Aug. 20, 1935. H. A. STEVENS 2,011,694

DOOR CLOSER

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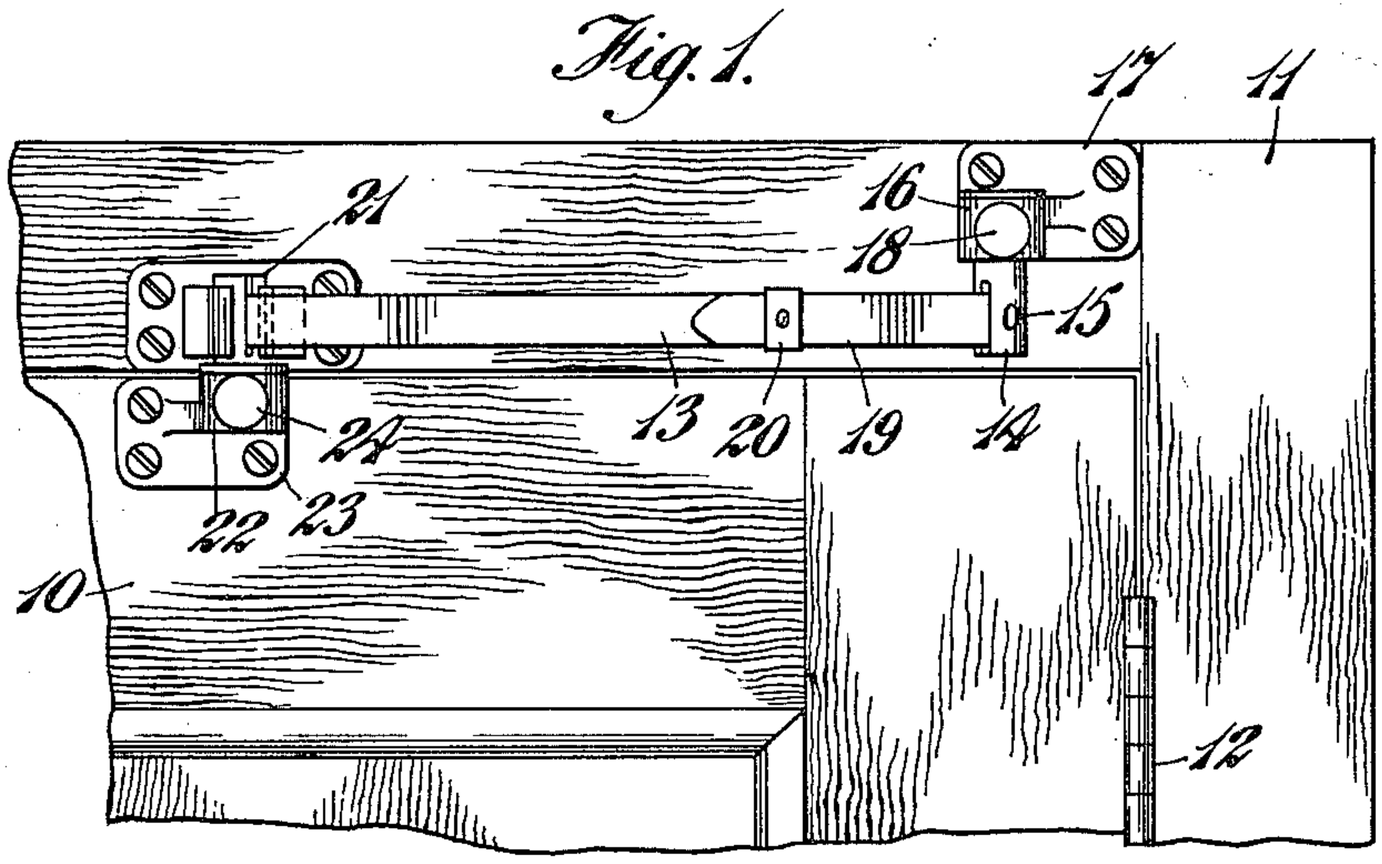
Fig. 1.



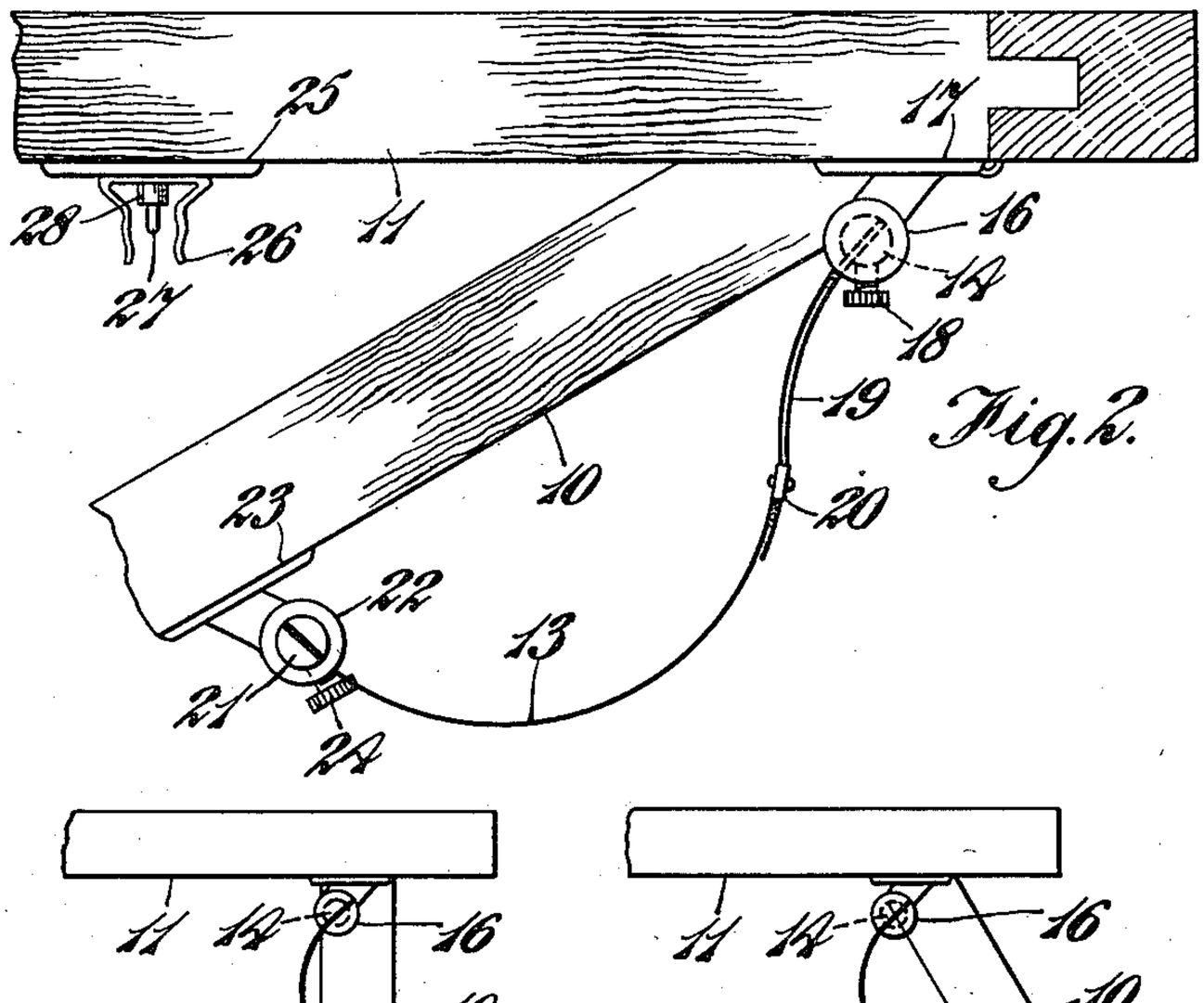


Fig. 2.

Fig. 3.

Fig. 4.

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Fig. 5.

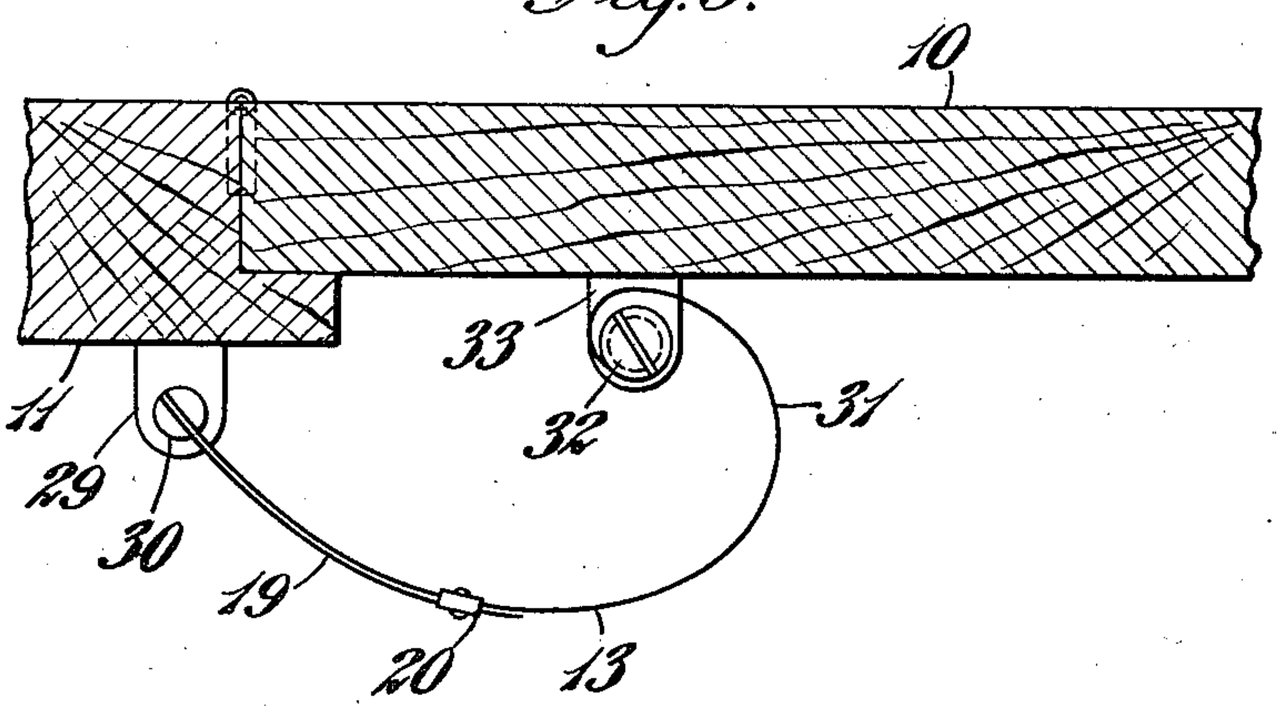


Fig. 6.

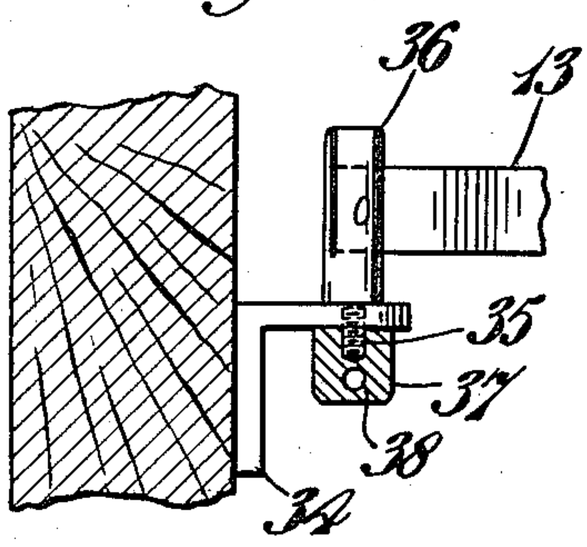


Fig. 7.

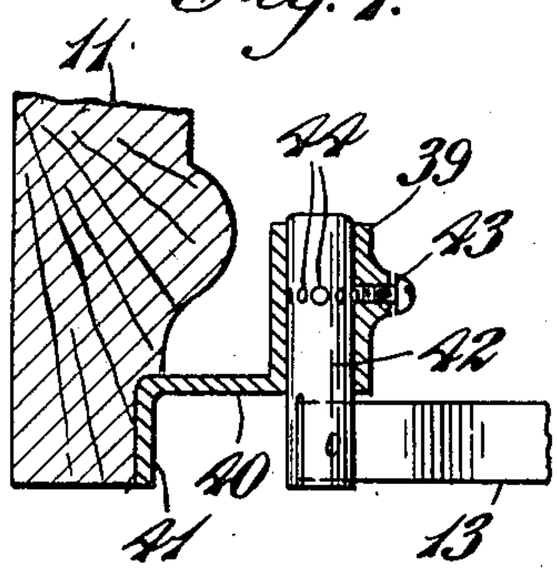
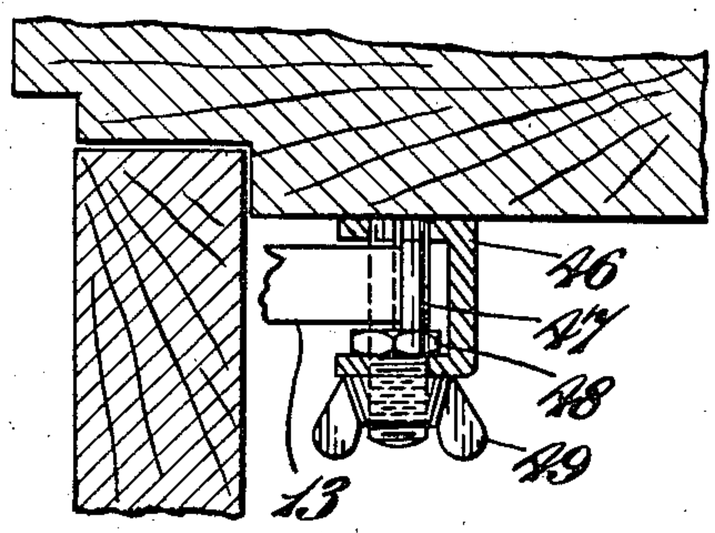


Fig. 8.



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DOOR CLOSER

Herbert Alfred Stevens, London, England

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In Great Britain December 28, 1932

2 Claims. (Cl. 16—72)

This invention relates to springs for doors, gates and like pivoted members, and it has for its object to provide a form of spring which is extremely simple in construction. It is, moreover, reliable in operation, and can easily be fitted to a door or the like, while an additional advantage consists in the fact that, by suitably positioning the fixing devices forming part of the spring, various effects can be obtained, and in some cases such variations may be brought about by merely adjusting the setting of the spring relative to said fixing devices.

A door or like spring according to the invention comprises a length of resilient strip having a fixing bracket attached at each end whereby the ends of the spring may be attached to the door and door-frame or equivalent parts respectively, the arrangement being such that one or both ends of the spring may be orientated relative to the corresponding part of the door or door-frame, and firmly clamped in position for regulating the effect of the spring. The invention also provides a spring for controlling doors, gates or like pivoted members, comprising a comparatively long resilient strip or rod disposed in a plane at right-angles to the pivotal axis of the door or equivalent, a bracket being attached to each end of the strip or rod for securing to the door-frame or equivalent adjacent the pivotal axis of the door and to said door at a position remote from the said axis, respectively.

As a further feature the invention provides a door or like spring comprising a flexible spring member arranged for lateral bending and having at or adjacent each end a fixing member, one for attachment to the door and the other for attachment to the frame, the arrangement being such that during the opening and closing of the door, bending takes place in the flexible spring member in a plane substantially at right angles to the pivotal axis of the door. Further, the door or like spring may comprise a flexible spring member in the form of a strip, and fixing means at both ends for attachment to a door or door frame, said fixing means being arranged so that the end portions of the spring member extend outwardly from the general plane of the door or frame. The spring member may conveniently be arranged to bend only in one plane and may be mounted at or adjacent its ends in fittings, one at least of which, when the door is installed, permits the corresponding end of the spring to be adjusted relative to the door or frame about an axis at right angles to the plane of bending. The spring may readily be provided with one or more buffers or other resilient means serving to arrest the movement of the door in a gentle manner, and, if desired, springs in accordance with the invention may be arranged with readily releasable locking means whereby the spring may be caused to produce various effects.

In order that the invention may be more fully understood it is illustrated in the accompanying drawings in which:

Figure 1 is a fragmentary elevation showing one form of spring secured in position upon a door and door frame;

Figure 2 is a fragmentary plan corresponding to Figure 1, the door being partially opened;

Figures 3 and 4 show diagrammatically the positions occupied by the spring;

Figure 5 shows in sectional plan a modified construction of door spring; and

Figures 6, 7 and 8 are part sectional elevations showing modifications in the fixing and adjusting means.

Referring to Figures 1 and 2, a door indicated at 10 is pivotally mounted upon a door frame 11 by means of hinges, one of which is indicated at 12, and said door 10 is required normally to close itself. To this end a spring member 13 in the form of a comparatively thin strip or a number of such strips superimposed is mounted radially in a slotted peg 14, and is conveniently held in position by means of a rivet 15, the peg 14 being carried rotatably by a collar 16 which is formed integrally with a fixing plate 17 secured to the frame 11. Rotational movement of the peg 14 relative to the collar 16 is permitted, the adjustment so provided being locked by means of a knurled or otherwise formed set screw 18 which may, if desired, engage its inner end with one of a series of recesses formed in the peg 14.

In order to strengthen the spring member 13, a reinforcing strip 19 extends therealong, and is conveniently held in place at its outer end by means of a clip 20, thus producing a laminated construction. The other end of the spring 13 is similarly mounted in a peg 21, and this extends downwardly into the collar 22 of a fixing bracket, indicated generally at 23, on the door, a locking screw 24 being provided.

With a view to avoiding noise and vibration as the door closes, a buffer is provided for co-operation with the peg 21, and this is shown more clearly in Figure 2. A block or other suitable bracket, indicated at 25, is attached to the door frame 11 and carries a spring clip 26 of substan-

tially U-shape, the limbs of which are arranged to embrace the peg 21 and thus prevent the door from rattling. Moreover, a plunger 27 is resiliently and telescopically mounted in a barrel 28 so as to absorb momentum from the door as the latter reaches its closed position.

It will be appreciated that the force exerted by the spring 13 is to a large measure dependent upon the setting of the pegs 14 and 21 relative to the frame 11 and door 10 respectively, while by the suitable arrangement of these parts, various effects can be obtained. Thus, Figure 3 shows diagrammatically the disposition assumed by the spring 13 when it is originally set in the manner shown in Figure 2, both of the screws 18 and 24 being securely tightened. In this case the closing torque about the pivotal axis of the door increases as the door is opened, thus providing ample power for closing the door in all circumstances. If, however, the screw 24 is allowed to operate in a circumferential slot formed in the peg 21 so as to permit a limited angular freedom of the latter within the collar 22, the effect, indicated in Figure 4, may be obtained. In this case when the door is fully opened to the position shown, pivotal movement of the spring 13 and peg 21 takes place within the bracket 23 and this automatically retains the door in its fully-open position. When, however, the door 10 is slightly moved towards its closed position, by manual or other means, the spring 13 once more becomes effectual and causes said door to be completely closed in an automatic manner.

The actual construction of the device may be modified in various ways, and Figure 5 illustrates an adaptation which is somewhat more compact and which may be arranged to co-operate between the upright part of a door frame and the associated portion of the door. In this instance, the spring 13 is secured as before in an adjustable manner relative to the door frame 11 through the medium of a bracket 29 and a peg 30, the latter being provided with locking means (not shown) whereby its angular setting relative to the bracket 29 may be preserved. A reinforcing strip 19 and clip 20 are provided as before described, but the other end of the spring 13 is spirally formed, as indicated at 31, and is arranged to freely encircle a screw 32 or equivalent upwardly projecting pin carried by a fixing bracket 33, the latter in turn being secured to the door 10. When said door 10 is opened, the spring effect is imparted partly due to the bending of the door frame end of the spring 13 and strip 19, and partly by the uncoiling of the spiral portion 31, thus producing an extremely smooth action and enabling the device to be used, if desired, with doors which open in either direction. In this case, it may sometimes be found desirable to provide a separate spring 13 upon each side of the door.

Various modifications may be made in the construction of the fittings whereby the ends of the spring member are anchored to the door and door frame, and various forms are shown in Figures 6, 7 and 8. Referring to the first of these, it will be seen that an angle bracket 34 is perforated to receive a screw-threaded pin 35 formed upon a lug 36, which latter is in turn secured to the spring 13, the pin 35 being provided with a nut 37 which may be tightened for locking the lug 36, conveniently by means of a tommy bar inserted in a diametral hole 38.

The form of fitting shown in Figure 7 is useful more particularly where projecting mouldings or equivalent obstacles are encountered in fixing the door frame bracket such as 17, and in this instance a tubular socket 39 is supported on an arm 40, the latter being formed with a fixing plate 41, while a peg 42 is secured to the spring 13 and is locked in the appropriate angular position within the sleeve 39 by means of a set screw 43, a series of depressions 44 being formed around the circumference of the peg 42 for securing an adequate grip.

The arrangement shown in Figure 8 is applicable where overhanging door frames are provided and in this instance a substantially U-shaped bracket is formed with a fixing plate 46, and is arranged to receive the vertically disposed pin 47 which is slotted for the reception of the spring 13. At its lower part the pin 47 is formed with a hut or collar 48, and is screw-threaded for the reception of a butterfly nut 49 for locking the angular setting of the spring 13.

Although in the description the present invention is referred to doors, it will be appreciated that it is equally applicable to other forms of pivoted members, such for instances as gates, flaps or lids, and it will be understood that these modifications are to be included within the scope of the words door and door frame.

The improved form of door spring is extremely serviceable and robust in use, as the resilient member is subjected only to comparatively low stresses, and in consequence breakage very rarely occurs, and it is found also that a comparatively short spring is sufficiently strong to close a door of the ordinary kind such as is found in the usual dwelling house.

What I claim is:—

1. A spring for closing a door or the like comprising a curved resilient strip, pegs, each peg being diametrically slotted from one end and ends of the strip being secured in the slots, brackets adapted to be secured to the door and a door frame respectively within which the respective pegs are rotatably engaged, and a buffer adapted to be secured on the door frame and including a spring clip to clasp the peg on the door.

2. A spring for closing a door comprising a resilient strip, brackets adapted to be secured one to a door and the other to a door frame above the door, each bracket carrying a socket, pegs connected with end portions of said strip, one peg extending upwardly from the strip for engagement in the socket of the frame-carried bracket and the other peg extending downwardly from the strip for engagement in the socket of the door-carried bracket, means to releasably secure each peg in the socket receiving the same, and a buffer adapted to be secured to a door frame in position for engagement by the pin carried by the door-carried bracket including means for gripping the last mentioned peg and holding a door closed.

HERBERT ALFRED STEVENS.