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D. C. RUTH

1,915,448

SAFETY HINGE

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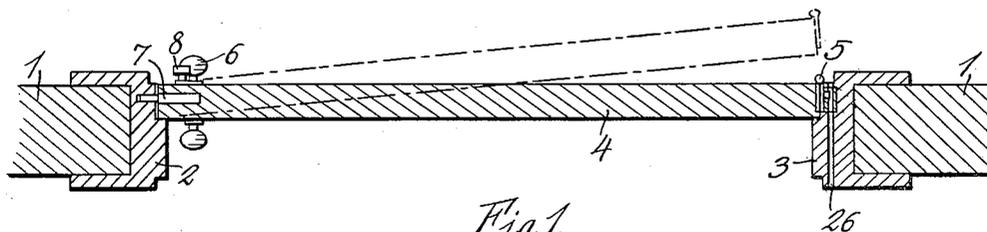


Fig. 1.

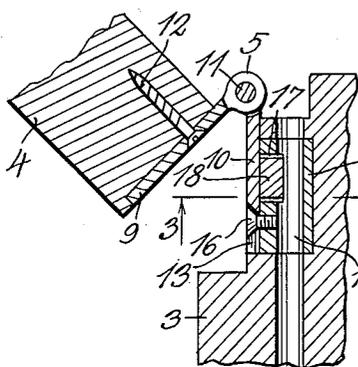


Fig. 2.

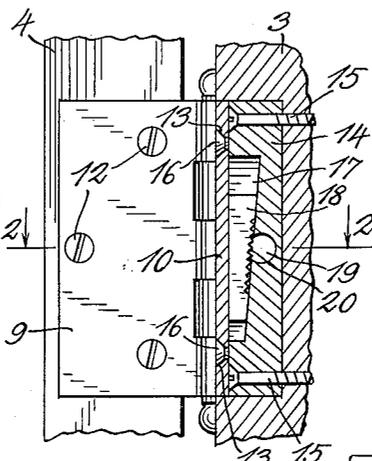


Fig. 3.

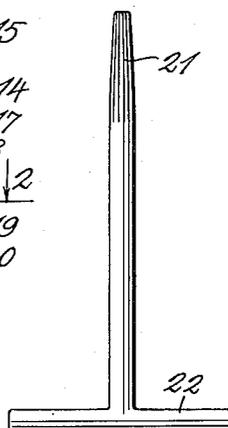


Fig. 6.

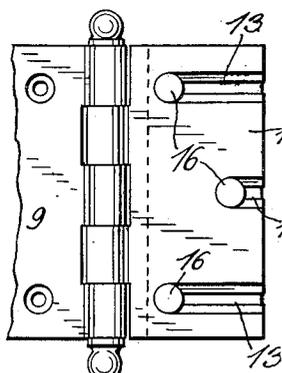


Fig. 4.

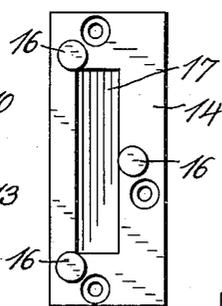


Fig. 5.

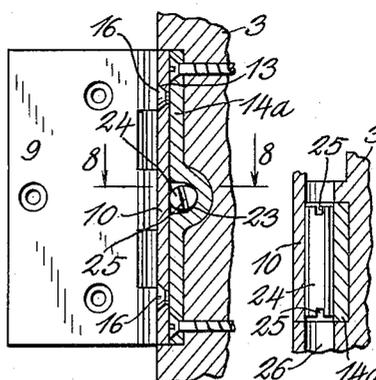


Fig. 7.

Fig. 8.

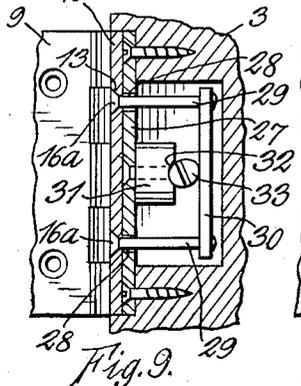


Fig. 9.

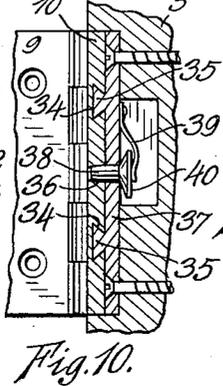


Fig. 10.

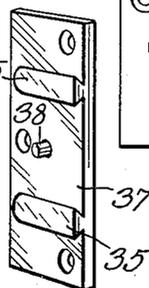


Fig. 11.

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## SAFETY HINGE

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This invention relates to improvements in safety hinges for doors and has reference more particularly to a hinge of such construction that it can be disconnected while the door is closed.

It has frequently happened in the past that for some reason or another, doors to rooms in hotels and bathroom doors have been locked from the inside and the occupant has become disabled or died, or for other reason been unable to open the door, and this has necessitated the forceful breaking of the door for the purpose of entering the room.

Hotel doors, as well as bathroom doors, are usually provided with bolts by means of which they can be locked from the inside, and since no way is provided for releasing the bolts from the outside of the room, it is evident that unless some other means is provided for entering, the door must be mutilated to some extent before the lock can be opened and entry had to the room.

It is the object of this invention to produce a hinge of such construction that one part thereof is secured either to the door frame or to the door by means that can be operated from the outside, while the door is in closed position in such a way that the hinge can be disconnected so as to allow the door to be removed from the opening without making it necessary to break the same.

This invention, briefly described, consists of a hinge formed from two plates connected along one edge by means of a pivot in the usual manner. One of these plates is provided with the ordinary screw holes and the other has a plurality of openings extending inwardly from the free edge thereof. Secured to the door frame, or to the door, is an anchoring plate that is provided with projections that enter the openings in the hinge and with means for forcing these projections against the sides of the openings so as to clamp the hinge to the anchoring plates. The clamping means is so constructed and arranged that it can be operated from the outside of the room while the door is closed.

Having thus briefly described the invention, the same will now be described in detail and for this purpose reference will be had to

the accompanying drawing in which the invention has been illustrated and in which:

Fig. 1 is a section through a door and through the sides of the door frame showing a door connected to the frame and secured in closed position by means of a bolt;

Fig. 2 is a section taken on line 2—2 Fig. 3 and shows one embodiment of the invention;

Fig. 3 is a section taken on line 3—3, Fig. 2;

Fig. 4 is a view showing the inside of the hinge in parallel open position;

Fig. 5 is a plan view of the anchoring plate shown in Figs. 2 and 3;

Fig. 6 is a view showing a specially constructed key for operating the latching means;

Fig. 7 is a section similar to that shown in Fig. 3, but showing a slightly modified form of the invention;

Fig. 8 is a section taken on line 8—8, Fig. 7;

Fig. 9 is a section corresponding to that shown in Fig. 3 and shows a slightly different form of the invention;

Fig. 10 is a section similar to that shown in Fig. 9 and shows another modification of the invention; and

Fig. 11 is a perspective view of the anchoring plate employed in the construction shown in Fig. 10.

In the drawing reference numerals 1 represent the walls of the room and reference numerals 2 and 3 represent the vertical side members of the door frame, while the door has been designated by reference numeral 4. The door is provided with a hinge 5 which is of the construction that forms the subject of this invention and at the other side it is provided with an ordinary lock 6 and a bolt 7 that can only be operated from the inside of the room by means of the knob 8. In the drawing the bolt has been shown as engaging the door frame, thereby securely locking the door so that it cannot be opened from the outside, even by the use of a master key.

The hinge represented by reference numeral 5 in Fig. 1 consists of hinge plates 9 and 10. These are connected along one edge

by means of a hinge pin 11 in the usual manner. The plate 9 which has been shown as secured to the door is provided with the ordinary openings for the reception of screws 12, and does not differ in any particular from the ordinary hinged plate in common use. The hinge plate 10 is provided with two or more openings 13 that extend inwardly from the free end thereof. In the construction illustrated, the openings are slots that have bevelled sides and which terminate at points corresponding to the places where the screw holes are usually provided. Secured to the vertical side 3 of the door frame is an anchoring plate 14. This plate is held in place by means of screws 15 and is provided on its outer surface with projections having bevelled heads 16 which are so located that the hinge plate 10 can slide over the anchoring plate in such a way that the heads of the projections enter the openings or slots in the manner shown in Fig. 4. The anchoring plate is provided with a longitudinal depression or recess 17, whose bottom is inclined with respect to the outer surface of the plate. Located in this recess is a wedge 18. The top and bottom sides of this wedge are inclined at the same angle as the bottom of the recess 17 and the outer surface of the anchoring block, so that when the wedge is moved longitudinally in the recess, its outer surface will always be parallel with the outer surface of the anchoring plate. The anchoring plate is provided with an opening 19 that is intersected by the bottom of the recess and the bottom surface of the wedge is provided with teeth 20. By inserting the tool that is shown in Fig. 6 into the opening 19, the fluted sides 21 of this tool will engage the teeth 20 of the wedge and when the tool is rotated by means of the handle 22, the wedge can be moved longitudinally in the recess. It is apparent that when the hinge is in place with the projections extending through the slots or openings and the wedge is forcibly moved downwardly by the key shown in Fig. 6, the hinge will be moved outwardly with such force that the friction will positively hold the same in place with respect to the anchoring plate and when the hinges are connected between the door and the door frame in the manner just described and shown on the drawing, the door can be operated in the usual manner, but if for any reason it becomes necessary to enter the room when the door is locked and bolted, this can be accomplished by releasing the wedges 18 by means of the key shown in Fig. 6, and after the wedges have been released, the door can be pushed inwardly from the full line to the dotted line position shown in Fig. 1 and can then be entirely removed from the door opening without the necessity of damaging it in any way. After the door has been

removed, it can readily be replaced because the replacing can be done while the door is open, but unless the door is first entirely removed from the opening, it is very difficult, if not impossible, to replace it.

In Figs. 7 and 8 a slightly different form of the invention has been shown. In the embodiment illustrated in these figures, the anchoring plate shown in Figs. 2 and 3 has been replaced by an anchoring plate 14a which is thinner than the corresponding anchoring plate 14 and has its outer surface provided with a transverse recess 23 within which is located a cam 24. This cam is merely a short rod of an elliptical cross section and is provided at its opposite ends with transverse slots at 25 that can be engaged by a screw driver or a similar tool. The anchoring plate 14a is provided with projections 16 that enter the slots or openings in the hinge in the manner described in connection with Figs. 4 and 5. When the hinge is in place on the anchoring plate, it can be securely latched or clamped in position by merely turning the cam 24 and can be released by inserting a screwdriver or other suitable tool through the opening 26 and rotating the cam through a few degrees, thereby removing the pressure, whereupon the hinge can be readily separated from the anchoring plate.

In Fig. 9 I have shown another form of the invention in which the anchoring plate 27 is constructed slightly different from the anchoring plates shown and described above. Anchoring plate 27 is provided with two openings 28 through which the shank portions 29 of the clamping members 16a extend. The inner ends of the parts 29 are connected by means of a transverse bar 30. Secured to the inside of the anchoring plate is a block 31 that has a recess 32 in which the cam member 33 rests. This cam member has an elliptical cross section and may be identical with cam member 24 shown in Figs. 7 and 8. By rotating the cam member, the hinge can be securely latched to the anchoring plate in a manner corresponding to that above described. The object of the construction shown in Fig. 9 is principally to make it possible to move the hole 26 farther away from the outside surface of the door frame.

In Figs. 10 and 11 another modification has been shown. In this modification the hinge plate 10 has been provided with dovetailed grooves 34 and the anchoring plate has been provided with correspondingly shaped transverse projections 35 that are adapted to fit the grooves in the manner shown in Fig. 10. The hinge plate is provided with a hole 36 that is so located that it registers with a corresponding opening in the anchoring plate 37. A pin 38 extends through the hole in the anchoring plate and is pressed outwardly by means of a spring 39. The pin is provided

ed with a head 40 that has a conical under surface and is so located that it can be engaged by means of a screwdriver or other similar tool inserted through a suitable opening. When the hinge is to be disconnected, the pin is withdrawn from the opening in the hinge plate, whereupon the hinge can be disconnected as above described. The hole 36 and the corresponding portion of the pin are preferably tapered so as to more securely latch the parts against accidental movement.

It is evident that pin 38 must be of such size that it will resist the ordinary shearing strains to which it is subjected. If the pin is made of tin or an alloy containing tin and lead, it must be made larger than when made of brass or steel.

From the above description it will be apparent that by means of the simple hinge construction described, it is possible to open doors that are locked without the necessity of injuring them in any way and this can be done without in the least interfering with the security of the occupant, because when the door is opened in this manner, it has to be entirely removed from the door opening and this would preclude burglars or criminals of any kind from resorting to taking advantage of this safety device because any room that is entered in this way will immediately become conspicuous, due to the absence of the door.

Having described the invention what is claimed as new is:

1. A safety door hinge comprising, a hinge portion formed from two plates pivotally connected along one edge, one of the said plates having a plurality of spaced inclined shoulders extending inwardly from its free edge, an anchoring plate adapted to be secured to the door frame, and provided on one side with inclined shoulders adapted to enter between and engage the inclined shoulders on the hinge member and means for releasably interconnecting the anchoring plate and the hinge plate, said means being releasable from the outside while the door is in locked position.

2. A safety door hinge comprising a hinge portion formed from two plates pivotally connected along one edge, one of the said plates having a plurality of openings extending inwardly from its free edge, an anchoring plate adapted to be secured to the door frame and provided on one side with headed projections adapted to enter and engage the sides of the opening and with a longitudinally extending groove whose bottom is inclined with respect to the surface, a wedge located in the groove, the angle between the two sides of the wedge being the same as the angle between the face of the plate and the bottom of the groove, the under surface of the wedge having teeth, the plate having an opening which is intersected

by the toothed surface, and a key having its outer surface provided with teeth for engaging the teeth on the wedge.

3. A safety door hinge comprising, a hinge portion formed of two plates pivotally connected along one edge, one of said plates being adapted to be attached to a door, the other plate having a plurality of openings, an anchoring plate adapted to be secured to the door frame, said anchoring plate having projections adapted to extend into the openings and engage the walls thereof, and means for moving the projections and the hinge plate relative to each other for clamping the latter with respect to the anchoring plate, said means being operable while the door is closed.

4. A safety door hinge comprising, a hinge portion formed of two plates pivotally connected along one edge, one of said plates being adapted to be attached to a door, the other plate having a plurality of openings, an anchoring plate adapted to be secured to the door frame, said anchoring plate having projections adapted to extend into the openings and engage the walls thereof, and means comprising a rotatable cam for moving the projections and the hinge plate relative to each other for clamping the latter with respect to the anchoring plate, said means being operable while the door is closed.

5. A safety door hinge comprising, a hinge portion formed of two plates pivotally connected along one edge, one of said plates being adapted to be attached to a door, the other plate having a plurality of openings, an anchoring plate adapted to be secured to the door frame, said anchoring plate having projections adapted to extend into the openings and engage the walls thereof, and a cam located between the anchoring plate and the hinge plate, said cam comprising means for separating the plates and forcing the projections into engagement with the sides of the openings.

6. A safety door hinge comprising two plates pivotally connected along one edge, one of said plates having a plurality of spaced opposed beveled surfaces extending inwardly from its free edge, an anchoring plate adapted to be secured to a door frame between it and the adjacent surface of the door, said anchoring plate having one side provided with projections having beveled surfaces spaced and located to engage the beveled surfaces on the hinge plate whereby a dove-tail connection is formed, the anchoring plate and the hinge having registering openings and a pin inserted through the openings for preventing the hinge and anchoring plate from moving relative to each other in the direction of the inclined surfaces.

In testimony whereof I affix my signature.

DAVID C. RUTH.

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