Jan. 28, 1958 L. A. KLEE 2,820,981

DOOR STOP AND CLOSER

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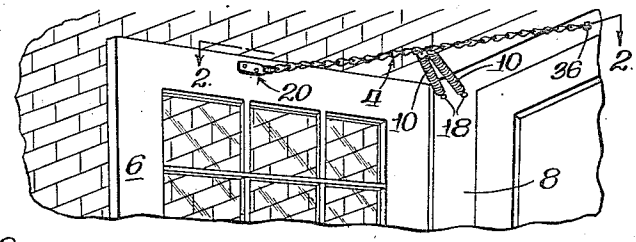
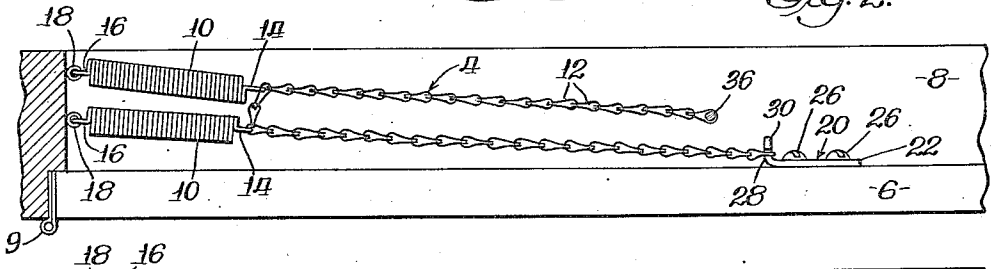


Fig. 1.

Fig. 2.



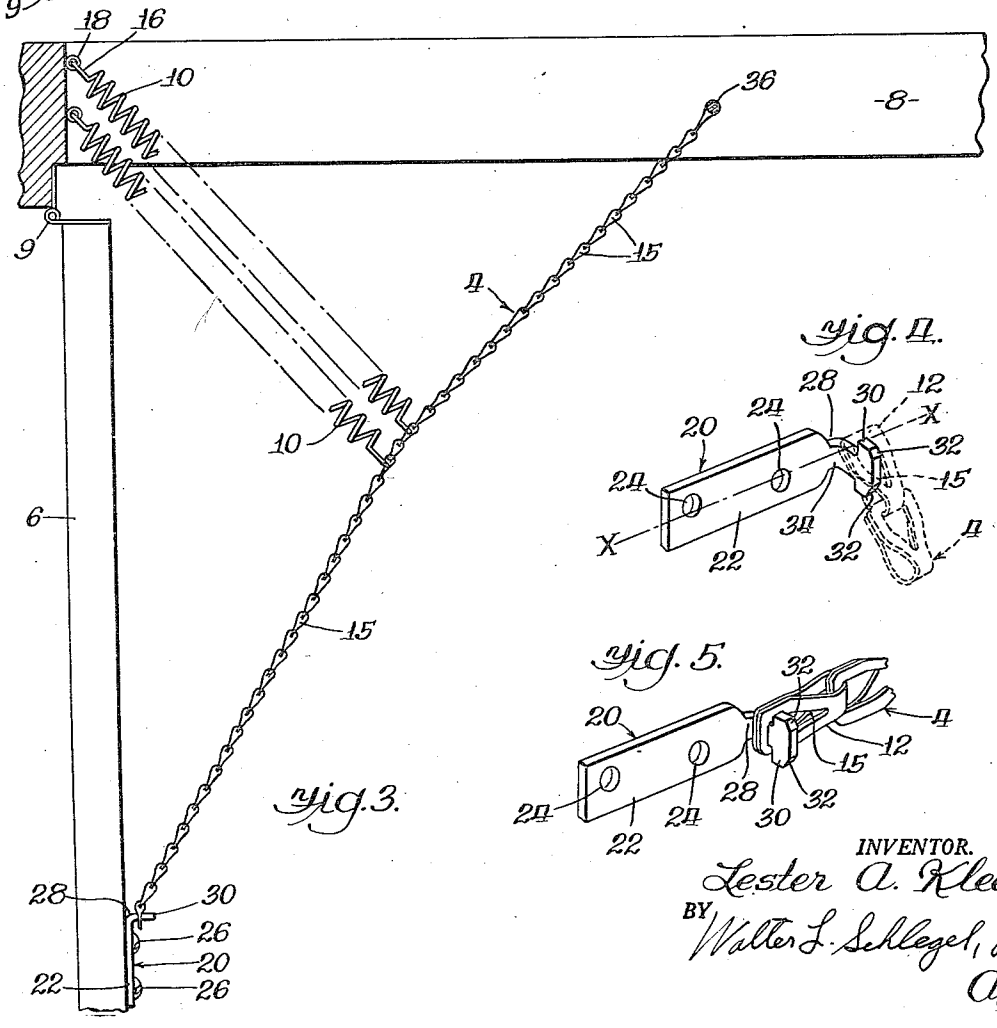


Fig. 3.

Fig. 4.

Fig. 5.

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DOOR STOP AND CLOSER

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4 Claims. (Cl. 16—63)

This invention relates to a combination door stopper and closer device and more particularly to an improved device of the type disclosed in my copending application, Serial No. 312,811, filed October 2, 1952, for combination door stop and closer, wherein resilient means act on a chain connected to a door and doorframe for yieldingly resisting opening of the door.

A primary object of the present invention is to facilitate application of the device to a door with the chain under tension.

Another object of the device is to provide means for quickly disconnecting the chain from the door to render the device inoperative for short periods as for example when large objects are carried through the doorway.

A further object of the invention is to devise a door mounted bracket to which the chain may be quickly and positively connected, and from which bracket the chain may be immediately released, for the purposes above described.

A more specific object of the invention is to devise a bracket such as above described which is lightweight and of economical construction and which is nevertheless strong enough to resist the severe impacts on the chain when the door is suddenly opened by a gust of wind.

The foregoing and other objects and advantages of the invention will become apparent from a consideration of the following specification and accompanying drawing, wherein:

Figure 1 is a perspective view of the novel device applied to a storm door;

Figure 2 is an enlarged sectional view taken on line 2—2 of Figure 1 showing the door in closed position;

Figure 3 is a view similar to Figure 2 showing the door in open position;

Figure 4 is a perspective view of the bracket with the chain shown in phantom lines at a position to connect or disconnect the chain from the bracket; and

Figure 5 is a perspective view of the bracket with the chain connected thereto.

Describing the invention in detail and referring first to the general assembly view of Figure 1, a preferred embodiment of the novel device comprises a flexible but non-extensible door stop 4 attached to a door 6 and to a door frame 8 in which the door is hinged at 9 (Figure 3) in the usual manner on a substantially vertical axis, although it will be understood that the device may be applied to a door hinged on a horizontal or diagonal axis. The stop 4 is cushioned by one or more extension coil springs 10 connected to the stop 4 and to the door frame as hereinafter described in detail.

The stop 4 is preferably in the form of a chain as illustrated in Figures 2 and 3, said chain comprising links 12 to which the springs 10 are connected by integral hooks 14 on said springs received within eyes or loops 15 of the links 12, so that the springs 10 and stop 4 are pivotally interconnected for relative movement on axes which are preferably approximately parallel to the hinge axis of the door.

The opposite ends of the springs are provided with hooks 16 similarly pivoted on substantially vertical axes within eyes 18 threaded into the door frame 8.

Thus is will be understood that when the door 6 is urged from its fully closed position of Figure 2 to its open position of Figure 3, the springs cushion the impact of the door as the stop chain 4 reaches the position shown in Figure 2. This arrangement also prevents damage to the spring by resiliently limiting opening of the door. Furthermore, the pivotal axes of the springs are parallel to the hinge axis of the door, thereby preventing damage to the springs and to the stop chain 4 by preventing relative sliding therebetween lengthwise of the chain.

It may also be noted that the springs are arranged to prevent the chain from drooping at any time, and the springs may be extended without permanent distortion to the length shown in Figure 3, the free length of the springs being less than one-third of the extended length shown in Figure 3.

Another feature of the invention is the fact that the hooks 14 of the springs may be inserted in any desired links 12 of the chain type stop member 4 as may be desired in adjusting or installing the device under various conditions. Also the spring hooks 14 and 16 may be readily removed from the eyes 15 and 18 to facilitate assembly of the device.

An unusually effective device of this type has been put into service with springs which exert a pulling force of about two pounds on the chain 4 when the door is closed and exert a pulling force of about twenty-eight pounds on the chain in the position of Figure 2, from which position a static force of 220 pounds is necessary to straighten the chain 4.

As best seen in Figure 2, one spring 10 is disposed in substantially straight-line relationship with a segment of the chain 4 which is anchored as hereinafter described to the door 6 Thus, when the door assumes its open position shown in Figure 3 the spring pivots slightly and maintains the spring in the form of a V with the chain segments at opposite sides of the spring defining an obtuse angle.

A primary feature of the present invention is the manner in which one end of the chain 4 is attached to the door 6 by an anchor bracket 20 having a flat elongated body 22 with a pair of holes 24 offset from opposite sides of the longitudinal centerline x—x of said body, said holes being adapted to receive screws 26 (Figures 2 and 3) or other convenient means for attaching the bracket 20 to the door 6.

The end of body 22 adjacent or facing hinge 9 is provided with a neck 28 bent to approximately perpendicular relationship with respect to said body, and the neck 28 terminates in an enlarged flat head or anchor part 30 having its upper and lower edges preferably beveled as at 32 (Figures 4 and 5) for a purpose hereinafter described.

In assembling one end of the chain 4 with the bracket 20, the end link 12 which is the anchor part at one end of said chain, as best seen in Figure 4, is arranged with the free end of said link seated against the neck 28 and the eye or opening 15 of the link which is elongated aligned lengthwise of the head, so that the link may be rotated over the head 30, the beveled edges 32 of the head providing just enough clearance for this purpose. Upon release of the chain 4, the tension of springs 10 immediately pulls all slack out of the chain 4, rotating it to the position best shown in Figures 2, 3 and 5 so that the opening 15 of end link 12 on the neck 28 is approximately perpendicular to the head 30, thereby preventing any possibility of accidental disconnection of the chain 4 from bracket 20 until tension on the chain 4 is released, as by disconnecting the springs, or by man-

ually pulling the chain to create slack between the springs and the bracket **20** under which conditions the link **12** on the neck **28** may be manually rotated to the position shown in Figure 4 and may be removed by reversing the procedure above described for connecting the chain to the bracket.

It may be noted that the bracket **20** is preferably formed of a single flat strip of steel or aluminum stamped and bent to the configuration shown in the drawing. When the neck **28** is bent to the form illustrated, the metal at **34** (Figure 4) is placed under compression, thereby affording a structure having more than adequate strength to resist maximum service impacts on the door.

The opposite end of the chain may be attached or anchored to the doorframe in any desired manner, as by a screw **36** or any other convenient means providing a permanent or detachable anchor for the chain.

Thus when installing the device, one end of the chain may be anchored at **36**, and the bracket **20** may be attached to the door by screws **26**, whereupon the springs may be manually extended to provide sufficient slack in the chain to attach the other end thereof to the bracket **20** as above described. If the device must be temporarily disconnected for some reason, the chain may be quickly disconnected from bracket **20** and may be later connected thereto when desired.

I claim:

1. In a door stop for a door hinged to a support, the combination of a chain having one end anchored to the support, a bracket having a flat body portion bearing at one side thereof against the door and anchored thereto, and a neck projecting angularly from the opopsite side of said bracket and having a head thereon spaced from the door, said head extending above and below said neck, said chain having an end link with an elongated opening the width of which is narrower than the length of said head, the length of said opening being greater than that of said head and the width of said opening being greater than the width of the head so that the latter may pass through the opening when aligned therewith, said neck being received in said opening, and spring means connected to the support and to the chain between its ends for maintaining the chain under tension and thereby holding said link in position whereat its opening is approximately perpendicular to said head to prevent accidental disassembly of said link from said neck, said chain defining an obtuse angle when the door is fully open at approximately a right angle to the support.

2. In a door stop for a door hinged to a support, the combination of a substantially nonextensible, flexible stop anchored at one end to the support, a bracket having a flat body portion bearing at one side thereof against said door and having a neck and an elongated head on said neck spaced from the door, screw means extending through openings of the bracket and into the door to anchor the bracket thereto, said stop having a link at its opposite end with an elongated opening the width of which is narrower than the length of said head, said neck being received in said opening, the length of said opening being greater than that of said head and the width of said opening being greater than the width of the head so that the latter may pass through the opening when aligned therewith, and spring means for maintaining said stop under tension to yieldingly resist opening of the door and to thereby hold said link in position whereat said opening is approximately perpendicular to said head, said flexible stop defining an obtuse angle when the door is fully open at approximately a right angle to the support.

3. In a door stop for a door hinged to a support, the combination of a flexible stop member connected at one end thereof to said support, a bracket having a flat body portion bearing at one side thereof against the door and having a head, screw means extending through holes of the bracket and into the door to anchor the bracket thereto, a link on the other end of said member, said link having an opening through which said head is insertable when the opening and head are aligned lengthwise of each other, said head being longer than the width of said opening, and spring means for yieldingly maintaining tension on said link to hold it in position whereat said opening is approximately perpendicular to said head, said stop member defining an obtuse angle when the door is fully open at approximately a right angle to the support.

4. In a door stop for a door hinged to a support, the combination of a flexible member anchored at one end to said support, an anchor part carried by the door, another anchor part carried by the other end of said member, one of said parts having an elongated opening adapted in one relative rotational position of said parts to receive an elongated portion of the other anchor part, and spring means connected to said member between its ends for yieldingly resisting opening of the door and for maintaining tension on said member to yieldingly resist rotational movement of the anchor part carried by said member to said position relative to the anchor part carried by the door, said flexible member defining an obtuse angle when the door is fully open at approximately a right angle to the support.

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