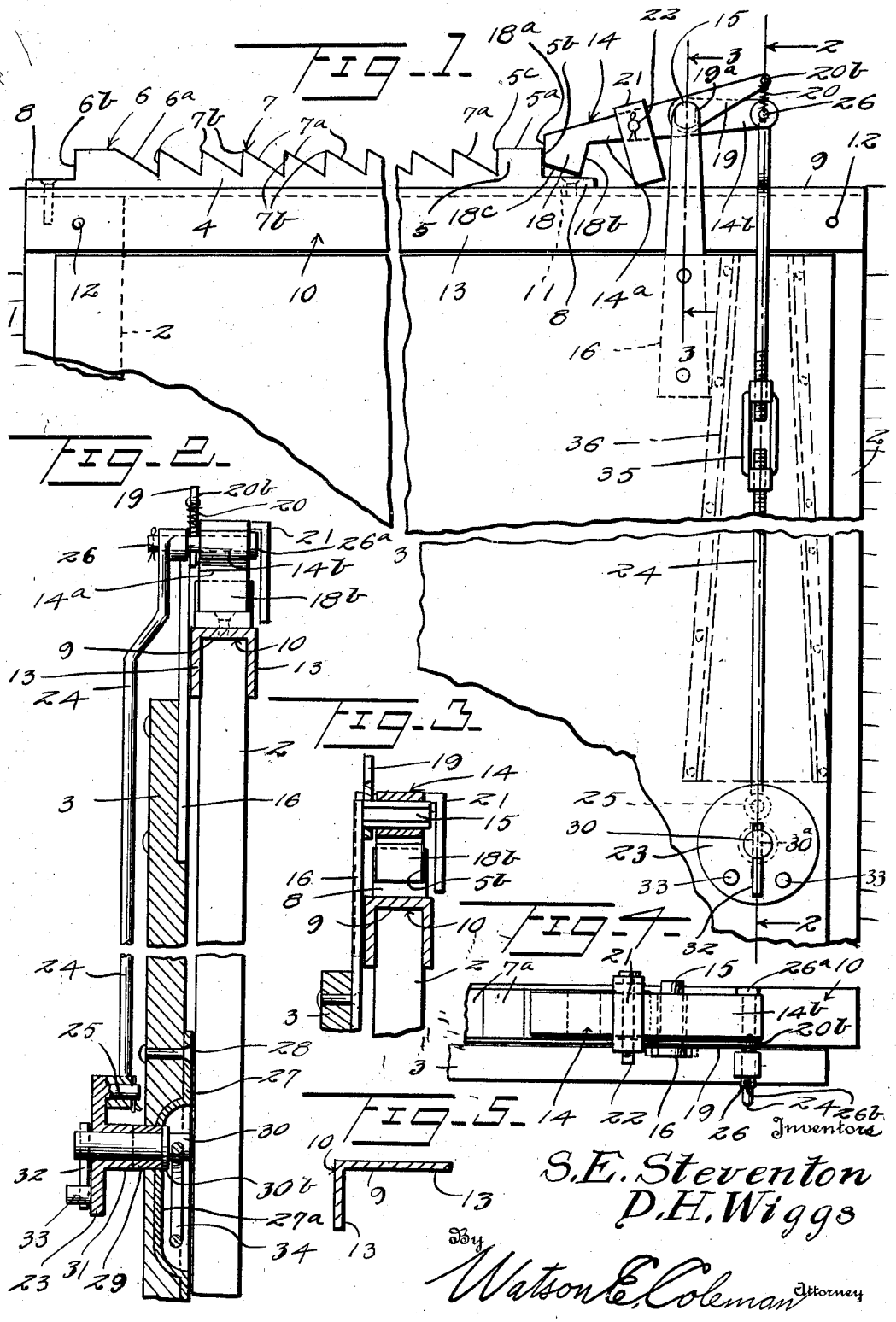
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SAFETY DOOR CATCH

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SAFETY DOOR CATCH

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This invention relates to a safety catch which, while capable of being used in connection with sliding doors generally, shall be especially adapted for use in connection with the heavy sliding doors of railway baggage and express cars.

The invention has for one of its objects to provide a safety catch which shall be adapted to positively hold a baggage or express car door in partly or fully opened position against accidental closing whereby to prevent the loss of life and injuries which would result in the closing of the door due to switching in terminals, express falling against the door, sudden stopping of the car and the like.

The invention has for a further object to provide a safety catch which will positively hold the door in closed position.

The invention has for a further object to provide a safety catch which will automatically function on the opening of the door to hold it against accidental closing and which will automatically function on the closing of the door to hold it against accidental opening.

The invention has for a further object to provide a safety catch which shall be positive in action, which shall be simple, durable and inexpensive to manufacture, and which shall be adapted to be easily and quickly applied and easily and quickly operated to effect the release of the door for movement into opened or closed position.

With the foregoing and other objects in view, the nature of which will appear as the description proceeds, the invention consists in a construction, combination and arrangement of parts hereinafter fully described and claimed, and illustrated in the accompanying drawings, wherein:—

Figure 1 is an elevational view illustrating the application of the safety catch;

Figure 2 is a sectional view taken on the vertical plane indicated by the line 2—2 of Figure 1;

Figure 3 is a sectional view taken on the vertical plane indicated by the line 3—3 of Figure 1;

Figure 4 is a top plan view of fragmentary portions of the safety catch and car door; and

Figure 5 is a sectional view illustrating the form of the attaching bar before it is applied to the door posts.

Referring in detail to the drawings, 1 designates a side, 2 the door posts and 3 the sliding door of a railway baggage or express car, the door being mounted by means, not shown, for movement to the left while being opened.

The safety catch comprises a keeper 4 which is in the form of a rack bar. The rack bar 4 is provided at its upper side with terminal teeth 5 and 6 and intermediate teeth 7, and it is provided with terminal attaching lugs 8. The rack bar 4 is positioned upon and secured to the web 9 of an attaching bar 10 of inverted U-form in cross section, the parts being connected by bolts or rivets 11 passing through and engaging the lugs 8 and web 9. The rack bar 4 and the attaching bar 10 are slightly longer than the horizontal dimensions of the door opening of the car, and the attaching bar is positioned upon and secured to the upper ends of the door posts 2. The attaching bar 10 receives the upper end portions of the door posts, and is secured thereto by bolts 12. To permit the ready application of the attaching bar 10 to the door posts 2, the attaching bar 4 is delivered for application with one of its flanges 13 arranged in horizontal alinement with its web 9, as shown in Figure 5. After the application of the attaching bar 10 this flange is bent down into contact with the door posts 2, and thereafter, the bolts are applied.

The tooth 5 of the rack bar 4 is of rectangular formation and has a horizontal upper face 5*a* and vertical inner and outer faces 5*b* and 5*c*, respectively. The tooth 6 has an inclined inner face 6*a* and a vertical outer face 6*b*. The teeth 7 each have inclined inner faces 7*a* and vertical outer faces 7*b*. The latch dog 14 of the safety catch contacts with the inner face 5*b* of the tooth 5 when the door is closed, contacts with the outer face 7*b* of one of the teeth 7 when the door is partly opened, and contacts with the outer face 6*b* of the tooth 6 when the door is fully opened. During the opening movement of the door 3 the latch dog 14 moves in the direction of the tooth 6, and to permit it to freely ride over the teeth 7,

during the opening movement of the door, the inner faces 7*a* of these teeth incline upwardly in the direction of the movement of the latch dog.

The latch dog 14 is of angular formation in plan. It is provided at the juncture of its long arm 14*a* and short arm 14*b* with an opening for the reception of a pivot pin 15 which extends horizontally from the upper end of a bracket arm 16. The arm 16 is secured to the door 3 by bolts 17, and it extends above the door for a distance sufficient to position the latch dog 14 above the rack bar 4. The latch dog 14 is provided at the free end of its long arm 14*a* with a downwardly extending engaging point or catch 18 which is provided with a vertical outer face 18*a*, a downwardly and outwardly inclined inner face 18*b* and an upwardly and forwardly inclined lower face 18*c*. The face 18*a* contacts with the inner face 5*b* of the tooth 5 when the door 3 is fully closed, and in view thereof the door will be positively held in such position.

The face 18*b* contacts with the outer face of one of the teeth 5 and 7 when the door is partly opened, and contacts with the outer face of the tooth 6 when the door is fully opened, and in view thereof the door will be positively held in either partly opened or fully opened position.

An arm 19 extends upwardly and inwardly from the pivot pin 15. It is provided with an opening 19*a* for the reception of the pivot pin 15. A portion of the wall of the opening and a portion of the lateral surface of the pivot pin are straight and contact to hold the arm against any pivotal movement on the pivot pin. A coil spring 20 secured at one end to the arm 14*b* of the latch dog 14 and as at 20*b* to the arm 19, functions to yieldingly retain the latch dog in engagement with the rack bar 4. To hold the latch dog 14 against any lateral movement with respect to the rack bar 4, and thus insure an accurate engagement between these parts, a guide 21 of inverted U-form is employed. The guide 21 straddles the latch dog 14 outwardly beyond the pivot pin 15, and the side members or arms thereof extend below the latch dog and contact with the sides of the rack bar 4. The guide 21 is secured in place by a pin 22.

As the latch dog 14 cooperates with the tooth 5 to positively hold the door in fully closed position, and as it cooperates with one of the teeth 6 and 7 to positively hold the door against movement in the direction of its fully closed position, it must be withdrawn from contact with the rack bar 4 when it is desired to open the door from its fully closed position or when it is desired to close the door.

The means by which the latch dog 14 may be withdrawn from engagement with the rack bar 4 comprises a disc 23 which is rotatably mounted upon the inner side of the door 3 below the latch dog, and a rod 24 pivotally connected at its lower end to a lug 25 on the outer side of the disc and pivotally connected at its upper end to the free end of the latch dog arm 14*b* by a pin 26. The pin 26 passes through the latch dog arm 14*b*, and is provided at one end with a flange 26*a* contacting with one side of the said arm. The pin 26 is provided at its other end with an opening 26*b* within which the lower end of the spring 20 is secured. The spring functions to secure the rod 24 on the pin, and cooperates with the flange 26*a* to hold the pin against displacement from the latch dog arm.

A plate 27 is secured to the outer side of the door 3 by rivets or bolts 28. The plate 27 is provided with an inwardly dished portion 27*a*, and a bushing 29 fixed to this portion extend through the door 3. A spindle 30 is journaled in the bushing 29 and extends through a hub 31 upon the outer face of the disc 23. The spindle 30 extends through the disc 23 to a point beyond the inner face thereof, and it is provided inwardly beyond the disc with a radial opening. The bushing 29 is longer than the thickness of the door 3, and the hub 31 is longer than the lug 25, the bushing and hub contacting to space the lug from the door so as to permit free movement of the disc.

The spindle 30 is held against endwise movement with respect to the bushing 29 by a collar 30*b* formed on the spindle and contacting with the bushing, and by a pin 32 which passes through the opening in the spindle and contacts with the inner face of the disc. The pin 32 also holds the disc 23 on the spindle 30, and cooperates with lugs 33, on the inner face of the disc, to establish an operative connection between the spindle and the disc. The lugs 33 are arranged at opposite sides of the pin 32 and in spaced relation thereto, so as to permit the latch dog 14 to move, while passing over the inclined faces 7*a* of the teeth 7, without imparting movement to the spindle. A handle 34 in the form of a ring is pivotally connected to the outer end of the spindle 30, and it is adapted, when not in use, to extend downwardly from the spindle within the dished portion 27*a* of the plate 27. When the handle 34 is in this position all danger of the accidental retraction of the latch dog 14 is avoided.

In order to permit the latch dog 14 to be arranged accurately with respect to the rack bar 4 during the application of the safety catch, and to permit any adjustment of the latch dog that may be found necessary in order to insure its efficient cooperation with the rack bar, the rod 24 is made in sections and the sections thereof are connected by a turnbuckle 35, the turnbuckle being adapted to be operated to vary the effective length of the rod so as to effect the desired adjustment

of the latch dog 14. In order to prevent injury to the rod 24 and turnbuckle 35 by the contents of the car, a guard 36 is provided for these parts.

From the foregoing description, taken in connection with the accompanying drawings, it should be apparent that the safety catch will either positively hold the door in fully closed position or fully opened position, and that it will positively hold the door against movement from a partly opened position in the direction of its fully closed position.

It should also be apparent that the door will be automatically latched in its fully opened position or in any partly opened position into which it may be moved, and that the handle 34 and the connection between it and the latch dog 14 enable the latch to be easily and quickly retracted when it is desired to release the door from its fully closed or partly opened position.

While we have described and illustrated the safety catch in connection with a door adapted to be moved to the left while being opened, it is to be understood that the safety catch may be constructed for use in connection with a door adapted to be moved to the right while being opened. It should also be understood that the safety catch can be adapted for use in connection with sliding doors of the double type, and when made for a door of this type two rack bars and two latch dogs will be employed.

The handle 34 permits the latch dog 14 to be retracted by a person outside of the car, and the disc 23 permits the latch dog to be retracted by a person within the car.

As the lugs 33 are spaced apart for a distance greater than the diameter of the pin 32, the disc 23 may be turned far enough to retract the latch dog 14 without imparting any movement to the spindle 30, and in view thereof the freezing of the handle 34 to the plate 27 will not interfere with the retraction of the latch dog by a person within the car.

If the door opening is of considerable width, the rack attaching bar may be supported at its center by a brace, not shown, connected to the bar and to the ceiling of the car. While the parts of the catch may be made from any suitable material, they will be preferably made from hardened iron or steel, such as chrome vanadium. The vertical face 5*b* of the tooth 5 and the vertical face 6*b* of the tooth 6, are of greater depth than the vertical faces of the teeth 7. When the catch 18 of the dog 14 is in contact with either of the tooth faces 5*b* or 6*b*, the dog will, owing to the depth of these tooth faces, occupy an approximately right angular position with respect to the pull rod 24 and the pivot lug 25 will be at the dead center of the disc 23 and the spindle 30, with the result that the dog cannot be withdrawn from contact with either of these tooth faces by slacking or wiggling the door, except through the direct operation of the spindle. Furthermore, the disc of the tooth face 5*b* insures a positive contact between the catch 18 and such face even though the upper inner corners of the tooth 5 be knocked off. When the catch 18 is in contact with one of the inclined tooth faces 7*a* or vertical tooth faces 7*b*, the dog 14 will occupy an acute angular position with respect to the pull rod 24.

The pivot 25 will be off of the dead center of the disc 23 and spindle 30, with the result that the door may be moved from any partly opened position in the direction of its fully opened position without turning the disc 23, the catch 18 passing from one to the other during this movement of the door.

While I have described the principle of the invention together with the structure which I now consider the preferred embodiment thereof, it is to be understood that the structure shown is merely illustrative and that such changes may be made, when desired, as fall within the scope of the invention as claimed.

We claim:—

1. A catch of the character set forth, comprising a rack bar, a bracket arm having a pivot fixed thereto, an angular latch dog rockably mounted at the juncture of its arms on the pivot, an arm fixedly secured to the pivot and having an angular relation with respect to one of the latch dog arms, a spring positioned between said last arms to hold the latch dog in active position, and a catch carried by the other arm of the latch dog.

2. A catch of the character set forth, comprising a rack bar having terminal and intermediate teeth, the intermediate teeth having inclined inner faces and vertical outer faces, one of the terminal teeth having an inner vertical face and the other terminal tooth having an outer vertical face of greater depth than the vertical faces of the intermediate teeth, a pivoted dog, a rotatable operating member, and a pull rod pivotally connected to the dog and operating member, the dog and pull rod occupying a substantially right angular position with respect to each other and the pivotal connection between the pull rod and operating member being at the dead center of the member when the dog is in contact with the vertical face of either of the terminal teeth, and the dog and pull rod occupying an acute angular position with respect to each other and the pivotal connection between the pull rod and member being at one side of the dead center of the member when the dog is in contact with an inclined or vertical face of one of the intermediate teeth.

In testimony whereof we hereunto affix our signatures.

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