The present invention provides a pusher block for facilitating the opening or closing of heavy sliding doors of the types found on railroad freight cars and other equipment.

The pusher block provided by our present invention is particularly useful and advantageous where a fork lift truck or other material-handling machinery is to be used for opening or closing the heavy sliding door. However, the pusher block is also useful and advantageous where other opening means, such as bars, hooks, and the like, are to be used.

The pusher block of the present invention will be described as applied to the sliding door side of a railroad freight car. However, the pusher block is also applicable to the heavy sliding doors which may be found on other forms of transportation or fixed storage facilities.

Railroad freight car doors have been subjected to frequent and costly damage by shippers and consignees who use fork lift trucks or other material-handling machinery to open and close the freight car side doors. When the forks of lift trucks, or other handling equipment, hooks or other tools, are used for applying pressure against the heavy sliding doors for opening or closing the same, such equipment or tools tend to gouge and puncture the door panels. This, of course, is undesirable as it leads to corrosion and to impairment of weatherproofing of the car.

Most modern box cars are designed to permit the bottom of the side door to rest upon a bottom support or truck when not being opened or closed. Lifting levers are located at the bottom corners of the doors which, when either pulled or pushed, as by hand, raise the door and support it on rollers. The door is then readily closed or opened by rolling it, pushing or pulling on the operating lever, as the case may be, until the door has reached the desired position. Such operating levers are located very close to the bottom of the doors and when a car is adjacent a loading platform, the lever is ordinarily only a few inches above the platform level. In this position, it is practically impossible to open the side doors by hand. Accordingly, shippers and consignees have become accustomed to using fork lift trucks and other tools to assist them in opening and closing the heavy doors, with resultant damage to the door.

In the opening or closing of freight car side doors, the force required for moving the door can be greatly reduced if a lifting as well as pushing motion is applied, or, depending upon the type of side door suspension or securing, a downward pressure and pushing motion. If no lifting force or downward pressure, as the case may be, is exerted, the force required to open or close the door is greatly increased, particularly on older doors which have been subjected to service wear, deterioration, and abuse.

The object of our present invention is to provide means for facilitating the opening and closing of heavy sliding doors, such as are found on railroad freight box cars.

A further object is to provide means for the above-recited purpose which may be permanently secured to the door itself and which will facilitate the opening and closing of the sliding doors by fork lift trucks, and other material-handling machinery.

The above objects are achieved, in accordance with our present invention, by a pusher block secured to the outer face of the sliding door and shaped to provide a pair of pockets, one for use in opening and the other for use in closing the door. Each pocket will permit entry of the fork of a lift truck to apply either an upward or downward force, as may be necessary, while at the same time applying a lateral force to push the door to an open or closed position. In addition, the pusher block serves as a protection for preventing the lift truck fork, bar, hook, or other tool, from penetrating or denting the side panel of the door in the event of improper handling of the truck or other tool, or as a result of a sudden binding action in the door suspension.

The present invention will be best understood from the following detailed description of a preferred embodiment thereof as illustrated in the drawing, in which:

FIGS. 1 and 2 are diagrammatic side elevational representations showing railroad freight box cars at loading platforms, each having a different type of side door frequently found on box cars, and each having its side doors equipped with a pusher block in accordance with the present invention;

FIG. 3 is an enlarged view of that portion of FIG. 1 represented by the dot-and-dash rectangle identified III;

FIG. 4 is a cross-sectional view along the line IV--IV of FIG. 3;

FIG. 5 is an enlarged view of that portion of FIG. 2 represented by the dot-and-dash rectangle identified V;

FIG. 6 is a cross-sectional view along the line VI--VI of FIG. 5;

FIG. 7 is a diagrammatic perspective representation illustrating the manner in which a fork lift truck is employed to apply force against the pusher block to the sliding door; and

FIG. 8 is a sectional view looking down along the line VIII--VIII of FIG. 7.

In describing the preferred embodiment of the invention illustrated in the drawing, specific terminology has been resorted to for the sake of clarity. However, it is not the intention to be limited to the specific terms so selected, and it is to be understood that each specific term includes all technical equivalents which operate in a similar manner to accomplish a similar purpose.

In the drawing, FIGS. 1, 3, and 4 illustrate a box car having corrugated steel double doors (of the type not equipped with center operating mechanism) made by the Youngstown Steel Door Company, of Cleveland, Ohio, while FIGS. 2, 5, and 6 illustrate a box car having panelled steel double doors of the type made by the Superior Car Door Company, of Chicago, Illinois.

While double doors have been illustrated in the drawing, it is to be understood that the side door pusher block of our present invention is equally applicable to cars having a single side door.

Referring now to FIG. 1, the box car 10 is shown as having a main side door 12 and an auxiliary side door 13, both shown in closed position. The dot-and-dash line 14 represents the limit of the main door 12 in open position, while the dot-and-dash line 15 represents the limit of the auxiliary door 13 in open position.

In accordance with our present invention, both the main side door 12 and the auxiliary side door 13 are equipped with pusher blocks, one on each door, identified in FIG. 1 by the reference numerals 22 and 23 respectively. These pusher blocks are mounted on the outer walls of the doors in the locations indicated generally in FIG. 1. Both of the pusher blocks 22 and 23 are of similar construction, so that it will be necessary to describe in detail but one of them.

FIG. 3 represents an enlargement of that portion of the main door 12 represented in FIG. 1 by the dot-and-
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3,131,260 3 dash rectangle identified as III, and together with FIG. 4 shows the structural details of the pusher block 22.

Referring now to FIGS. 3 and 4, pusher block 22 is a horizontally-disposed double-pocket structure, preferably a steel casting, and preferably 15" long and 3½" high having a flat rear wall 32 with integral flanges 34, 35, extending outward 2½" from its upper and lower edges, and with a vertical web 36 extending between the two flanges at the midpoint of the structure. The web 36 is preferably ½" thick; the rear wall and flanges are preferably ¾" thick at the center region tapering to ½" thick at the two ends. The pusher block 22 is riveted to the corrugated side door 12 of the car at a level between the third and fourth corrugations, counting from the bottom. A steel reinforcing plate 37 is used on the inner wall of the car door, the plate being preferably of 12 gauge steel. To install the pusher block 22, ten holes are shot and reamed for receiving rivets. It is important that the rivets be flush with the inner surface of the reinforcing plate so as to avoid any projections from the inside wall of the car which may damage lining. The pusher block is preferably located relatively close to the rear edge of the door; the edge of the pusher block closer to the rear edge of the door is preferably 61½" away.

The pusher block 23 is of similar construction and similarly mounted on the auxiliary door 13. The edge of block 23 closer to the rear edge of the auxiliary door is 6½" away.

Referring now to FIGS. 2, 5, and 6, these figures show a type of door 42, 43 made by the Superior Car Door Company. Each door is built up of seven horizontal panels 45 which are overlapped and welded in watershed relationship. The bottom portion of each panel is formed into a box girder or channel 44. The pusher blocks 52 and 53 installed respectively on the main and auxiliary doors of the paneled door are of similar construction to that described in connection with FIGS. 1, 3, and 4, but in the case of the Superior type of paneled door, the pusher block is located just below the lowermost box girder or channel 44, as illustrated in FIGS. 5 and 6 by the pusher block 53 on the main door 42.

The manner in which the pusher blocks are employed to facilitate opening or closing the sliding door using a fork lift truck is illustrated in FIG. 7. There a fork lift truck is shown in the act of opening the main door 12 of a Youngstown type door. As there shown, the operator manipulates his motor vehicle 51 so that one of the forwardly-extending elevatable arms 56 (the left arm as seen in FIG. 7) enters the left pocket of the pusher block 22 and engages and applies force against the web 36. If the suspension of the car door 12 is such that to facilitate movement of the door a lifting force should be used to raise the door from its track onto rollers, it will be seen that the necessary lifting force is readily applied by the lift truck arm 56 to the undersurface of the upper flange 34 of the pusher block. The combined force, i.e., the upward force on the undersurface of the upper flange 34 in combination with the forward force against the web 36, makes opening of the car door a comparatively easy task. Moreover, the side wall of the car door is protected, by the vertical rear wall 32 of the pusher block, from any gouging or piercing by the arm of the lift truck.

In FIG. 8, the slightly angular position of the left arm of the fork lift truck as it first enters into the left pocket of the pusher block is represented by the dot-and-dash lines. The angle shown is somewhat exaggerated.

It will be seen that if the car door suspension or securement is such that a downward force, rather than a lifting force is needed to facilitate initial movement of the car door, such force is readily applied by the fork lift truck downward against the upper surface of the lower flange 35, at the same time that a lateral force is applied against the vertical web 36.

It will also be seen that the pusher block, by reason of its particular shape and construction, provides two similar pockets, one for use in pushing the car door in one direction and the other for use in pushing the car door in the other direction.

In addition, the pusher block is useful where a hook is to be used to pull, rather than push, the door open or closed. In such case, the pulling force is applied against the web 36. If a lifting force is also necessary, the pull is applied to the web at the upper corner thereof where the upper flange joins the web. If a downward force is wanted, the pull is applied against the lower corner of the web.

While the preferred embodiment of this invention has been described in some detail, it will be obvious to one skilled in the art that various modifications may be made without departing from the invention as hereinafter claimed.

Having described our invention, we claim:

1. An attachment for use in opening and closing a heavy sliding door by use of a fork lift truck or other material-handling machinery or by hooks, bars, or other similar manual tools, said attachment comprising: a horizontally-disposed U-channel of steel plate having a vertical rear wall secured to the face of said sliding door and having upper and lower flanges extending laterally forward from said rear wall, and a vertical web extending between said upper and lower flanges at substantially the midpoint of said U-channel.

2. An attachment as claimed in claim 1 characterized in that said means for securing said formed block to the face of said sliding door includes a reinforcing plate on the other side of said sliding door opposite said formed block, and a plurality of rivets securing said block to said door and to said reinforcing plate.

3. An attachment as claimed in claim 2 further characterized in that said block is secured to said door in a corner region defined by the bottom and rear edge of said door.

4. An attachment to a heavy sliding door for facilitating opening and closing thereof by a fork lift truck or other material-handling machinery or by manually handled hooks, bars, or other similar tools, said attachment comprising: a horizontally-disposed U-channel of steel plate having a vertical rear wall secured to the other face of said sliding door and having upper and lower flanges extending horizontally forward from said rear wall, and a vertical web extending between said upper and lower flanges at substantially the midpoint of said U-channel.

5. An attachment as claimed in claim 4 characterized in that a flat reinforcing plate is secured to the other face of said sliding door, and in that said U-channel and said reinforcing plate are secured together by common securing means.

6. An attachment as claimed in claim 5 further characterized in that said securing means comprise a plurality of rivets, and in that the one end of each of said rivets is substantially flush with the surface of said reinforcing plate.

7. An attachment as claimed in claim 6 further characterized in that said block is secured to said door in a corner region defined by the bottom and rear edge of said door.

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