Dec. 24, 1940. L. L. WESTCAMP 2,226,037

DOOR CLOSING CONTROL MECHANISM

Filed March 13, 1939

Fig. 1

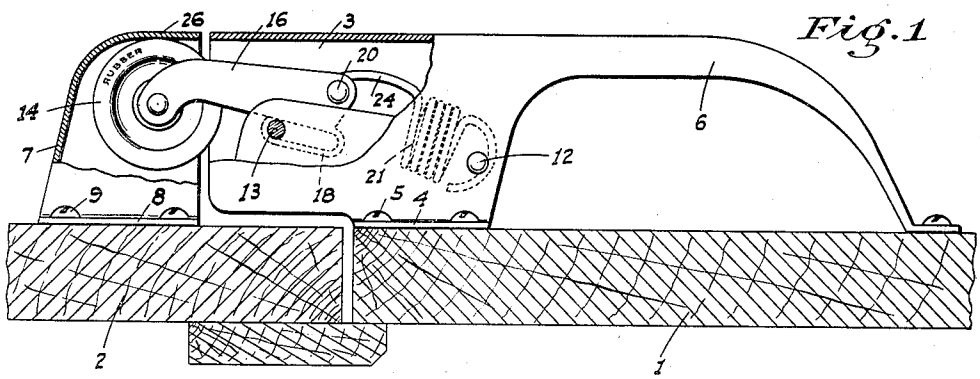


Fig. 2

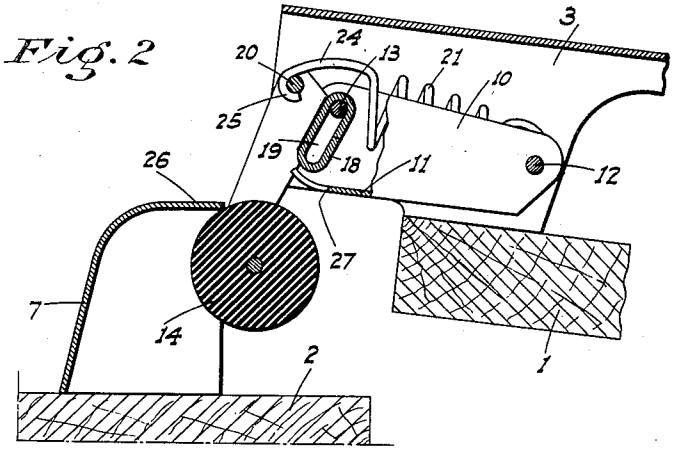


Fig. 4

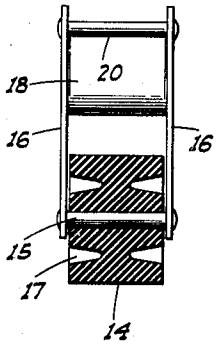
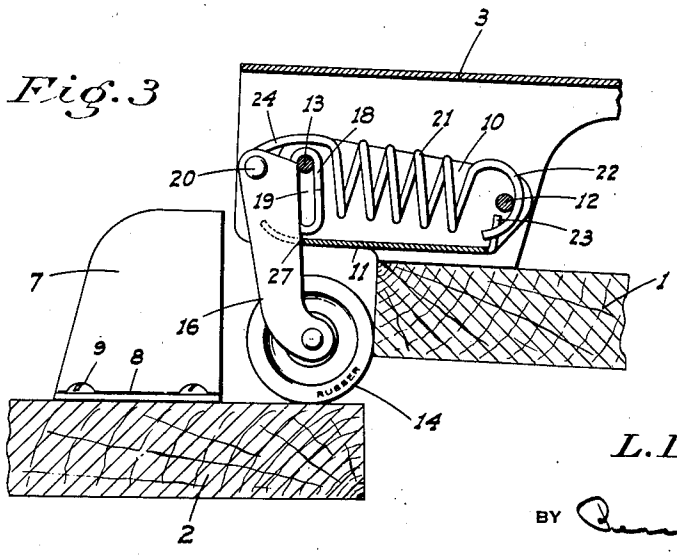


Fig. 3



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DOOR CLOSING CONTROL MECHANISM

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Application March 13, 1939, Serial No. 261,512

6 Claims. (Cl. 292—71)

This invention relates generally to a mechanism for checking and closing spring hinge doors or the like, and in particular the invention constitutes a modification of the assembly shown in my copending application for United States Letters Patent, Serial No. 261,510, filed March 13, 1939.

The objects of the present invention are generally to provide a spring actuated mechanism arranged to effectively check closing movement of a door, to subsequently close the door, thereafter to hold said door tightly but yieldably in closed position, and to accomplish the door checking and closing with a minimum of jar and sound.

In particular, it is an object of the invention to provide a mechanism of the type described, wherein a substantial portion of the structure, including the roller bumper unit and actuating spring, are carried by the door as is desirable in certain instances.

An additional object is to provide, in connection with the roller bumper and actuating spring, a unique form of mount for said bumper which provides for more efficient shock absorbing action by the roller bumper.

It is also an object to provide an improved roller bumper and one having greater resiliency than that disclosed in the above identified copending application.

A further object of the invention is to produce a simple and inexpensive device and yet one which will be exceedingly effective for the purpose for which it is designed.

These objects I accomplish by means of such structure and relative arrangement of parts as will fully appear by a perusal of the following specification and claims.

In the drawing similar characters of reference indicate corresponding parts in the several views.

Figure 1 is a top plan view, partly in section, showing the mechanism as mounted for use and in door holding position.

Figure 2 is a sectional plan view showing the roller bumper unit as moved from a door holding position upon partial opening of the door and just prior to the unit snapping to a cocked or door checking position.

Figure 3 is a similar view but with the roller bumper unit in cocked position.

Figure 4 is a plan view of the roller bumper unit; the roller bumper being shown in section.

Referring now more particularly to the characters of reference on the drawing, the numeral 1 indicates the door, while the door frame is shown at 2. An open ended housing 3 is secured on the door horizontally by means of outturned flanges 4 and screws 5; the open end of the housing overhanging the door frame 2 as shown. This housing, at the other end, is extended as a door handle 6. Another housing 7 is mounted on the door frame, in horizontal alinement with the housing 3, by means of flanges 8 and screws 9; the housing 7 being open at the end adjacent the housing 3 and disposed relatively close thereto when the door is closed.

A carrier for the roller bumper unit, hereinafter described in detail, is mounted in fixed relation in housing 3 and comprises vertically spaced side plates 10 and a bottom plate 11; this carrier being secured in place by a pair of vertical cross pins indicated at 12 and 13, the pin 12 being disposed adjacent the back of housing 3 while pin 13 is disposed adjacent but spaced from the open end thereof.

A roller bumper 14 is journaled on a vertical pin 15 carried between the outer ends of vertically spaced parallel arms 16 which are disposed at their other end between the side plates 10 of the carrier in the housing 3; the roller and outer ends of arms 16 normally projecting out of and beyond the open end of said housing in the manner shown in Fig. 1. To increase the resiliency of roller bumper 14, which is of cushion rubber or the like, the ends of said roller are cut out circumferentially as at 17.

The arms 16 are connected between their normally inner edges and adjacent the end opposite roller bumper 14 or rear end by means of a vertical cross sleeve 18; the bore 19 of this sleeve being elongated longitudinally of the arms 16, and the pin 13 extending through bore 19 and in relatively slidable relation with the sleeve.

A vertical cross pin 20 is fixed between the arms 16 adjacent said rear end thereof and adjacent the side edges opposite the side edges between which sleeve 18 extends. A snap action tension spring 21 is disposed lengthwise of the carrier and between side plates 10 thereof; the spring at its rear end having a hook 22 engaging over cross pin 12 and held against vertical movement or displacement by a slotted ear 23 struck toward pin 12 from carrier bottom 11. At the other end the spring is formed with a curved finger 24 which has its inception on the outer side of the spring, and as the finger engages pin 20 with a hook 25 on the free end thereof; said finger being disposed outward of pin 13 and sleeve 18 at all times.

The roller bumper 14, arms 16, and sleeve 18 may be termed the roller bumper unit and the

spring 21 is connected therewith, as above described and as is obvious, to effect a snap action of said roller bumper unit to alternate positions.

In the normal position shown in Fig. 1, the line of force of the spring is beyond dead center outwardly of and relative to pin 13; such pin being disposed in the forward end of elongated bore 19 of sleeve 18. The roller bumper 14 is then disposed within housing 7 on the door frame 2; said bumper being urged by the spring in an outward direction and into yieldable engagement with the inner surface of the top 26 of said housing 7. The top 26 serves as a strike plate and when the roller bumper is engaged therewith as above, the door is held in closed position.

With initial opening movement of the door, the roller bumper unit is rotated a certain amount about pin 13 in a counter-clockwise direction as shown in Fig. 2, due to the fact that the roller bumper cannot then escape housing 7. At the same time, sleeve 18 shifts inward and pin 13 moves to the other or rear end of the sleeve bore 19. This shifting movement of the roller bumper unit is assisted by a component of force arising from the angular displacement of the actuating spring 21 with respect to the support pin 12 and the pivot pin 13.

With continued opening movement of the door, the line of force of spring 21 passes beyond dead center inwardly of and relative to pin 13; the force of the spring then snapping the roller bumper unit to the cocked or door checking position shown in Fig. 3, and which is the one alternate to that shown in Fig. 1. The bottom 11 of the carrier in housing 3 is cut back at its front edge, as at 27, to form a stop for the roller bumper unit as it reaches the cocked position; the bottom 11 of the carrier then being spaced from the roller a distance less than the length of the elongated bore 19 of the sleeve 18. When the roller bumper unit is in cocked position, the roller clears housing 7 upon continued opening of the door but is in position to engage the portion of the door frame in front of said housing 7, and which portion housing 3 normally overlaps.

With closing movement of the door, roller bumper 14 strikes such door frame portion and causes inward motion of the roller bumper unit relative to housing 3 and until the roller bumper strikes the bottom 11 of the carrier 10; the side arms 16 of the roller bumper unit remaining against the stop 27 as the roller pin 15 is disposed in a plane laterally offset toward the door relative to the plane of pivot pin 13 and which produces a force moment acting on the roller bumper unit to effect such result. This movement of the door and initial action of the attached closure control mechanism effects a checking of the closing motion of the door with a minimum of jar and sound through compression and deformation of the resilient roller bumper 14 between the bottom 11 of the carrier and the door frame 2. Such initial inward swinging motion of the roller bumper unit shifts pin 13 toward the forward end of elongated sleeve bore 19 throwing spring 21 beyond dead center position and outwardly of pin 13. As the door starts to rebound and frees the roller bumper, the roller bumper unit snaps back to normal position with the roller bumper in housing 7 and engaging top 26; the door being tightly closed and with a minimum of slamming action.

From the foregoing description it will be readily seen that I have produced such a device as substantially fulfills the objects of the invention as set forth herein.

While this specification sets forth in detail the present and preferred construction of the device, still in practice such deviations from such detail may be resorted to as do not form a departure from the spirit of the invention, as defined by the appended claims.

Having thus described my invention, what I claim as new and useful and desire to secure by Letters Patent is:

1. In a door checking mechanism, a support adapted to be mounted on one of a pair of door members arranged for relative opening and closing movement, said support having a portion overhanging the other door member, a pair of arms disposed in side by side but spaced relation, a resilient bumper connected between the arms at one end, a transverse sleeve bearing connecting the arms at their other ends, the bore of the sleeve bearing being elongated lengthwise of said arms, a pin mounted on the support and extending through the bore in the sleeve bearing, the arms being adapted to swing about the pin from one position with the pin disposed in the end of the bore adjacent the bumper and the bumper clear of the other door member when the door members are closed, to another position with the pin in the opposite end of the bore and the bumper initially spaced from the overhanging portion of the support and disposed between said portion and said other door member when the door members are open whereby the bumper engages said other door member upon relative closing movement of the door members and whereupon the arms move in a direction so that the pin shifts to said adjacent end of the bore of the sleeve bearing and said overhanging portion of the support strikes the bumper.

2. A structure as in claim 1 including a snap action spring connected between the arms and the support, the spring being arranged so that when the arm is in said other position and the pin shifts to said adjacent end of the bore upon engagement of the bumper with the other door member, snap action movement is imparted to the arms and the same swing to said one position.

3. In a door checking mechanism, a support adapted to be mounted on one of a pair of door members arranged for relative opening and closing movement, the support having a portion adapted to overhang the other door member, an arm, a bumper on one end of the arm, and a pivotal connection between the other end of the arm and the support so that the arm may alternate in movement from one position when the door members are closed and from another position when the door members are open, the bumper, when the arm is in said other position, being disposed in initially spaced relation from said overhanging portion of the support and between said portion and the other door member whereby to engage the latter upon relative closing movement of said door members; said pivotal connection between the arm and support being arranged for limited relative shifting movement in such direction that upon engagement of the bumper with said other door member the arm and bumper shift relative to the support and said overhanging portion thereof strikes the bumper at a point remote from the point of engagement of said bumper with said other door member.

4. A structure as in claim 3 in which the bump-

er comprises a roller pivoted on said one end of the arm, said roller being engaged by said other door member and said portion of the support at opposed points on the periphery thereof.

5. In a door checking mechanism, a support adapted to be mounted on one of a pair of door members arranged for relative opening and closing movement, the support having a portion adapted to overhang the other door member, a snap action arm, a resilient bumper mounted on one end of the arm, a pivotal connection mounting the arm at its other end on the support for alternate movement from one position with the bumper clear of the other door member when the when the door members are closed and from another position with the bumper in initially spaced relation from the overhanging portion of the support and disposed between said portion and the other door member when the door members are open whereby the bumper engages said other door member upon relative closing movement of said door members; said pivotal connection between the arm and support being arranged for limited relative shifting movement in such direction that upon engagement of the bumper with said other door member, the arm and bumper shift relative to the support and said portion thereof then strikes the resilient bumper at a point remote from the point of engagement of said bumper with the other door member; said shifting movement causing snap action movement of the arm to said one position.

6. A structure as in claim 3 in which said pivotal connection comprises a sleeve bearing fixed on the arm transversely of said direction of shifting movement thereof, the bore of said sleeve bearing being elongated in said direction, and a bearing pin secured on the support and extending through said sleeve bearing; the path of movement of the pin in the elongated bore of the sleeve bearing being greater than the distance which the bumper and said portion of the support are initially spaced when the arm is disposed in said other position.

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