

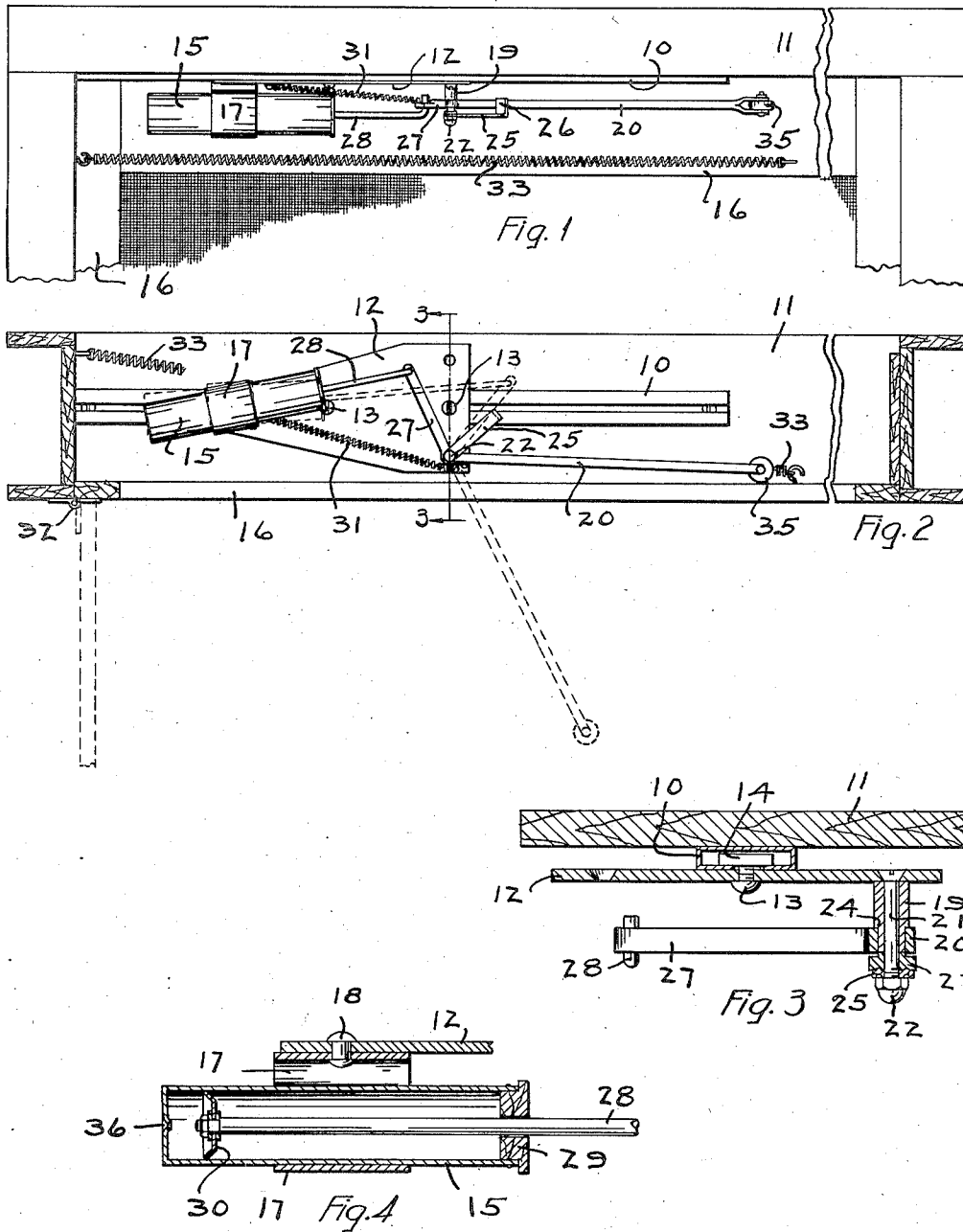
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DOOR CHECK

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DOOR CHECK

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7 Claims. (Cl. 16—84)

This invention relates to means for preventing the slamming of doors and the like upon closing, particularly when closed under the influence of a return spring. A primary object of the invention is to provide a structure which may be easily and quickly applied to meet the individual conditions encountered in varying sizes and weights of doors and return spring pulls.

A further primary object of my invention is to provide a structure which may be directly applied to the door frame and then adjusted to secure the desired door closing after mounting. A still further primary object of my invention is to provide means for controlling the rate of closing of the door within the last few inches of its travel.

These and many other objects and advantages, including the particular combination of elements as set forth in the accompanying claims, will become apparent to those versed in the art in the following description of one particular form of my invention as illustrated by the accompanying drawing, in which

Fig. 1 is a side elevation of a structure embodying my invention as applied to a door;

Fig. 2, a bottom plan view;

Fig. 3, a transverse vertical section on an enlarged scale on the line 3—3 in Fig. 2, and

Fig. 4, a detail in vertical longitudinal elevation through the check cylinder and its support.

Like characters of reference indicate like parts throughout the several views in the drawing.

I provide a track 10 and mount it along the under side of the door frame head 11 in parallel relation with its edges. I further provide a base plate 12 which is adjustably attached to the track 10 in some suitable manner. In the particular form herein shown, the track 10 is in the general shape of a T-slotted member preferably formed by rolling a strip of sheet metal into that form. The base plate 12 is mounted on the under side of the track 10 by means of one or more bolts 13 which extend through the plate and enter the slot in the track 10 to engage a nut 14 in each case carried within the track. Thus by loosening the bolts 13, the plate 12 may be shifted along the track 10 and then secured in position by tightening the bolt.

A cylinder 15 is rockably mounted on the plate 12 on that end directed toward the hinged side of the door 16. The cylinder 15 is mounted so that it may swing horizontally in parallel relation with the plate 12. One particular means of mounting the cylinder 15 is by a bracket 17 which surrounds the cylinder 15 and is in turn pivotally engaged through the rivet 18 with the plate 12, Fig. 4. On the other end of the plate 12, to one side of the longitudinal center line thereof, I mount a post 19 to rockably carry thereon a lever 20. The post 19 is secured in position to extend

downwardly from the plate 12 by means of a bolt 21 passing through the plate and axially through the post 19 to have a retaining nut 22 on its lower end. The lever 20 is maintained in position on the post 19 by means of a washer 23 carried on the bolt 21 against the under side of the lever so as to retain the lever between that washer and an upper shoulder 24 provided on the post. Preferably the lever 20 is formed to turn about the post 19 rather than having the post 19 turn about the bolt 21. In any event, the lever 20 is mounted to be rockable in parallel relation with the plate 12. Between the washer 23 and the nut 22, I interpose a stop arm 25 which is essentially a bar extending from the bolt and having an upturned end 26 in the path of the lever 20. The arm 25 may be adjustably revolved to any desired position and there secured in fixed relation to the plate 12 by tightening the nut 22. In the form herein shown, the lever 20 is shown to have an arm 27 extending inwardly from the post 19 under the plate 12 to receive the upturned end of the piston rod 28 which extends through a guiding head 29 in the cylinder 15 and carries a piston 30 on its other end within the cylinder.

A spring 31 is interconnected between the plate 12 and the lever 20 in such manner as to tend to cause the lever to revolve about the post 19 in a direction which will carry the piston 30 toward the head 29. The limit of this rotation of the lever under the influence of the spring 31 is determined by the position of the arm 25. Thus by moving the arm 25 around toward the cylinder 15, the travel of the piston 30 toward the head 29 is not permitted to be as much as when the arm 29 is swung around in the opposite direction. The upturned finger 26 of the arm 25 is in the path of the lever arm 27 to create the limiting stop. The normal position of the lever 20 when allowed to be under the complete influence of the spring 21 is that indicated by the dash lines in Fig. 2 wherein the lever 20 is turned around outwardly from under the door frame head 11 to be in the path of the door 16 as it is moved toward its closed position. As indicated in Fig. 2, the door 16 is hinged as at 32 and is normally pulled to its closed position by the return spring 33, here shown as being engaged to the door jamb 34 by one end and to the door 16 by its other end.

When the door 16 is pulled to its open position, the lever 20 will follow around with the opening door under the influence of the spring 31. In order to prevent damage to the door and to provide smoother action, the outer end of the lever 20 is provided with a roller 35 which is the door contacting part of the lever. The lever 20 through its roller 35 will follow around with the opening door 16 until the arm 27 strikes the finger 26 and is thereby stopped. From then on, the door 16 may be carried to its fully open position.

tion entirely removed from the lever 20. When the door is released and returned to the full influence of the spring 33, the door with rapid acceleration will be pulled toward its closed position and in so doing, will cause the upper rail of the door in the present case to strike the roller 35 and tend to swing it around to the solid line position as indicated in Fig. 2. In so doing, however, the piston rod 28 carries the piston 30 back within the cylinder 15 to compress the air therewithin, thereby through the lever 20 retarding the movement of the door.

The further the arm 25 is revolved around clockwise as viewed in Fig. 2, the quicker the door 16 will strike the outwardly presented roller 25 and thereby effect a long travel of the piston 30 in the cylinder 15 as compared to positions of the arm 25 when adjusted in a counterclockwise direction around toward the cylinder. In other words, by simply varying the position of the arm 25, the length of stroke of the piston 30 in the cylinder 15 is determined. The shorter this stroke is, the shorter is the period of time which the door is thereby resisted through the lever 20 in its closing movement. The compression between the end of the cylinder 15 and the piston 30 is gradually relieved through a small orifice such as the hole 36 in the closed end of the cylinder as indicated in Fig. 4.

Under many conditions, however, the adjustment of the arm 25 is not sufficient to permit full closing of the door as quickly as desired without slamming. Therefore in order to provide further adjustment, the plate 12 may be adjustably positioned along the track 10 and thereby vary the position at which the roller 35 may operate on the door 16. Thus by shifting the plate 12 further away from the door jamb 34 to bring the roller 35 out near the opening side of the door 16, greater resistance is offered to the closing of the door than where the plate 12 is adjusted in the opposite direction by reason of the change in location of the application of the roller 35 to the door 16 in reference to the hinged side of the door and the pull of the spring 33. By a combination of these two adjustments, perfect control of the door is secured to permit the door to come quickly to within a short distance of its closed position and then permit the door to swing on closed, positively, and without slam or noise. The roller 35 is preferably made out of some cushion material such as rubber so as to prevent any appreciable noise being set up upon the impact of the door 16 initially thereagainst.

The plate 12 may be so shaped as to permit the post 19 to be mounted on either side of the center line, such as passing the bolt 12 through the hole 37, Fig. 2, where the door swings from the other side of the frame, thereby making the structure perfectly interchangeable for right and left hand swinging doors.

While I have herein shown and described my invention in the one best form as now known to me, it is obvious that structural changes may be employed without departing from the spirit of the invention and I, therefore, do not desire to be limited to that precise form beyond the limitations as may be imposed by the following claims.

I claim:

1. For a door having a return pull spring, a door check comprising a door frame mounting member, a plate shiftable along the member, a cylinder carried by the plate, a lever rockably

mounted on the plate, a piston in said cylinder interconnected with said lever, and a spring normally urging said lever toward said door overcome by said return pull spring upon closing of the door, the closing of which door is checked by travel of said piston in said cylinder to create a resisting pressure thereby.

2. For a door having a return pull spring, a door check comprising a door frame mounting member, a plate shiftable along the member, a cylinder carried by the plate, a lever rockably mounted on the plate, a piston in said cylinder interconnected with said lever, and a spring normally urging said lever toward said door overcome by said return pull spring upon closing of the door, the closing of which is checked by travel of said piston in said cylinder to create a resisting pressure thereby, and means for variably positioning said lever in relation to impact with the door in its closing travel.

3. For a door having a return pull spring, a door check comprising a door frame mounting member, a plate shiftable along the member, a cylinder carried by the plate, a lever rockably mounted on the plate, a piston in said cylinder interconnected with said lever, and a spring normally urging said lever toward said door overcome by said return pull spring upon closing of the door, the closing of which is checked by travel of said piston in said cylinder to create a resisting pressure thereby, and means for variably positioning said lever in relation to impact with the door in its closing travel, said means comprising a stop interposed in the path of the lever limiting its travel toward the door under pull of said lever spring.

4. For a door, a check comprising a lever, means independent of the door yieldingly causing the lever to follow the door through at least a part of its opening travel, a cylinder, a piston in the cylinder, means interconnecting the piston with the lever, and means varying the stroke of said piston under impact of the door against said lever.

5. For a door, a check comprising a lever, means independent of the door yieldingly causing the lever to follow the door through at least a part of its opening travel, a cylinder, a piston in the cylinder, means interconnecting the piston with the lever, and means varying the stroke of said piston under impact of the door against said lever, said stroke varying means comprising a stop interposed in selected positions in the path of said lever thereby limiting the distance of follow-up of the opening door by the lever.

6. For a door, a check comprising a lever, means independent of the door yieldingly causing the lever to follow the door through at least a part of its opening travel, a cylinder, a piston in the cylinder, means interconnecting the piston with the lever, and means for variably positioning said lever and cylinder system with respect to the hinged side of the door.

7. For a door, a check comprising a lever, means independent of the door yieldingly causing the lever to follow the door through at least a part of its opening travel, a cylinder, a piston in the cylinder, means interconnecting the piston with the lever, and means for variably positioning said lever and cylinder system with respect to the hinged side of the door, and means varying the stroke of said piston through travel of said lever.

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