

April 22, 1924.

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H. S. HART ET AL  
SAFETY UNLOCKING DEVICE

Filed June 16, 1922

Fig. 1

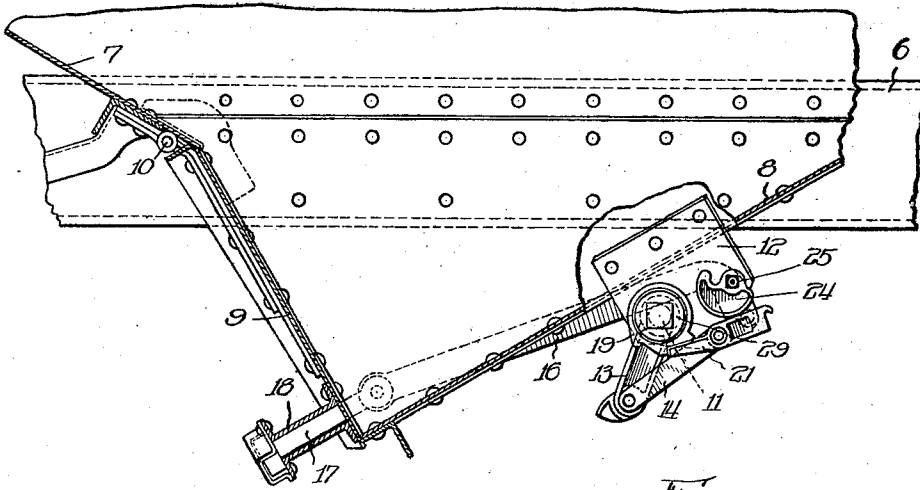


Fig. 2

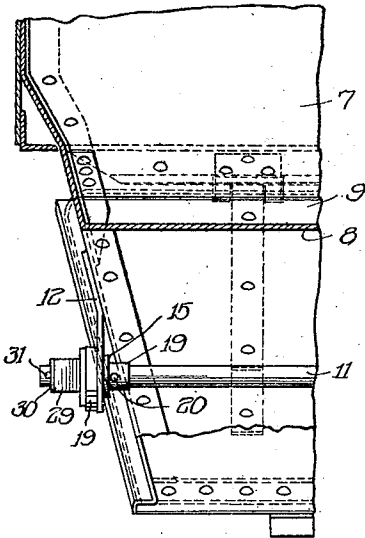


Fig. 3

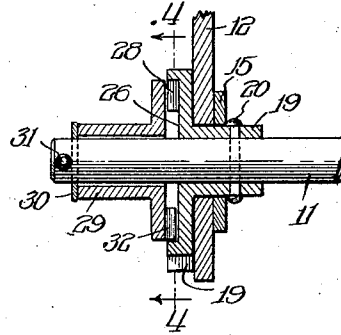
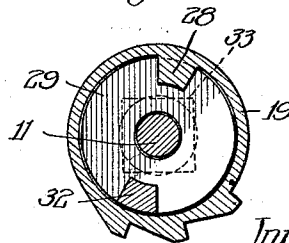


Fig. 4



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# UNITED STATES PATENT OFFICE.

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## SAFETY UNLOCKING DEVICE.

Application filed June 16, 1922. Serial No. 568,824.

*To all whom it may concern:*

Be it known that we, HARRY S. HART, JOHN O. NEIKIRK, and WILLIAM E. MOREY, citizens of the United States, residing at Chicago, Cook County, Lombard, Du Page County, and Chicago, Cook County, Illinois, have invented certain new and useful Improvements in Safety Unlocking Devices, of which the following is a specification.

This invention relates to a new and improved unlocking device and more particularly to a safety unlocking device adapted for use in connection with car door operating shafts.

In a number of types of door opening and closing and locking mechanism now in use upon dump cars and hopper cars, the mechanism is so designed that it is moved past a dead center in closing and locking. In these cars the weight of material in the car thrusts against the doors and consequently as soon as the operating mechanism has been moved past the dead center upon its opening movement, there is a tendency for the material to cause the doors to swing open with a rush. This tendency imparts a sudden shock to the operating mechanism as that mechanism passes the dead center. This results not only in injury to the mechanism but in danger to the person operating the mechanism.

In general, the shafts of such operating mechanisms are formed of different cross-sections at different portions of their length in order to facilitate the attachment of the operating parts and the elements necessary for retaining such shafts in place. Such shafts are materially more expensive to manufacture than shafts of a single simple cross-section throughout.

It is an object of the present invention to provide an additional mechanism in cooperation with the door operating and closing mechanism of these types, this additional mechanism serving to prevent the sudden shock being transmitted to the operating lever or wheel and to the operator.

It is a further object to provide means whereby the door operating mechanism may move forward free from the operating wheel or lever when the mechanism passes its dead center.

It is also an object to provide mechanism of this character adapted for use with shafts

of uniform cross-section and adapted to retain the shaft in place with a minimum of parts.

It is an additional object to provide means of this character which are simple in design and construction and positive in operation and which may be added to existing installations without material alteration thereof.

Other and further objects will appear as the description proceeds.

Broadly, our invention comprises members in combination with a car door operating shaft, these members being associated with the shaft in such manner as to be adapted to positively rotate the shaft and further to permit rotation of the shaft in advance of the movement imparted by the members. In the preferable form, it functions in this manner in either direction of operation. Further the members are adapted for use with a shaft of uniform cross-section and the means connecting the mechanism to the shaft also serves to retain the shaft in place.

We have illustrated a preferred embodiment of our invention in the accompanying drawings, in which—

Figure 1 is a fragmentary section of a hopper car showing the door operating mechanism with our invention applied thereto;

Figure 2 is a transverse section showing the mechanism of Figure 1;

Figure 3 is a fragmentary view on a larger scale and partly in section showing our safety unlocking device; and

Figure 4 is a section taken on line 4—4 of Figure 3.

In order to illustrate the application of our invention, we have shown it in association with a door operating mechanism which is old in the art and which is no part of the present invention. The portion of the car as shown comprises the car sills 6, the car floor 7 and hopper bottom 8. The hopper door 9 is hinged at 10 adjacent the floor portion 7. The car door operating shaft 11 is carried in hangers 12 below the hopper bottom 8. Rigidly connected to the shaft 11 is the arm 13 which is connected by links 14 and 16 to the bolt 17. The bolt 17 is connected to the hopper door 9 through bracket 18.

The ratchet-tooth member 19 is secured to

the shaft 11 by means of pin or rivet 20 as best shown in Figure 3. This pin 20 also serves to retain the holding washer 15 in place. The washer 15, together with the radially extending flange of the member 19, serve to engage opposite faces of the hanger 12 to retain the shaft in place. The pawl 21 is pivoted to the hanger 12 at 22 and is adapted to engage the ratchet-teeth on member 19. The outer heavier end 23 of the pawl may be engaged by the dog 24 which is pivoted at 25 to the hanger 12, this dog serving to lock the pawl in place against the ratchet-wheel.

This mechanism as so far described is old and as stated, forms no part of the present invention. In the construction as heretofore used, the shaft 11 would be rotated by a wheel or lever positively connected to the end of the shaft.

According to our invention, the ratchet drive member 19 has a sleeve portion fitting the shaft and a flange portion provided with an axially facing circular recess 26. The axially extending lug 28 projects from the inner face of the recess, the lug having both of its lateral faces extending on radial lines. The operating member 29 is fitted over the end of the shaft 11 and faces the ratchet member. The member 29 is held in place by means of the washer 30 and pin 31. The inner face of the member 29 carries the axially extending lug 32, the lateral faces of which are upon radial lines.

When assembled, as shown in Figure 3, the lug 32 is adapted to coact with the lug 28. The size and relation of the lugs is such that the operating member 29 may be rotated upon the shaft 11 in either direction the greater portion of a full circumference before the lugs are engaged. The outer portion of the operating member 29 is squared as indicated at 33 in Figure 4 and is thus adapted to receive an operating lever or wrench.

In closing the car door, the operating member 29 is rotated in the clockwise direction as seen in Figure 1. The member rotates freely until lug 32 engages the lug 28 and then the shaft 11 is caused to rotate with the member 29. The rotation of the shaft swings the arm 13 in the clockwise direction and the links are brought to the position shown in Figure 1, the door being fully closed. It is to be understood that during this operation, the dog 24 is out of engagement with the pawl 23 and hence the pawl coacts with the member 19 to have a ratchet action preventing back slip of the door. When the door is fully closed, the links and arm form a holding train which is past a dead center. That is, if the pawl is released from the member 19, direct thrust by the door 9 will not open the door.

In order to open the door, it is necessary

to rotate the shaft 11 in a counterclockwise direction until the holding train is past its dead center. In order to do this, the operating member 29 is rotated in the counterclockwise direction. It moves freely from the position it held when closing the door until it rotates sufficiently to bring the lug 32 against the opposite side of the lug 28. Further movement then of the member 29 causes the shaft 11 to rotate therewith.

As soon as the holding train passes its dead center, the thrust of the material against the door 9 or the weight of the door itself, if the car is empty, serves to exert a pull upon the shaft 11 tending to continue its rotation in the counterclockwise direction until the door is fully opened. If the car is fully loaded with easy flowing material, considerable shock will be imparted to the shaft at the instant of passing the dead center. This pull upon the shaft will cause it to rotate and the lug 28 will leave the lug 32 and continue in advance until the door is open. No pull will be imparted to the member 29 or to any operating handle or wrench connected thereto. The amount of circumferential clearance between the lugs 28 and 32 is ample to permit the shaft 11 to rotate sufficiently to permit the door to fully open without bringing the lug 28 against the opposite side of the lug 32.

The pin 20 serves both to retain the member 19 upon the shaft and the washer 15 in fixed relation upon the member 19. These two members serve to engage the hanger to maintain the shaft 11 in place. Removal of the pin 20 serves to disconnect the member 19 from the shaft and also to permit removal of the shaft from the car.

It is to be understood that our invention is adapted for use in connection with various other door operating mechanisms, one such mechanism having been shown for purposes of illustration only. Further our apparatus is capable of modification to adapt it to varying constructions and it is our intention to cover all such modifications coming within the scope of the appended claims.

We claim:

1. In combination with a car door operating shaft, a member fitted upon the shaft, means fitted to said member adapted to cooperate with said member to maintain the member in fixed relation to a shaft hanger, and means securing said cooperating means to the member and securing the member in fixed relation to the shaft, an axially projecting lug carried by said member, an operating member rotatably carried by the shaft and having an axially extending lug adapted to coact with the lug on the fixed member to positively rotate the shaft and to permit rotation of the shaft in advance of movement of the operating member.

2. In combination with a car door operating shaft, a member fixed to the shaft, said member having a sleeve portion fitting the shaft and a radial flange portion, a securing member fitted on said sleeve portion, means adapted to position the securing member on the sleeve portion whereby said radial flange portion and securing member are adapted to position the shaft relative to a shaft hanger, a lug on said flange portion, an operating member rotatably carried by the shaft, a lug on said member, the two lugs each extending through a relatively small portion of the circumference of the members and adapted to engage each other, whereby to positively rotate the shaft, and to permit rotation of the shaft in advance of movement of the operating member.

3. In combination with a car door operating shaft, a member fixed to the shaft, said member having a sleeve portion fitting the shaft and a radial flange portion, a holding washer carried on said sleeve portion, and a retaining member adapted to secure the fixed member to the shaft and to retain the holding washer upon the sleeve portion, the flange portion and holding washer being adapted to engage opposite faces of a hanger to retain the shaft in place therein.

4. In combination with a car door operating shaft, a member fixed to the shaft, said member having a sleeve portion fitting the shaft and a radial flange portion, a holding washer carried on said sleeve portion, a lug on said flange portion, an oper-

ating member rotatably carried by the shaft and having a lug adapted to coact with the lug on the sleeve portion to operatively connect said members, and a retaining member adapted to secure the fixed member to the shaft and to retain the holding washer upon the sleeve portion, the flange portion and holding washer being adapted to engage opposite faces of a hanger to retain the shaft in place therein.

5. In combination with a car door operating shaft, a member fixed to the shaft, said member having a sleeve portion fitting the shaft and a radial flange portion, a holding washer carried on said sleeve portion, a lug on said flange portion, an operating member rotatably carried by the shaft, a lug on said member, the two lugs each extending through a relatively small portion of the circumference of the members and adapted to engage each other, whereby to positively rotate the shaft, and to permit rotation of the shaft in advance of movement of the operating member, and a retaining member adapted to secure the fixed member to the shaft and to retain the holding washer upon the sleeve portion, the flange portion and holding washer being adapted to engage opposite faces of a hanger to retain the shaft in place therein.

Signed at Chicago, Illinois, this 9th day of June, 1922.

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