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E. F. MILES ET AL

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SECURED CAR DOOR

Filed Oct. 24, 1919

2 Sheets-Sheet 1

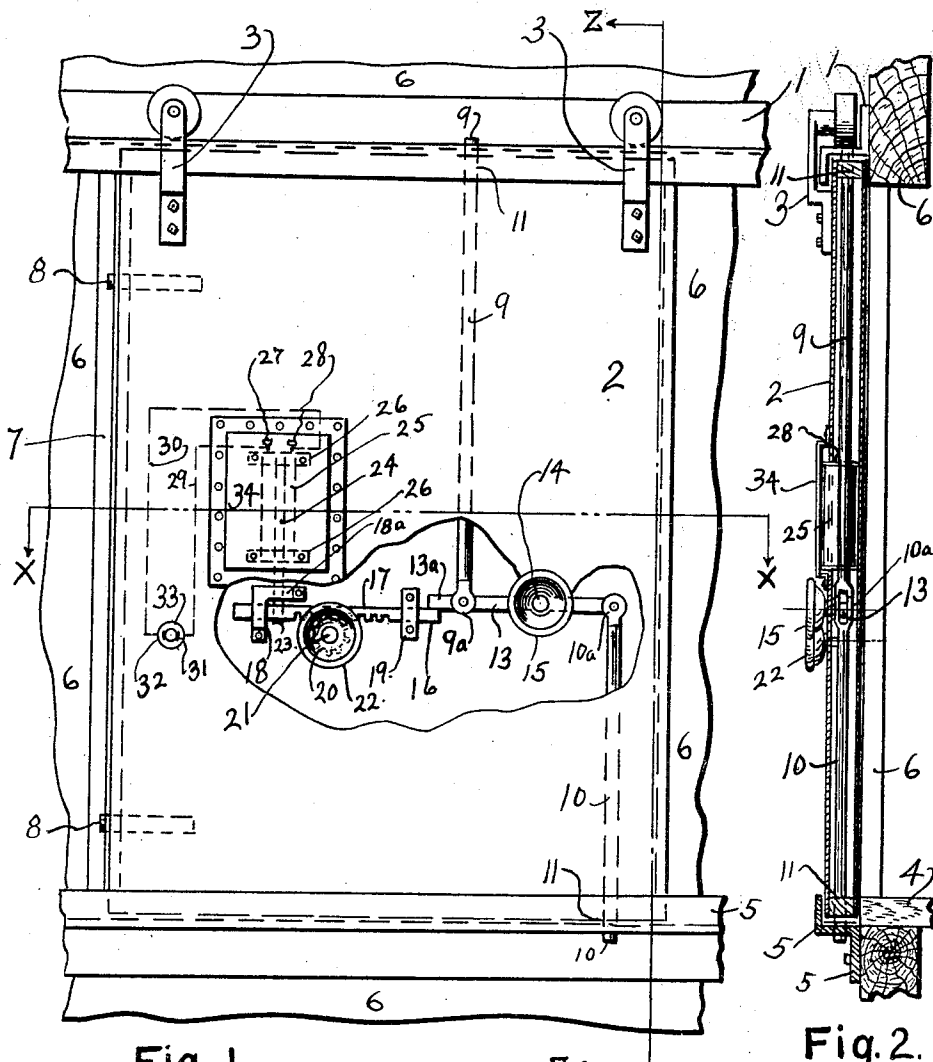


Fig. 1.

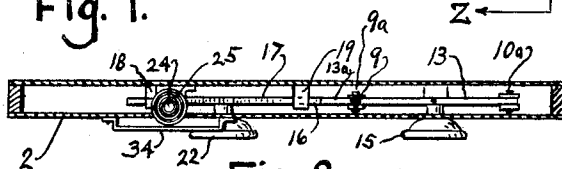


Fig. 3.

Fig. 2.

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2 Sheets-Sheet 2

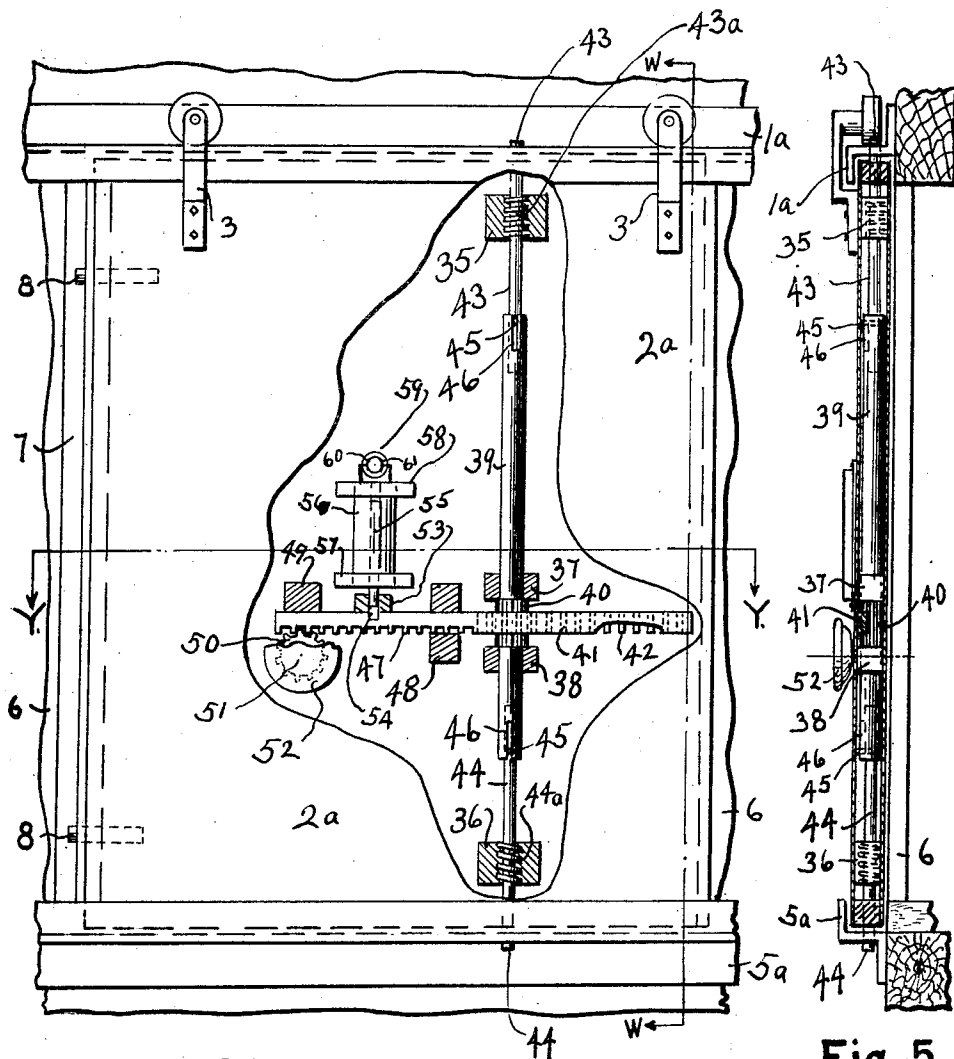


Fig. 4.

Fig. 5.

Fig. 6.

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UNITED STATES PATENT OFFICE.

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SECURED CAR DOOR.

Application filed October 24, 1919. Serial No. 333,049.

To all whom it may concern:

Be it known that we, EARL F. MILES and ERNEST V. LARKIN, citizens of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented new and useful Improvements in Secured Car Doors; and we do hereby declare the following to be a full, clear, and exact description of the same, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to figures of reference marked thereon, which form part of this specification.

Like figures of reference refer to like parts.

This invention relates to secured car doors.

One of the objects of this invention is to provide suitable means for releasably securing a car door in its closed position, in a manner to require the use of an electric current to release the lock upon the same.

A further object of this invention is to provide a simple and effective locking means for a door to secure the bolts of the same in a locked position, using another device for holding said locking means, against being unlocked whereby said device will be relieved of the direct strain, which would be caused by an attempt to force said lock, and an additional object is to have said device operated electrically.

A further object is to provide, in connection with an electrically operated device, for holding the securing means of said lock, a plug socket accessible from the outside of the door, to be used in conjunction with a current of special amperage or voltage or both, supplied at the freight stations, having such current adaptable to operate a specially formed electrical device, which controls the operation of the securing means of the lock.

With these and other objects, our invention resides in certain construction, two embodiments of which are illustrated in the drawings, their operation is explained, and what we claim is set forth.

In the drawings,

Figure 1 is a side elevation of a closed car door, positioned upon its frame, having part of the casing of said door broken away to show the construction of the locking parts embodying our invention.

Figure 2 is a sectional end elevation of the

door and frame shown in Figure 1 taken on the line Z—Z.

Figure 3 is a section taken on the line X—X in Figure 1

Figure 4 is a side elevation of a closed car door, having thereon a different locking mechanism, from that shown in Figure 1, and which is another embodiment of our invention, using screw operated bolt shafts.

Figure 5 is a sectional end elevation of the door and mechanism shown in Figure 4.

Figure 6 is a section taken on the line Y—Y of Figure 4.

In the figures, referring to Figures 1, 2, and 3, there is shown in rolling position upon the Z-bar track 1, the door 2, suspended by roller brackets 3. Outside the sill 4, of the doorway, is shown fixed a Z-bar 5, having approximately the same length as the Z-bar 1, both Z-bars forming parts of the frame 6, besides forming channels in which the door 2 slides. These channels form means for securing the door laterally against the frame 6. The door, as shown in Figure 1, is in a closed position, and adapted to be slid to the right to open the same. There is a jam formed by an angle iron 7. Bolt ends 8 fixed upon the frame of the door 2 are adapted to slide in and out of holes in the angle iron 7. These bolt ends 8, in the closed position shown, afford extra means for securing one end of the door to the framework of the car.

We place vertical bolt rods 9 and 10 near the opposite end of the door 2, the ends of which bolt rods engage corresponding holes in the respective channel irons 1 and 5, when the door is in its closed position. These bolt rods 9 and 10, reciprocate in proper bearings in the frame of the door 2, such as are indicated at 11 and 12. The inner ends of the rods 9 and 10 are pivoted at the respective points 9^a and 10^a, to a lever 13, which lever 13 is fulcrumed at the point 14, at which point is fixed a hand wheel 15, positioned on the outside of the casing of the door 2. The lever 13 has an extension 13^a, near the pivot point 9^a, and is engaged with the end 16 of the rack bar 17, which rack bar is in sliding engagement with the brackets 18 and 19, which are upon the frame of the door 2. In engagement with the rack 17, is the gear 20, which is journaled in connection with the frame of the door 2. Fixed to the shaft 21, upon which is secured the gear 20, is the hand

wheel 22, positioned outside the frame of the door 2. The rack 17, has a hole engaged by the bolt end 23, of the solenoid core 24, which bolt end is in sliding engagement with the part 18^a, of the bracket 18. A solenoid 25 surrounds the core 24, and is shown to have attaching straps 26, fixing the same to the frame of the door 2. There are also provided two binding posts 27 and 28, to which are attached the respective wires 29 and 30, connecting the terminals 31 and 32, of the socket 33, therewith. If desired, the socket 33 could be so incorporated by direct connections with the solenoid 25 in such a position as to dispense with the wires 29 and 30. Inasmuch as the required diameter for the solenoid 25 is such as to be greater than that afforded by the permissible space between the front and back of the frame of the door 2, we build out an extension 34, on the outer face of the door 2, which extension is sufficient to take care of the extra space required for the solenoid 25, but yet does not extend beyond the line of the hangers 3, or the usual hand brackets on the side of the car.

Referring now to the screw operated form of bolt shafts, and our device for operating the same, as shown in Figures 4, 5 and 6. We provide threaded blocks 35, and 36, securely fixed to the frame of the door 2^a, and also journaling blocks 37 and 38, in which is journaled the sleeve 39, having integral therewith the gear portion 40, which is positioned between the blocks 37 and 38, and serves to fix the sleeve 39 in vertical position to be rotated by the rack 41, having vertical teeth 42, meshing with the gear 40. In sliding engagement with the two ends of the sleeve 39, are the respective threaded shafts 43 and 44, each provided with a pin 45, in sliding engagement with the slot 46. The shaft 43, has a right-threaded portion at 43^a, engaging the threaded block 35, the shaft 44 has a left-threaded portion 44^a, engaging the threaded block 36. The shaft 43 passes up through a hole in the Z-bar 1^a, in the closed position of the door, while the shaft 44 passes down through a hole in the Z-bar 5^a. Other holes can be provided in these Z-bars, whereby the door can be locked in a partially open position for ventilation of the car interior. Returning to the rack 41, the same is shown to have a toothed portion 47, wherein the teeth are horizontal. This toothed portion 47 is in reciprocal engagement with the block 48, and the block 49. Meshing with the toothed portion 47, of the rack 41, is the gear 50, fixed to the shaft 51, upon which is fixed the hand wheel 52, on the outside of the door 2^a. The shaft 50 is journaled in suitable bearings fixed in the frame of the door 2^a, but not here shown. Midway of the blocks 48 and 49, is a block 53 fixed upon

the frame of the door 2^a. In reciprocal relation with this block 53, is the bolt end 54 of the core 55, which core is adapted for reciprocation within the coils of the solenoid 56. The solenoid 56 is secured to the door frame by straps 57 and 58.

We have shown in connection with this form of screw threaded locking mechanism, a threaded socket 59 mounted in connection with the top of the solenoid 56, having terminals 60 and 61. Remaining parts of the door and its frame are numbered the same as similar parts shown in Figures 1, 2 and 3.

Referring now to the operation of the form of our invention, illustrated in Figures 1, 2, and 3, the illustration in Figure 1 shows mechanism in locked position on the door 2, wherein the bolt shafts 9 and 10 engage holes in the respective Z-bars 1 and 5, and the lever bar 13 is in horizontal position, having its end 13^a engaged in locking position by the end 16 of the rack bar 17. This position of the rack bar 17, is secured by the bolt end 23, of the core 24, passing through a hole in the rack bar 17, and also passing through the bracket portion 18^a of the bracket 18 to take any transverse strain which might come on the bolt end 23 in an attempt to unlock the device by turning the hand wheel 22 counterclockwise. The bolt ends 8, 8, serve to secure the door transversely in the angle irons 7, but these bolt ends 8, 8, are adapted to slide horizontally in and out of the holes, they are shown to occupy in the angle iron 7. When it is desired to release the rack bar 17, from its engagement with the bolt end 23, of the solenoid core 25, so that the hand wheel 22 can be turned counterclockwise, to move the rack bar 17, to the left, so as to withdraw the end 16, from the locked engagement with the end 13^a of the lever 13, a suitable connection with the proper source of an electric current is made having the proper amperage and voltage to operate the solenoid 25. A plug is inserted in the socket 33 to make this connection with the terminals 31 and 33 thereof, and by the wire connection 31 and 32, with the solenoid 25 energize the same to lift the core 24, releasing the rack 17.

It will be observed that with the solenoid and the mechanism arranged within the casing of the door 2, as herein shown, without breaking through the casing of the door 2, that, only the proper electrical means will be of service in releasing this locking mechanism. After the locking mechanism is released and the bolt end 16 is withdrawn from the lever end 13^a, the operator is at liberty to turn the hand wheel 15 in a counterclockwise movement, thereby turning the lever 13, and lowering the bolt bar 9, and raising the bolt bar 10, from their respective connections with the Z-bars 1 and

3, to permit the door 2 to be rolled upon the Z-bar 1 to the right to open the same. A reverse of the operation just described is effected to close and lock the door, wherein the bolt end 23 of the solenoid core 24, will drop into the proper hole for the same made in the rack bar 17 in the position shown in Figure 1.

Referring now to the operation of the parts shown in Figures 4, 5, and 6, the illustration in Figure 4 shows the door mechanism in locked position, wherein the threaded rods 43 and 44, had been previously turned to their outermost position, having the outer ends of these rods engage holes in the respective Z-bars 1^a and 5^a. At the same time bolt end 54, of the solenoid core 55, engages the rack 41, while the teeth of the gear 40 are locked by meshing with the teeth 42 of the rack 41 in its fixed locked position. In order to release the rack bar 41, so that the same can be moved by the gear 50, through the agency of the hand wheel 52 and shaft 51, an electric plug connected with a source of electricity of the proper amperage and voltage to energize the solenoid 56, is put into the socket 59 to form a connection with the terminals 60 and 61, to cause the core 55 to be lifted out of its socket in the rack bar 41, and held there while the hand wheel 52 is turned counterclockwise to cause the gear 50 to throw the tooth portion 47, of the rack 41 to the left, and by the meshing of the teeth 42, with the gear 40, rotates the sleeve 39, in a manner through the pins 45, to turn the rods 43 and 44, to screw the same from the respective nut brackets 35 and 36, to withdraw the outer ends of the rods 43 and 44 from their engagement with the holes in the respective Z-bars 1^a and 5^a; after which the door 2^a is in released position to be slid to the right to open the same.

A reverse of the operations above described is effected to lock the door in the position shown in Figure 5, wherein the bolt end 54 finds its way in a corresponding recess in the rack bar 41, when the same has

been thrown to the right in the position shown, by means of the clockwise rotation of the hand wheel 52.

The same observation regarding the use of the solenoid of the mechanism arranged within the casing of the door, for locking the same and releasing by means of electrical current applies to this form of our device as just described, as shown in Figures 4, 5 and 6.

Other modifications of our invention may be devised without departing from the spirit and scope of said invention herein shown and described.

We claim:

1. The combination with a door for a freight car, of a bolt thereon, a lever connected with said bolt for projecting the same, positive means engaging said lever to prevent its operation, means for shifting said positive means out of engagement with said lever and reciprocating means normally preventing the shifting of said positive means.

2. The combination with a door for a freight car, of bolts thereon, a lever connected with said bolts projecting the same, a horizontally reciprocable bar adapted in one position to engage one end of said lever and prevent its operation, an electrically controlled bar normally resting in a notch in said first named bar to prevent its movement, and a socket through which the said bar can be electrically actuated.

3. The combination with a door for a freight car, having positive locking means and manually operated means for actuating said locking means to unlock the door, of a solenoid core adapted normally to engage an element of said manually operated means, thereby to prevent the operation of said locking means and a socket connected in circuit with said solenoid so that when a plug of specific form is inserted the core is retracted and the locking means may be operated to unlock the door.

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