H. ROWNTREE.

SAFETY LOCKING DEVICE FOR DOORS OR OTHER CLOSURES.

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Fig. 1.

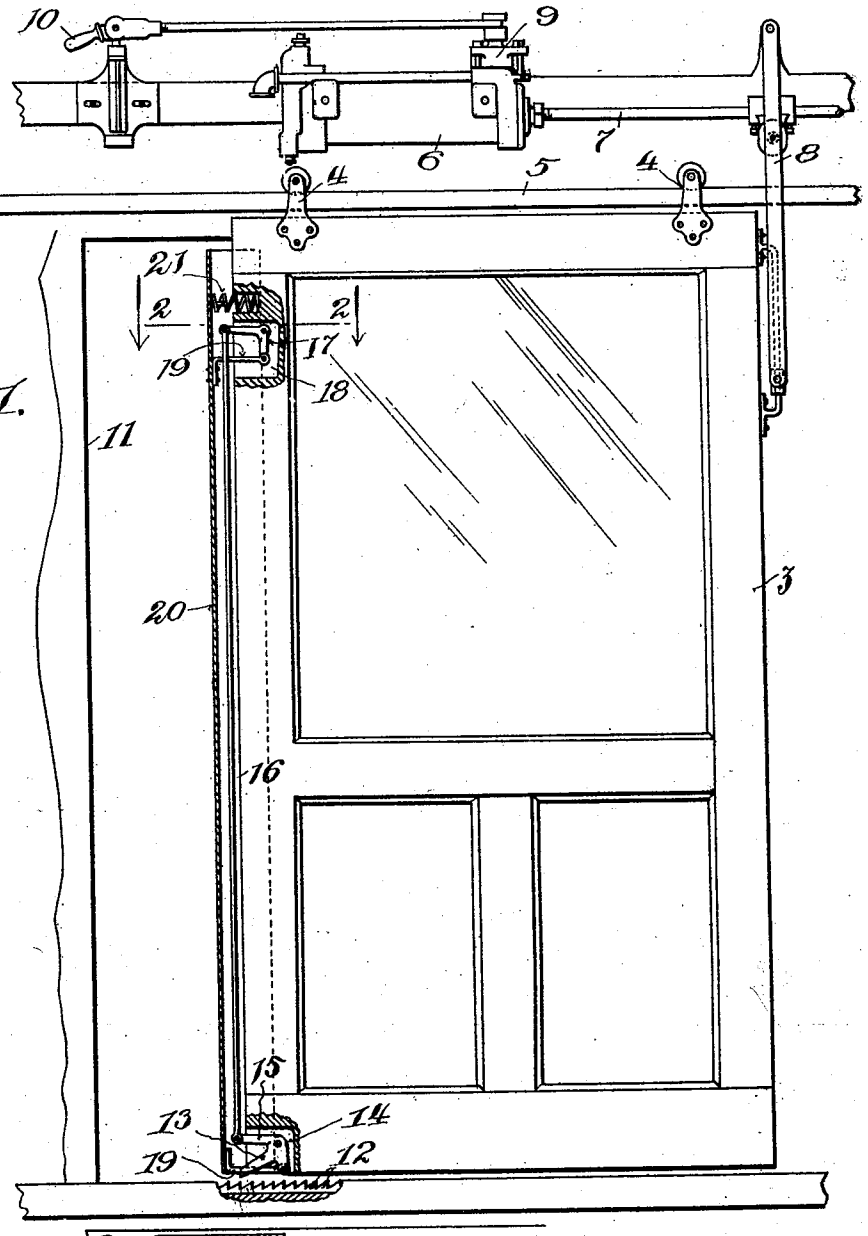
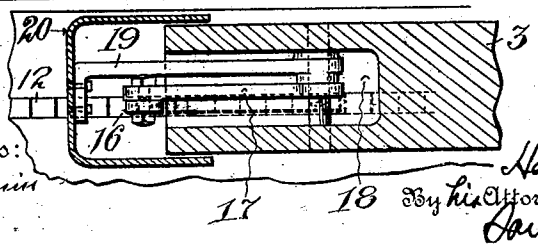


Fig. 2.



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UNITED STATES PATENT OFFICE.

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SAFETY LOCKING DEVICE FOR DOORS OR OTHER CLOSURES.

No. 913,773. Specification of Letters Patent. Patented March 2, 1909.

Application filed November 17, 1908. Serial No. 463,015.

To all whom it may concern:

Be it known that I, HAROLD ROWNTREE, a citizen of the United States, residing at Chicago, in the county of Cook, State of Illinois, have made a new and useful Invention in Safety Locking Devices for Doors or other Closures, of which the following is a specification.

The invention relates to safety devices for doors or other closures, and the object is to provide means which are simple and effective for locking the door against further closing movement, in case an obstruction is encountered by the door in closing.

Other objects of the invention will appear more fully hereinafter.

The invention consists substantially in the construction, combination, location and relative arrangement of parts all as will be more fully hereinafter set forth, as shown in the accompanying drawing, and finally pointed out in the appended claims.

In the drawing Figure 1 is a broken view, partly in section, and parts broken out, showing a locking mechanism embodying the principles of my invention as applied to a door. Fig. 2 is a broken view in section on the line 2, 2, Fig. 1 looking in the direction of the arrows.

In the operation of doors or other closures, and similar devices, it sometimes happens that, in closing, the door or other device encounters an obstruction which causes the closing movement of the door to be arrested or retarded. The application of the power employed to effect the closing movement of the door being continued after the obstruction is encountered tends to cause a continued squeeze of the obstruction between the advancing edge of the door and the door jamb and, sometimes, with an increasing force, depending somewhat upon the character of the door moving power employed, so that the danger of injury, as where the obstruction happens to be a person, is increased, and in any event, the withdrawal or removal of the obstruction results in causing the door to slam to its final closed position. This objection is particularly serious in the case of doors or gates of street, subway, elevated, passenger elevator, and other cars, and the like, and especially where it is necessary for large crowds of people to use or pass through the doorways or entrances of such cars. The dangers and objections noted are also increased where the doors are operated by pressure or other power mechanism, since, in the case of pressure power, for instance the pressure applied to close the door continues to build up when an obstruction is encountered, and hence an increasing force is applied tending to move the door to its closed position during the time the obstruction remains in front of the advancing edge of the door.

It is among the special purposes of my present invention to provide means which are simple and efficient for locking the door against further closing movement when an obstruction is encountered, and requiring at least a slight opening or reverse movement of the door to release the lock, thereby destroying or counteracting the effect of the building up of the power tending to close the door. And in accordance with one form of application of my invention I employ a mechanism which is automatic in its operation both in its locking and also in its releasing movements.

While my invention is applicable to a large variety of doors, gates or other closures, and to various means employed to move the same, I have shown the invention applied to a door and a pressure mechanism for operating it, merely as illustrative of the principles involved, and I will now describe the same with reference to such application, but of course, the invention, as defined in the claims, is not to be limited in respect to the particular type or style of door gate, closure or the like, nor to the particular means employed for operating or moving the same.

In the drawing, reference character 3, designates a door, which, in this instance, is shown as a sliding door, being suspended by roller hangers, 4, operating on a track 5. The door is shown as being operated by power mechanism, which, in the case shown, comprises a power cylinder 6, the piston rod 7, of which, has suitable connection with a rocking lever 8, the latter slidingly engaging the door. The supply and exhaust of power medium to and from the cylinder is controlled by a valve mechanism 9, by means of a control device

10. The door is arranged to move towards the jamb 11, in the closing movement thereof.

The parts so far described may be of any usual or desired construction and arrangement, and in the details thereof form no part of the present invention.

In the door sill or tread, over which the door operates, is arranged a rack 12, with which coöperates a locking dog or pawl 13, pivotally mounted in a recess 14, in the front edge of the door at its lower end. Formed with or connected to the pawl 13, to rock therewith, is a bell crank lever 15, to one arm of which is pivotally connected one end of a rod 16, the other end of said rod being pivotally connected to a corresponding arm of a bell crank lever 17, pivotally mounted in a recess 18, in the front edge of the door near its upper end. Brackets or straps 19, are connected to the other arms, respectively, of the bell crank levers 15, 17, and these brackets support a facing or member 20, at the front edge of the door. A spring 21, or its equivalent, may be interposed between the member 20, and the front edge of the door, the tension of said spring being constantly exerted upon the member 20, to press the same away from the front edge of the door.

From the foregoing description it will be seen that the member 20, while carried by the door, is nevertheless capable of being moved relatively to the door, and, under normal conditions, is held by the spring 21, yieldingly pressed away from and in advance of the front edge of the door, thereby, through the brackets or straps 19, rocking the bell crank levers 15 and 17, in a direction to cause the pawl 13, to be held out of engaging relation with respect to rack 12. The drawing shows the parts occupying this position and relation. When, however, the door, in closing, encounters an obstruction, as when a person is caught between the front edge of the door and the adjacent jamb, the member 20, yields against the tension of spring 21, and is moved towards the front edge of the door, thereby rocking the bell cranks 15, 17, in a direction to carry the pawl 13, into engagement with the rack 12, thereby forming a positive lock to prevent any further movement of the door toward closed position, and retaining the door against further closing movement until the obstruction is removed so as to permit the spring 21, to come into play to again force the member 20, away from the front edge of the door, thereby releasing the door and permitting the same to move on towards its final closed position.

It will be observed that the arrangement of levers and connections is such as to constitute a parallel motion, the member 20, always moving parallel to itself.

When a power mechanism is employed to effect the operation of the door, and the power is constantly applied, until the door reaches its final closed position, as, for instance, in the case of pressure operated door moving means, it will be readily seen that when the locking pawl 15, is once engaged in the rack 12, by the door meeting an obstruction in its closing movement, it is necessary to first reverse the power mechanism sufficiently to relieve the pressure exerted thereby on the locking pawl in order that such pawl may be released from the rack 12, and this reversal of the power mechanism serves to relieve the built up pressure caused by the arrest of the door in its closing movement, and therefore the subsequent movement of the door towards its final closing position after being released, is effected evenly and smoothly and without undue shock or slam.

In practice I prefer to employ a facing 20, substantially U-shaped to telescope over the front edge of the door thereby controlling the lock operating mechanism and also providing a neat and finished appearance.

Having now set forth the object and nature of my invention, and a construction embodying the principles thereof, and having explained such construction, its purpose, function and mode of operation, what I claim as new and useful, and of my own invention, and desire to secure by Letters Patent, is,—

1. In a safety device for doors or the like, a door, in combination with means automatically operated by the door striking the obstruction in closing, for preventing further movement toward closed position.

2. In a safety device for doors, or the like, a door, in combination with means for preventing further movement of the door towards closed position when an obstruction is encountered during such closing movement.

3. In a safety device for doors, or the like, a door, in combination with means carried by the door and operated by encountering an obstruction in closing, for preventing further closing movement.

4. In a safety device for doors, or the like, a door, in combination with means for automatically locking the door against further closing movement when an obstruction is encountered during such closing movement.

5. In a safety device for doors, or the like, a door, a locking device carried thereby to lock the door against closing movement, and means operated by encountering an obstruction in closing for making said locking device effective.

6. In a safety device for doors, or the like, a door, a member carried by the door at its front edge, and movable relatively to the door, and means operated by the movement of said member relative to the door for locking the door against further movement.

7. In a safety device for doors, or the like, a door, a member carried by the door at its

front edge, and movable relatively to the door, a locking device carried by the door, and connections between the movable member and the locking device, to control the latter.

8. In a safety device for doors or the like, a door, operating mechanism therefor, and means controlled by an encountered obstruction to the closing movement of the door for rendering the door operating mechanism inoperative.

9. In a safety device for doors, or the like, a door, power mechanism for operating the same, and means controlled by an encountered obstruction to the closing movement of the door for rendering the power mechanism inoperative.

10. In a safety device for doors, or the like, a door, a locking pawl carried thereby, a stationary rack with which the pawl cooperates, and means operated by an encountered obstruction to the closing movement of the door for moving the pawl into engagement with the rack.

11. In a safety device for doors, or the like, a door, a member carried at the front edge of the door for movement relative thereto, a spring interposed between said member and the door, a locking device carried by the door, and connections between the movable member and the locking device for operating the latter.

12. In a safety device for doors, or the like, a door having a recess in the front edge thereof, a locking pawl pivotally mounted in said recess, a rack with which said pawl coöperates, a member carried at the front edge of the door and movable relative thereto, and connections between said member and pawl for controlling the latter.

13. In a safety device for doors, a door having recesses in its front edge, bell crank levers mounted in said recesses, a rod connecting corresponding arms of said levers, a facing for the front edge of the door, connections between said facing and the other arms of the bell crank levers, and a spring interposed between the facing and the door edge.

In testimony whereof I have hereunto set my hand in the presence of the subscribing witnesses, on this 6th day of November, A. D., 1908.

HAROLD ROWNTREE.

Witnesses:

JNO. B. BURDETT,

LEMUEL M. SHIELDS.