

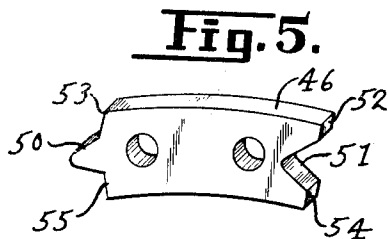
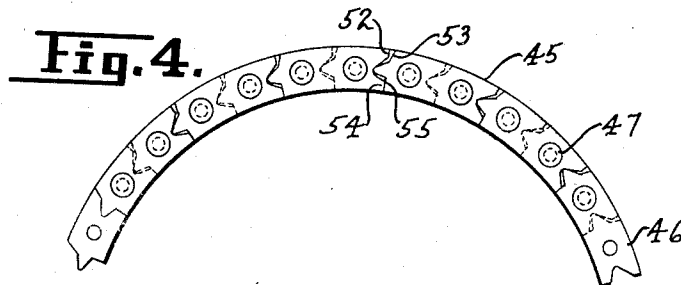
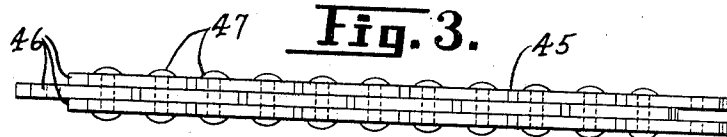
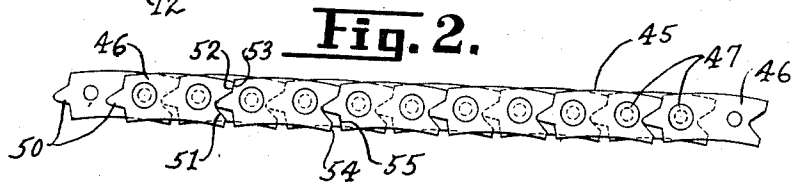
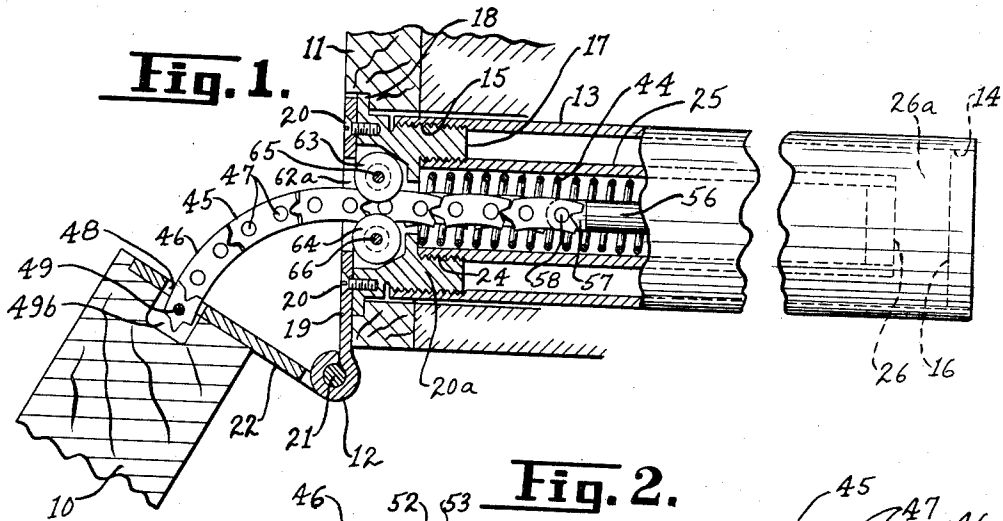
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NONJAMMING CHAIN FOR DOOR CLOSERS AND CHECKS

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NONJAMMING CHAIN FOR DOOR CLOSERS
AND CHECKS

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Original application February 18, 1931, Serial No. 516,641, now Patent No. 1,898,609, dated February 21, 1933. Divided and this application July 20, 1932, Serial No. 623,526

3 Claims. (Cl. 59—78)

This invention relates to door closers and checks of the "piston rod coiled spring" type, and more particularly to a non-jamming non-looping link chain for connecting the piston rod of the door check to the door plate.

One object of this invention is to provide a door chain of the above nature having means for limiting the degree of pivoting of one link with respect to its adjacent cooperating links, whereby the chain as a whole will be prevented from bending more than a predetermined amount.

A further object is to provide a non-kinking link chain of the above nature which will be simple in construction, inexpensive to manufacture, easy to install and manipulate, compact, and very durable in use.

With these and other objects in view there has been illustrated on the accompanying drawing one form in which the invention may be conveniently embodied in practice.

In the drawing:

Fig. 1 is a fragmentary sectional view of a door closer and check, showing the improved non-kinking chain cooperatively connected thereto.

Fig. 2 is a plan view of the non-jamming link chain shown in the straight shape which the chain assumes when in closed position within the door check and closer.

Fig. 3 is a front view of the same.

Fig. 4 is a plan view of the same showing the chain in the arcuate shape which it assumes when the door is in open position.

Fig. 5 is a perspective view of one of the individual links of the chain.

This application is a division of my prior application filed February 18, 1931, Serial No. 516,641, for Concealed door closers and checks.

Referring now to the drawing in which like reference numerals denote corresponding parts throughout the several views, the numeral 10 indicates a door adapted to be pivotally supported upon a door jamb 11 by means of hinges 12 having the usual stationary jamb plates 19 which are connected, as by screws 20, to a collar 20a having an integral jamb overlapping flange plate 18. Each plate 19 is joined by a hinge pin 21 to the swinging hinge plate 22 which is mounted flush with the rear edge of the door 10.

The collar flange plate 18 is adapted to be secured to the jamb as by screws, not shown, located at the corners of said plate. The collar 20a is provided with a tapped recess 24 for receiving the threaded end of a small piston chamber 25 located concentrically within the

outer casing 13, the inner end 26 of said piston chamber 25 terminating a short distance from the end plug 16. The space 26a between the exterior of the piston chamber 25 and the outer casing 13 comprises a reservoir for the checking liquid.

In order to press the piston, not shown, at all times toward the rear end of the chamber 25, provision is made of a helical coiled spring 44, one end of which engages the piston, and the other end of which is set in the base of the recess 24. In order to connect the door with the piston, provision is made of a special form of link chain 45 having three rows of links 46 of identical construction, said links being connected together by rivets 47. As clearly shown in Fig. 3, the outer links are staggered with respect to the inner links. Each of the links 46 is formed in the shape of an arc of a circle, the radius of which corresponds to the distance from the center of the door hinge to said chain. The outermost link 46 of the middle row passes through an aperture 48 in the hinge 22, as shown in Fig. 1, and is secured within a recess 49b in the door 10 by means of a transverse pin 49 abutted against the back of the said hinge plate 22.

Each of the links 46 is provided at one end with a projecting V-shaped pointed lug 50, while the other end of each link has a V-shaped slot 51, the angle of said slot being somewhat greater than the angle of the lug 50. Thus, when assembled as shown in Figs. 1 to 4, each lug 50 will project into the V-shaped slot 51 of the next adjacent link. By means of this construction it will be seen that the shoulders 52 on the outer side of the V-shaped slots will engage the shoulders 53 on the outer side of the lugs 50 when the chain is located within the piston chamber in the position shown in Fig. 1 and will prevent the links of the chain from being bent backwardly beyond the straight line position shown in Fig. 2.

In a like manner the shoulders 54 on the inner side of the V-shaped slots 51 will engage the shoulders 55 on the inside of the lugs 50 when the chain is in the curved position outside of the piston chamber shown in Figs. 1 and 4. The chain will thus be prevented from bending beyond said curved position. It will thus be seen that the chain will be limited in its flexing movements between the straight position shown in Fig. 2 and the curved position shown in Fig. 4 in the operations of closing and opening the door.

The ends of the links 46 in the outside rows at the inner end of the chain are adapted to be connected to a connecting rod 56 having a reduced section 57 fitting between said links, said rod being pivotally secured to said links by a rivet 58 passing therethrough. The inner end of the connecting rod 56 is pivotally connected to the front end of the piston, not shown, previously referred to.

In order to guide the chain through an aperture 26a at the front of the collar 20a, provision is made of a pair of flanged guide pulleys 63 and 64 adapted to rotate upon pins 65 and 66 passing through said collar 20a.

Operation

In operation, when the door is swung from closed position to the open position shown in Fig. 1, the piston will be moved forwardly within the piston chamber 25, causing the coiled spring 44 to be compressed and creating a vacuum within the rear end of said piston chamber. The ball check valve located in the rear of the chamber 25 will thus be caused to unseat itself and move to the left, thus permitting the liquid from the reservoir 26a to pass freely into the piston chamber 25.

It will thus be seen that relatively little resistance will be offered to the opening of the door, but as soon as the door is released, the compressed spring 44 will come into action and force the piston to the right in the piston chamber 25. The piston will move rapidly at first, until the ball check valve has been forced back against its seat. Further movement of the piston to the right under the influence of the spring 44 will be retarded by reason of the fact that the liquid in the piston chamber is caused to flow through relatively small bypass openings, whereby the closing of the door will be cushioned to the desired extent. The needle valve may, of course, be adjusted to obtain any desired closing speed.

While the casing 13 of the door closer and check has been herein disclosed as located within the door jamb and wall of the room, it will be understood that it is within the spirit and scope of the present invention to reverse this arrangement and locate said casing within the door, and fasten the chain to the jamb plate.

While there has been disclosed in this specification one form in which the invention may be embodied, it is to be understood that this form is shown for the purpose of illustration only, and that the invention is not to be limited to the specific disclosures, but may be modified and embodied in various other forms without departing from its spirit. In short, the invention includes all the modifications and embodiments coming within the scope of the following claims.

Having thus fully described the invention, what is claimed as new, and for which it is desired to secure Letters Patent, is:

1. In a flexible chain for connecting a door to a door closer and check, a plurality of connected interfitting links, each link having a V-shaped projection at one end and a V-shaped recess at its opposite end, shoulders at each side of said projection and recess respectively to limit the angle through which said chain may be flexed in both directions, said links being arranged in three parallel rows, the links of the middle row being staggered with respect to the links of the outer rows.

2. In a flexible chain for connecting a door to a door closer and check, a plurality of connected interfitting links, each link having a V-shaped projection at one end and a V-shaped recess at its opposite end, shoulders at each side of said projection and recess respectively to limit the angle through which said chain may be flexed in both directions, said links being arranged in three parallel rows, the adjacent links of each outer row having their abutting edges located at the centers of the links of the middle row.

3. In a flexible chain for connecting a door to a door closer and check, a plurality of connected interfitting links arranged in two rows, each link having a V-shaped projection at one end and a V-shaped recess at its opposite end, shoulders at each side of said projection and recess respectively to limit the angle through which said chain may be flexed in both directions, and a pivot pin on each link located between said V-shaped projection and recess for connecting said link to a similar link of the other row.

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