March 24, 1931. J. P. WARD ET AL 1,797,384

LOCKING MECHANISM FOR FREIGHT CAR DOORS

Filed Sept. 29, 1928 2 Sheets-Sheet 1

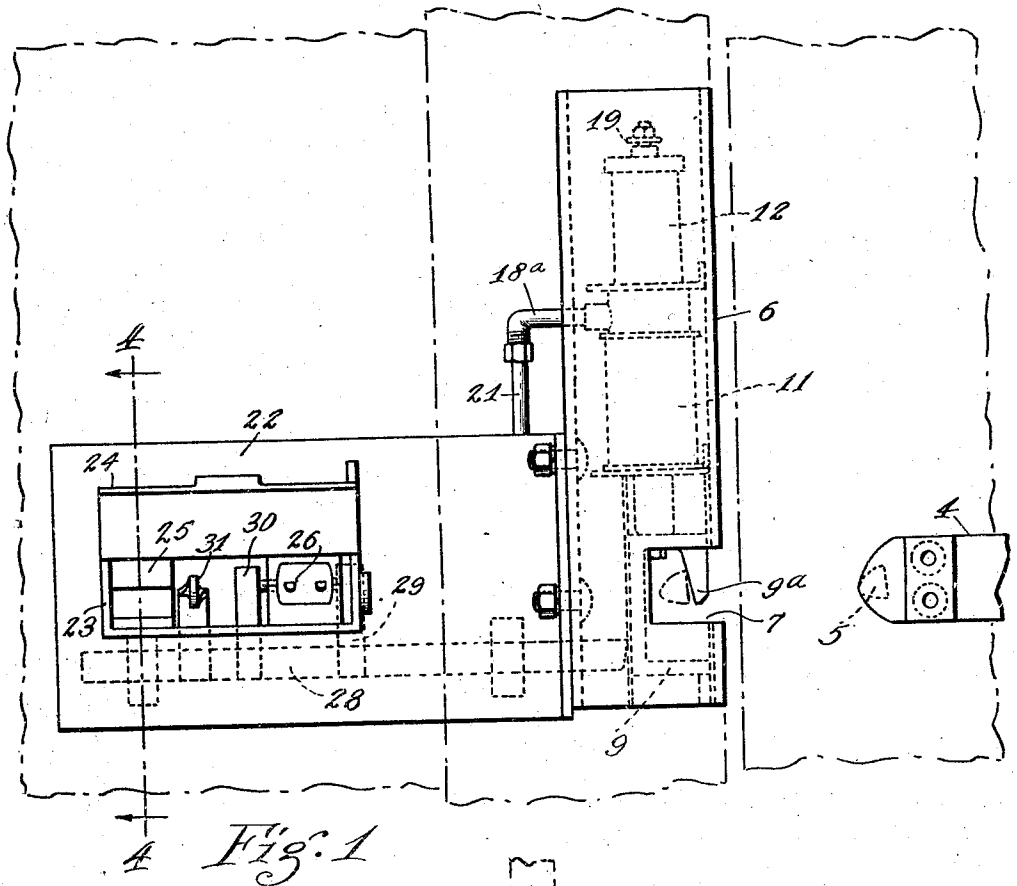


Fig. 1

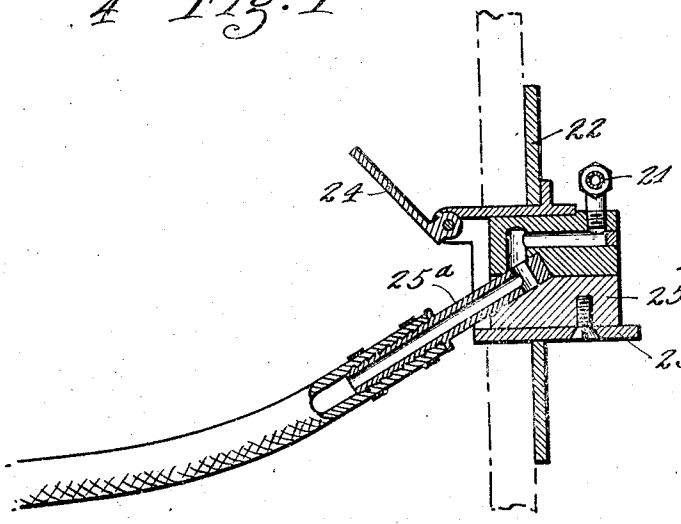


Fig. 4

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LOCKING MECHANISM FOR FREIGHT CAR DOORS

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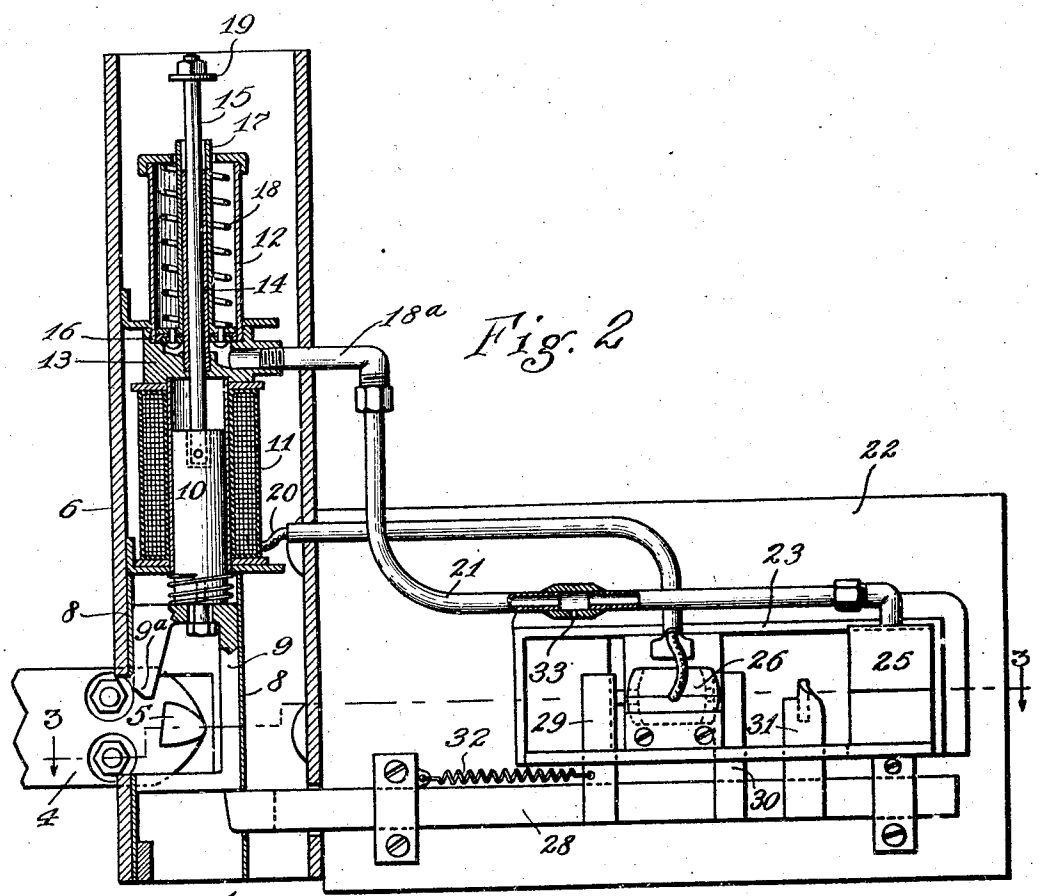


Fig. 2

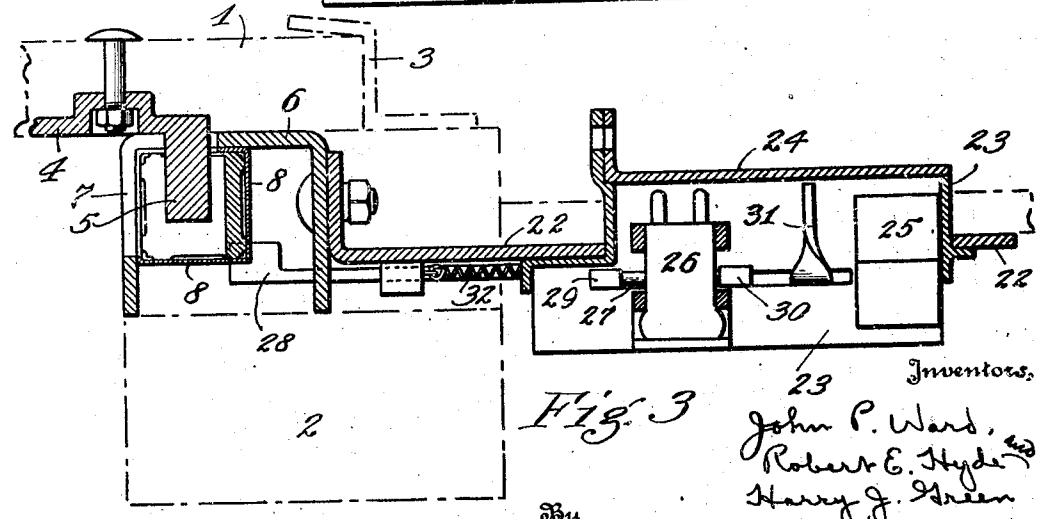


Fig. 3

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UNITED STATES PATENT OFFICE

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LOCKING MECHANISM FOR FREIGHT-CAR DOORS

Application filed September 29, 1928. Serial No. 309,199.

This invention relates to a locking mechanism that is especially adapted for use in connection with the doors of freight cars and the main object of the invention is to provide a locking mechanism of this character which will act automatically to lock the door when the latter is moved to closed position and which is provided also with a pair of independently power operated mechanisms for releasing the lock and which also is provided with manually operable means for rendering the locking mechanism ineffective.

A further object of the invention is to provide a locking mechanism for freight car doors which is compact and rigid in construction and designed to be mounted in adjacent parts of the door and door frame in such a manner as not to offer obstructions on which objects may catch when passing through the door opening.

A still further object of the invention is to provide a locking mechanism of the character described which incorporates electrical means for releasing the lock and pressure operated means, each of which is independently operated and accessible only to authorized persons.

A still further object of the invention is to provide a locking mechanism of the character described which is provided with means for rendering the locking mechanism ineffective when desired, the manually operable means being so connected with the electrical means as to break the circuit thereto when the locking mechanism is rendered ineffective.

Further and more limited objects of the invention will appear as the description proceeds and by reference to the accompanying drawings in which Fig. 1 is a view in rear elevation disclosing the locking mechanism attached to a freight car, the freight car door and siding being shown in dot and dash lines, Fig. 2 is a view partly in rear elevation and partly in section disclosing the locking mechanism and means for operating the same; Fig. 3 is a horizontal sectional view of the line 3—3 of Fig. 2 and Fig. 4 is a vertical sectional view showing the mechanism for connecting the fluid pressure operating mechanism with a source of pressure.

Referring now to the drawings, the reference character 1 designates a car door which is slidably mounted on the side of a freight car and abuts against a post 2 forming a part of the side of the car. The door, when in closed position, reposes within a Z-bar 3 which is secured to the post 2. The siding and lining of the car body are secured to the post 2 in a manner well known to those skilled in the art. The post 2 is mortised or cut-away along its front side adjacent the door opening for the accommodation of the locking mechanism. Secured to the inner face of the door 1 is a keeper or latch member 4 having an angularly disposed base portion 5 shaped somewhat like an arrowhead, as shown most clearly in Fig. 2.

The locking mechanism consists essentially of an outer casing 6 which is shaped in section as shown most clearly in Figs. 2 and 3. The casing 6 is preferably made of sheet metal and has an opening 7 in one corner thereof. Arranged within the outer casing 6 adjacent the lower end thereof is an inner casing 8 which has an opening therein disposed in alignment with the opening 7 in the casing 6. Slidably mounted within the inner casing 8 is a C-shaped locking head 9 having a nose portion 9^a disposed adjacent the opening and adapted to be engaged by the nose portion 5 of the keeper or latch member 4. The locking head is freely reciprocable within the housing and drops by gravity to the locking position. When the door is moved to closed position, the nose 5 engages the nose portion 9^a of the locking head and elevates the same. After the nose 5 has entered the locking head 9, the locking head drops by gravity with the nose portion 9^a disposed to the rear of or behind the nose 5 thereby locking the door in closed position. Carried by the locking head 9 is an annular stem 10 which extends upwardly therefrom through an aperture in the end wall of the inner casing 6 and constitutes the movable core of a solenoid 11. When the solenoid 11 is energized, in a manner to be hereinafter described, the stem 10 is attracted and moved upwardly elevating the locking head 9 to such a position that the nose 9^a will be dis-

posed above the nose portion 5 of the latch member or keeper 4 and thereby permitting the door to be opened.

This same result may be obtained by a pneumatic means which will now be described. Arranged within the outer casing 6 and disposed above the solenoid 11 is a power cylinder 12 which is supported on a base member 13. Carried by the base member 13 is a stationary sleeve 14 through which extends a stem 15 which is connected at its lower end with the stem 10. Arranged within the cylinder 12 and surrounding the sleeve 14 is a piston 16 having a tubular sleeve or collar 17 which extends upwardly therefrom and projects through the upper end of the cylinder, as shown most clearly in Fig. 2. The piston 16 is normally urged downwardly by a coil spring 18. The base member 13 has a port or passageway therein in which is connected a pipe or connection 18ª through which fluid pressure may be admitted to elevate the piston against the tension of the coil spring. Carried by the upper end of the stem 15 is a disk 19. When the piston is elevated the collar 17, which is rigid therewith, will also be moved upwardly and will strike against the disk 19 and move the stem 15 upwardly and thus move the locking head 9 upwardly thereby releasing the latching member 4. The coil spring 14 will return the piston to its original position when the pressure is relieved.

Current is supplied to the solenoid 11 through a cable 20 and pressure is conveyed to the pipe 18ª and cylinder 12 by means of a pipe 21. Mounted on the car body in any convenient place is a terminal plate 22 having an opening therein in which is arranged a box or housing 23, the front of which is closed by a pivotally mounted door or cover 24. Secured within the box 23 is terminal block or connection 25 to which the pipe 21 is connected. The terminal block 25 has a bore or passageway therein whereby a hose coupling may be connected therewith to supply fluid pressure to the power cylinder, as shown most clearly in Fig. 4. Also arranged within the box 23 is a terminal block or jack 26 of well known construction and having binding posts to which the wires leading to the solenoid are connected. The terminal block 26 also carries a switch 27 for opening or closing the circuit to the solenoid in a manner to be hereinafter described.

Slidably mounted on the plate 22 is a latch or bar 28 on which is mounted a pair of arms 29 and 30 which are disposed on opposite sides of the jack 26, as shown in Fig. 2. Also carried by the latch 28 is an operating lever 31 which projects into the box. One end of the latch 28 projects through aligned openings in the inner and outer casings and is urged toward the left as seen in Fig. 2 by a tension spring 32. The latch 28 engages under the locking head and holds the same in the elevated position and maintains the locking mechanism ineffective. When it is desired to lock the door in closed position, the latch 28 is moved toward the right, as seen in Fig. 2, whereupon the arm 29 engages the switch 27 and actuates the same to close the circuit to the electrical means for releasing the lock, the latch 28 then riding on the vertical side of the locking head as shown in Fig. 1 in dotted lines. When it is desired to open the car, the cover 24 is opened and, if the operator uses the electrical means for operating the lock, he plugs into the terminal block or jack 26 and as the switch 27 is in a position closing the circuit, the solenoid will be energized and elevate the locking head to release the latch member 4. The latch 28 will then be moved to the position shown in Fig. 2 whereupon the arm 30 will engage the switch 27 and move the same toward the left and break the circuit to the solenoid. The electric current for operating the lock may be obtained from any suitable source.

When the lock is to be operated by the pressure fluid, the pressure is supplied from the usual compressed air supply generally found at railroad terminals, or from the train line. The operator merely connects the pressure line nozzle 25ª into the terminal block or connection 25 as shown in Fig. 4, whereupon pressure is supplied to the pressure cylinder which operates as hereinbefore described. When the car is moved into a siding, the latch 28 may be moved to the position shown in Fig. 2 thereby rendering the locking mechanism ineffective. After the car door has been locked, the cover 24 may be closed and sealed or locked in the usual manner. In order to prevent the lock from being released by unauthorized persons, the pressure line 21 is provided with a vent 33 which is of such size that considerable pressure is necessary to lift the piston in the power cylinder the vent being always open thereby rendering it impossible for an unauthorized person to release the lock by means of a small air pump. The parts are so designed that a pressure of between seventy and eighty pounds is necessary to lift the piston in the power cylinder. It is of course understood that the locking mechanism is all enclosed within the wall structure of the car and is accessible only when the cover 24 is opened.

Various changes may be made in the details of construction and arrangement of parts without departing from the spirit of our invention and it is understood that the invention is limited only in accordance with the scope of the appended claims. It will now be clear that we have provided a locking mechanism of the character described which will accomplish the objects of the invention as hereinbefore stated.

Having thus described our invention, what we claim is:

1. A locking mechanism of the character described comprising a casing having an opening in the side, a locking head slidably mounted within said casing and having a depending nose on the side adjacent to the open side of the casing, a latch member adapted to be projected through the opening in the casing and to engage the nose of the locking head, the latch member coacting with the nose in the manner of a cam thereby to lift the locking head as the latch member enters the casing the head dropping by gravity to dispose the nose on the rear side of the latch member, electrically operated means for elevating the locking head whereby to release said latch and a manually operable latch for rendering said locking means ineffective, and means associated with said latch for breaking the circuit to said electrically operated means.

2. A lock of the character described comprising a casing having an opening therein, a substantially C-shaped locking head slidably mounted within said casing adjacent said opening and having a depending nose on the side corresponding to the open side of the C-shaped locking head, a latch member adapted to be projected into said opening and into locking engagement with said locking head, the said latch member being designed to cooperate with said nose in the nature of a cam to elevate the locking head as the latch member enters the casing, the head dropping by gravity to project said nose to the rear of the latch member, power operated means for elevating the locking head whereby to release said latch member, and a manually operable latch for holding said locking head in the elevated position independently of said power operated means, and means associated with said latch for rendering said power operated means ineffective.

3. In a lock of the character described comprising a casing having an opening therein, a locking head reciprocably mounted within said casing, a latch member adapted to be projected through the opening in the casing and into locking engagement with the locking head, two power operated units acting independently of each other for lifting the locking head whereby to release the latch member and manually operable latch means adapted to be moved to a position to hold said locking head in the elevated position independently of the said power units, and means associated with said latch means for rendering one of said power operated units ineffective.

4. A locking mechanism of the character described comprising a casing having an opening therein, a locking head slidably mounted within said casing, a keeper adapted to be moved into interlocking engagement with said locking head, electrical means for moving said locking head to such a position as to release said keeper, a manually operable latch member for rendering said locking mechanism ineffective, and means associated with said latch for breaking the circuit to said electrical means.

5. A locking mechanism of the character described comprising a casing having an opening therein, a locking head slidably mounted within said casing, a keeper adapted to be moved into interlocking engagement with said locking head, electrical means for moving said locking head to such a position as to release said keeper, fluid pressure means also operable to move said locking head to such a position as to release said keeper, and a manually operable latch member for rendering said locking mechanism ineffective, and means associated with said latch for breaking the circuit to said electrical means when moved to one position.

6. A locking mechanism of the character described comprising a casing having an opening therein, a locking head movably mounted within said casing, a keeper adapted to be moved into interlocking engagement with said locking head, a pressure operated power unit operable to move said locking head to such a position as to release the keeper, a manually operable latch for rendering said locking mechanism ineffective, and means for rendering said power unit inoperable until a predetermined pressure is applied thereto.

7. A locking mechanism of the character described comprising a casing having an opening therein, a locking head movably mounted within said casing, a keeper adapted to be moved into interlocking engagement with said locking head, a pressure operated power unit operable to move said locking head to such a position as to release the keeper, a manually operable latch for rendering said locking mechanism ineffective, said power operated unit having a vent opening therein whereby a predetermined pressure must be applied thereto in order to render said locking mechanism ineffective.

In testimony whereof, we hereunto affix our signatures.

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ROBERT E. HYDE.
HARRY J. GREEN.