of the connected lever and hasp when in door locking position.

4. In an operating and locking mechanism for a sliding door member associated with a frame member, the combination with a bracket mounted on one of said members, an operating lever pivotally mounted on said bracket and including a locking projection, a hasp pivoted to said lever and formed with spaced engaging portions, a locking link pivoted to said hasp between said portions and the pivotal connection with the lever and being so constructed and arranged as to be freely suspended therefrom when the latter is in a substantially horizontal operative position, said locking link being automatically shiftable by said locking projection for engagement therewith, and a hasp lug on the other of said members for cooperation with the spaced engaging portions of said hasp.

5. In an operating and locking mechanism for a sliding door member associated with a frame member, the combination with a bracket mounted on one of said members, an operating lever pivotally mounted on said bracket and including a locking projection, a hasp pivoted to said lever and formed with spaced engaging portions, and a locking link pivoted to said hasp between said portions and the pivotal connection with the lever and so constructed and arranged as to be swingingly suspended therefrom when said hasp is in a substantially horizontal operative position whereby said link is capable of automatic engagement with the locking projection upon contact therewith during movement of the operating lever into door locking position.

6. In a railway car door opening, closing and locking mechanism the combination of an operating lever including a locking projection, said operating lever being pivotally carried by the car structure for swinging movement in a plane substantially parallel to the plane of the door, a hasp pivotally carried by said lever for swinging movements in a plane substantially parallel to the plane of the door, a hasp lug carried by the door and freely engageable by said hasp to open or close and lock the door, a locking dog carried by said hasp and connecting said hasp and lever by engagement with said locking projection to prevent relative motion therebetween when said hasp and lever have been moved to door locking position, and stop means carried by said lever and engaging the car structure to prevent rotation in unison of said lever, hasp and locking dog when in door locking position.

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