May 28, 1957 F. C. FRYE 2,793,891

DOOR DETENT UNIT

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Fig. 1.

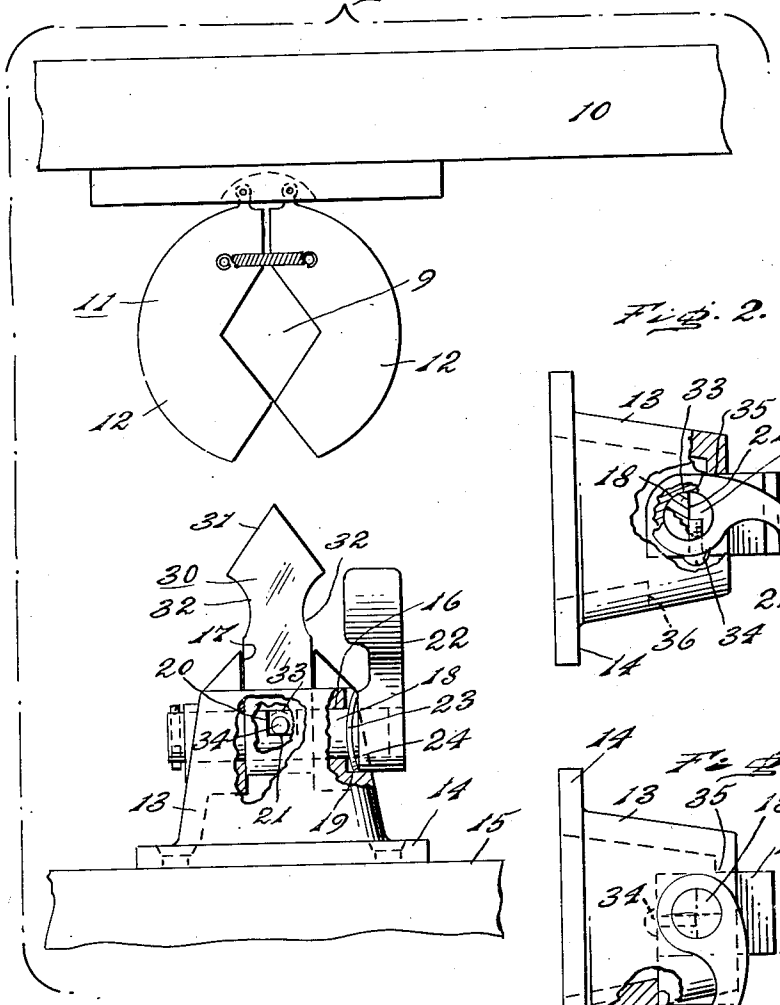
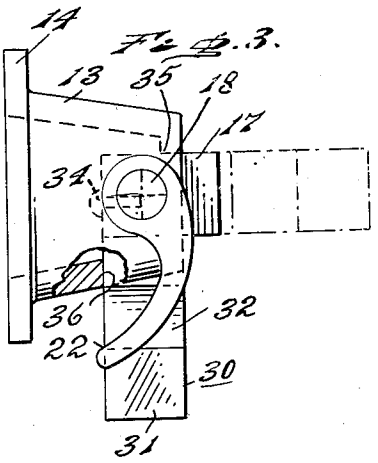


Fig. 2.

Fig. 3.



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DOOR DETENT UNIT

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5 Claims. (Cl. 292—18)

This invention relates to door checks or detents for train doors, and particularly to door checks for holding train doors open against the bias of springs tending to close same.

In the main it is desired by railroads that the doors at each end of the cars of a train remain closed as much of the time as possible. To facilitate such closing it is customary to bias the doors toward closing with relatively heavy spring pressure. This, in extremes of weather, to prevent the escape of heat in winter, or the escape of cold air in air-conditioned cars in summer. At all times it is preferred in order to deter passengers from emergence from the cars onto the vestibule platforms while the train is in motion.

On the other hand, although passengers with both hands free can open a door against the spring bias sufficiently widely as to pass through the door, which in the absence of restraint would close again after such passenger movement, a passenger with luggage finds it difficult to manipulate both the door and the luggage. It became evident that a detent or check must be provided for the door to hold it open against or toward the wall of the car to permit free passage through the door. As originally provided, in at least one form, this took the form of complemental male and female members on the door and car wall, operative for engagement when the door was opened and slammed toward the wall and to force the coupling members into coupled engagement. With fixed members, of course, the door would be retained open every time it was opened with a slam against the wall-mounted portion. In order to discourage such retention of the door in the open position, in the majority of situations in which mere transitory opening followed by immediate closing was the only actual requirement, the member on the car wall was pivoted to have a normal gravitational inoperative position. In this position no slamming open of the door would engage the complemental detent members and the door would close immediately under its spring bias. In order to permit the door to be detained open when necessary, however, a small handle extension was provided, rigid with the detent member, which could be manipulated by one hand to hold the detent member in its operative position, while the door was opened and moved against the wall with the other. Forcible separation of the detent members and closing of the door thereafter permitted the wall member to drop out of operative position until again moved and held by the door user. This was a palliative but a very unsatisfactory procedure. Many unpleasant results such as bruised fingers followed its use, and it was of the utmost inconvenience to passengers carrying luggage. Another almost equally inconvenient device was mounted for 180° movement between fixed positions, in one of which the detent member was always operative and in the other the detent was inoperative and was replaced by a rubber bumper.

It is among the objects of this invention to provide a

door detent which can be manually rendered operative by preliminary actuation by one hand and remains operative thereafter without any further activity by the operator until the related door is moved once toward the wall to engage the complemental detent elements, and which automatically moves into inoperative position when the detent is separated as the door is closed so that the door cannot be detained again until a further preliminary one-handed actuation of the detent; to provide an improved detent organization for car walls as a replacement for existing detent units, which, however, is useable with existing complemental units on the car doors; to simplify and cheapen the costs of detent mechanisms; to provide a manual control device for a wall or fixed support-mounted pivoted detent member holding the latter in an operative position against a gravitational bias and which is responsive to contact by the complemental detent member on the door, in coupling with the operative member, to move the manual control device to permit the pivoted detent to move under the bias to inoperative position upon withdrawal of the complemental detent member; to effect a highly compact unitary detent mechanism for effecting the preceding objects; and to provide other objects and advantages as will be come apparent as the description proceeds.

In the accompanying drawings forming part of this description:

Fig. 1 represents a plan of the respective coupling members in the operative attitudes thereof in juxtaposition just prior to coupling interengagement, in partial section.

Fig. 2 represents a side elevation of the male element in its operative attitude.

Fig. 3 represents a side elevation of the same in its inoperative attitude, with a dotted line showing of the operative attitude as maintained until selective withdrawal of the complemental female coupling.

Referring to Fig. 1, the combination of a representative of the conventional resilient female member as mounted on the door of the car is shown in juxtaposition to the actuated or positioned male member of this invention, mounted on a wall of the car, just prior to the interengagement of the parts in moving the door to detained opening. The door of the car is indicated at **10**, and the fixed suport or wall is indicated at **15**. The female coupling **11** mounted usually on the door **10** is comprised of symmetrical halves **12—12**, biased together by suitable means, and defining a male-element-engaging slot **9**, and capable of separation against the bias when parted by the relatively entering wedge of the male member to be described, and to resiliently re-approach each other after the male member has entered, to engage and hold same against relative retraction in the coupled assembly of the parts. It will be obvious that for purposes of the invention it makes no particular difference which parts are on the door or on the wall or other fixed support.

The detent organization according to this invention comprises a housing or base **13** having a mounting plate **14** for rigid mounting on the wall or fixed support **15** of the car. The housing **13** is tranasversely bored as at **16** to receive the shaft to be described, and has a longitudinal slot **17** normal to the bore **16**, to receive and laterally brace the male member, to be described.

The bore **16** merges into a larger bore or recess **19** at one side of the base. Shaft **18** is journalled in the bore **17** and in its transverse center has a transverse slot **20**, extending half way into the shaft and having a planar lower generally diametrically extending surface **21**. The slot **20** is narrower than the slot **17** and is generally centered therein. The shaft **18** has keyed to it at one end a curved handle element **22**, having an axial extension **24** disposed in the recess **19**, and a frictional

restraint on the oscillations of the shaft is provided, such as by the spring washer **23** surrounding the shaft and disposed in recess **19**, interposed between the axial extension **24** and the inner end of the recess **19**. After mounting the male coupling member to be described, the shaft is disposed in the bore **16** and secured therein by suitable pins or the like, or by peining over the shaft end opposite to the handle **22** to keep the friction spring washer **23** under compression.

The male coupling member **30** has the outer leading edge wedge portion **31** and the lateral recesses **32** defining the undercut or pointed hooked wedging end for cooperation with the female coupling **11** and its anchoring slot **9** in coupling and uncoupling.

The member **30** at its inner end is transversely bored as at **33**, to receive the shaft **18**. A stud, such as a set screw **34** or the like passes through the male element into the bore **33** just above the center thereof, and which also enters transverse slot **20** in the shaft. In one relative position of the parts the shank of set screw **34** is parallel to the plane surface **21** of shaft slot **20**. The male member **30** is freely mounted on the shaft **18** so as to have free turning thereon about the axis of the shaft to a limit defined by the set screw **34** in its relation to the diametric plane surface **21** of the slot **20**. The male member has its center of gravity spaced from the axis of the shaft and is therefore unstable and able to move on the shaft except when the set screw **34** is in engagement with the plane surface **21** of the slot. The male member on its pivotal support is disposed in the longitudinal slot **17**, and is positively stopped in upward motion by an upper transverse overhanging front edge **35** of the base extending across slot **17**, or by any other desired form of stop. It is moved into this position and held therein by manual upward movement of the handle, turning the shaft and imposing torque on the male member by pressure from the plane surface **21** of the slot **20** against the set screw **34**. When upwardly disposed and stopped, the male element is in its operative horizontal projecting position ready to be coupled with the complemental female coupling **11** whenever the latter is relatively forced thereagainst. In this setting the male member is held by the frictional resistance of the shaft against undesired rotation and cannot be permitted to drop into inoperative position under gravity until the shaft has been counter-rotated in some manner to remove the impingement pressure of the flat surface **21** from against the side of the stud or set screw **34**. Of course, having once been set in operative disposition, any further opposite manual actuation of the handle, and thus of the shaft, may be made if desired during which the male member will move gravitationally out of its projected operative disposition, into its substantially pendent inoperative position. The base is so formed that when the male member is permitted to move downwardly about the shaft as a pivot, it abuts a lower and rearward transverse base edge surface **36**, at the lower edge of slot **17**. The stop edge surfaces **35** and **36** are relatively staggered so that the male member has substantially 90° of rotational motion between engagement with one face thereof against the upper forward edge **35**, and engagement of an opposite face thereof against the rearward lower edge **36**.

In completion of the manual upward movement of the parts to establish the operative attitude of the male member **30** it will be observed that the outer free end of the curved handle is disposed beside the extended male member with the terminus thereof well below the diametric axis of the shaft aligned with the central longitudinal axis of the male element and in position to be engaged by one of the halves **12** of the female coupling element as it moves with vigor into coupling engagement with the aligned male element.

The operation will be evident. The normal inactive position of the parts is attained upon any ultimate uncoupling of the complemental members. As the handle

is pushed downwardly by the half **12**, the shaft is rotated to remove the pressure of the plane surface **21** of the slot **20** from the set screw or stud **34** and the handle assumes the downward position shown in Fig. 3. Upon uncoupling, the male member drops by gravity into the dependent attitude shown in full lines in Fig. 3. Thereafter, the coupling is inoperative and the door can be swung open toward the fixed wall as often as it may happen without the operation of the detent. However, with the door closed, any passenger who can reach the male element handle with one hand grasps the handle and moves the male element to the horizontal fixed position shown in dotted lines in Fig. 3, in which it remains after the passenger releases the handle. This places the male element in its operative position for any subsequent opening of the door to be accompanied by detent actuation. As the detent actuation accomplishing coupling of the members is also accompanied by the synchronous forcible downturn of the handle, the rapidity of the motion of coupling and the inertia of the operative male member assures proper complete coupling. However, any release of the detent coupling is immediately followed by the biased movement of the male element into its inoperative position.

It will be clear that many changes may be made in the device without departing from the principles of the invention, and all such are to be construed as within the scope of the appended claims except as they may otherwise be specifically limited.

Having thus described my invention, I claim:

1. A door detent coupling comprising in combination with a door-mounted female coupling member and a fixed support, a male coupling member, means mounting the male member on said support for movement between an operative and an inoperative position, means for manually moving the male member from its inoperative into its operative position, means for imposing restraint on and retaining said male member in its operative position after the conclusion of the manual movement, means actuated by said female member during coupling with said male member for removing the restraint to permit said male member to move to its inoperative position upon relative withdrawal of the female coupling member from said male member, said male member being biased toward its inoperative position.

2. In a door detent coupling, a base, a shaft journalled in the base and having a transverse slot, a male member journalled on the shaft, a stud mounted on said male member and extending into said slot, a handle on said shaft, friction means for holding the shaft against undesired movement, means on the base to stop the upward movement of the male member as the shaft is turned by said handle and as the stud is engaged by a surface of said slot to dispose said male member in a stationary operative projected position, said male member being free to drop into an inoperative position under gravity bias when the shaft is oppositely turned.

3. In a door detent coupling, a base having a longitudinal slot and a bore normal to said slot, said slot defined in part by a transverse stop surface, a shaft journalled in said bore and having a transverse slot narrower than said longitudinal slot and defined in part by a generally diametrical surface, a pointed male element journalled on said shaft and disposed in said longitudinal slot with its center of gravity spaced from said shaft, abutment means mounted on said male element and projecting into said transverse slot, friction means operative on said shaft to hold same in an attained position against undesired movement, a handle mounted on said shaft and having a curved end, whereby the handle may be manually engaged to move the shaft and by engagement between the said surface of said transverse slot and said abutment means the male element may be swung upwardly against gravitational bias to engagement against said stop surface to establish a stationary operative posi-

tion of the male element in said longitudinal slot with the handle generally aligned beside said male element and with the terminus of the curved end disposed below the axis of said shaft in position to be engaged and the shaft rotated by an impinging element moving toward said male element, and whereby the male element can swing downwardly under gravity into an inoperative position when the shaft has been rotated by such impingement against the handle end.

4. A door detent coupling as recited in claim 3, in which said longitudinal slot is defined in part by an upper transverse edge stop surface, and a spaced staggered lower transverse edge stop surface, whereby said male element can swing on said shaft through approximately 90° between limits defined by said respective stop surfaces.

5. A door detent coupling comprising a first and a second coupling unit, one of said units comprising a mounting base having a generally planar mounting surface, a coupling member pivoted to said mounting base and movable between an operative position generally normal to said mounting surface and an inoperative gravity-biased position generally parallel to said mounting surface, said units being disposed for relative movement toward and away from each other in the general line of said coupling member in its operative position, means engageable by the fingers of an operator for manually moving said coupling member from its inoperative to its operative position and imposing frictional restraint on said coupling member for holding it in its operative position when the operator's fingers are removed, and said other unit being disposed for engagement of and interlocking with said coupling member in its operative position in relative motion to said first unit, and means actuated by said other unit coincidentally with said engagement and interlocking for removing said frictional restraint whereby upon relative movement of said units away from each other said coupling member responds to the gravity bias to move to said inoperative position.

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