

1,045,652.

Fig. 1.

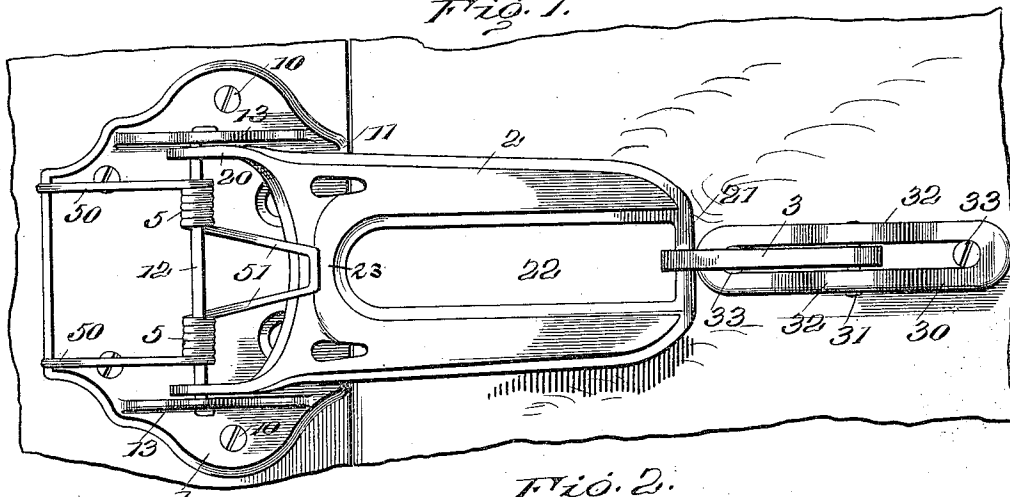


Fig. 2.

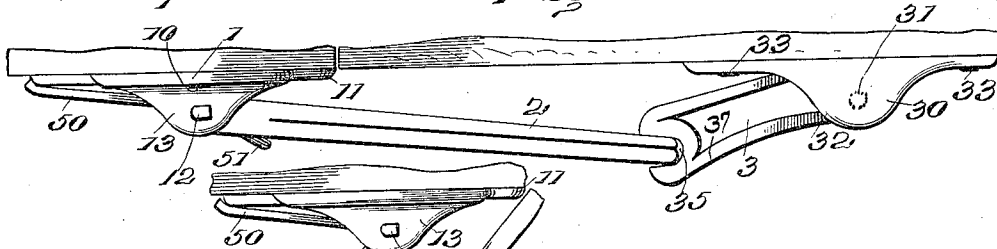


Fig. 3.

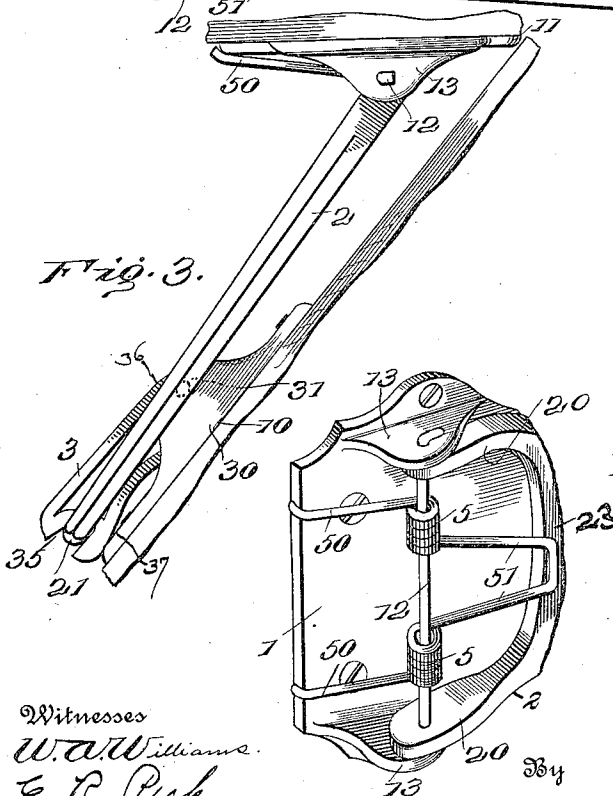


Fig. 5.

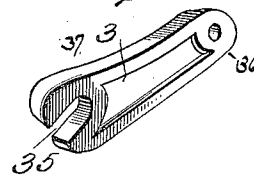


Fig. 4.

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UNITED STATES PATENT OFFICE.

NORMAN B. WILDER, OF MORRISON, ILLINOIS.

DOOR-SPRING.

1,045,652.

Specification of Letters Patent.

Patented Nov. 26, 1912.

Application filed March 25, 1912. Serial No. 686,049.

To all whom it may concern:

Be it known that I, NORMAN B. WILDER, a citizen of the United States, residing at Morrison, in the county of Whiteside and State of Illinois, have invented certain new and useful Improvements in Door-Springs, of which the following is a specification.

This invention relates to certain improvements in and relating to springs for closing doors, and other purposes, and the objects and nature of the invention will be readily understood by those skilled in the art in the light of the following explanation of the accompanying drawings illustrating what I now believe to be my preferred embodiment from among other formations, combinations and arrangements within the spirit and scope of my invention.

The invention consists in certain novel features in construction and in combinations and arrangements as more fully and particularly set forth and pointed out hereinafter.

Referring to the accompanying drawings:—Figure 1, is an elevation of a structure embodying my improvement and applied to a door. Fig. 2, is a top plan showing the positions of the parts when the door is in closed position. Fig. 3, is a similar view showing the door opened and thus held by the device of this invention. Fig. 4, is a detail perspective view. Fig. 5, is a detail perspective view of the link connection.

The embodiment illustrated comprises a socket plate or base 30, a link 3, an arm 2, an actuating spring, and a comparatively large base plate 1, formed with widely-separated parallel outwardly-projecting perforated flanges or ears 13, carrying a pivot rod or pin 12, and holding the same parallel with and spaced outwardly from the face of the base plate. The fulcrumed end of the arm 2, is mounted on rod 12, and is arranged between and upheld by ears 13. The fulcrumed end of said arm is centrally notched or bifurcated to provide a recess for the reception of the actuating spring and a cross or transverse portion 23, to be engaged by said spring, and to form upper and lower parallel widely-separated rearwardly-projecting perforated arms 20, confined to swing on the rod 12, and between the ears 13.

The outer or free end of the arm 2, is formed with a transverse bearing or journal bar or pin 21, parallel with the pivot rod 12, and bridging the outer end of a longitudinal

slot 22, the inner end of which is closed or bridged by transverse portion 23.

The arm 2, with its projections 20, and its bearing or journal 21, and transverse web 23, is preferably formed in one piece by casting, drop forging, stamping or otherwise. The socket plate 30, is formed with parallel flanges 32, to provide an elongated groove in which the link 3, is fulcrumed on cross pin 31, to swing in the same plane as arm 2. The flanges 32, guide, brace and support the link while the elongated base proper forms the floor of the groove between the flanges and a stop to limit the swing of the link in either direction.

The free or outer end of the link is pivotally joined to the free or outer end of the arm to swing therewith on a transverse axis. For instance, I show the free end of the link longitudinally slotted or bifurcated at 35, to embrace the journal 21, and form a bearing on which the link and arm swing, although I do not wish to limit the invention to the bifurcated end as the arm and link might be otherwise pivotally joined. The actuating spring is bent from or formed of a single length of suitable spring wire or rod. The spring comprises a pair of aligned widely-separated spring coils 5, diametrically-enlarged with respect to and loosely embracing the hinge pin 12, with the parallel ends 50, of the wire extending laterally from the opposite or outer ends of the coils and bearing inwardly against the base plate 1, at widely-separated points. The central portion of the wire is bent to form a laterally extending loop 51, extending from the inner ends of the two coils and at its free end bearing inwardly and centrally against the outer face of the transverse web 23, of the arm 2.

On applying the device to close, or hold open, a door or other swinging element, the base 1, is secured by screws 10, or the like, to the door frame with the straight edge 11, of said plate parallel and about flush with the hinged edge of the door adjacent to the vertical edge of the door frame. The socket base 30, is secured to the door by screws 33, or the like, and is located a greater or lesser distance from the base plate straight-edge 11, according to the distance the door is to swing open before being locked in open position by the device described, as will be hereinafter more fully pointed out. The straight-edge 11, is so located with respect

to the pivot or hinged rod 12, as to constitute a gage or indicator for the proper location and application of the device to the door frame, thereby overcoming certain grave defects and objections heretofore existing in swing arm door closers. If the base plate is secured with the straight edge 11, approximately flush and parallel with the vertical edge of the door frame at the hinged edge of the door, it is then an easy matter to accurately locate and fix the socket 30, to bring about the desired action of the spring closer.

When the door is swung open, the spring 51, resists such opening movement through the arm and link, and the link swings outwardly from the door to a position perpendicular to the door and then swings back in the opposite direction toward the door until the link assumes the reversed position about as shown in Fig. 3. The arm is carried by the link toward and from the surface of the door during this swinging movement.

When in the opening swing of the door, the arm and link reach the position shown in Fig. 3, the door will be automatically held in such position, as the axis of the pivotal connection between the arm and link has passed beyond the dead center and hence the spring does not exert closing force or power on the door but the power of the spring is consumed in holding the arm pressed toward the door and locked by the link against door-closing swing, the link being held in reversed position by the arm with its free end pressed tightly against the socket floor.

The door can be readily released from this locked position, by a comparatively slight force or power exerted on the door toward closing position to cause the link to swing back from the socket floor and past dead center. The spring will thereupon close the door and the parts will assume the positions of Fig. 1. The link is so formed that it cannot close down on the floor of the socket 30, to a position parallel with the door or in direct continuation of the arm when the door is in closed position, even though the socket plate should be secured to the door at a greater relative distance from edge 11, than is indicated by Fig. 2. The bulge or convexity 36, will, under such conditions engage the floor of the socket when the door is closed and thus hold the link approximately in the inclined position shown by Fig. 2, with the axis 21, between the link and arm located a distance outwardly beyond the door and beyond a straight line intersecting the axis 12 and 31. The spring is thus exerting closing pressure on the door even when the door is in closed position, and this pressure will be increased from the very initial opening movement of the door. The opposite edge 37 of the link is preferably

concaved or reduced to permit the link when reversed to close in approximately parallel with the door and carry the axis 21, inwardly beyond the dead center and beyond the longitudinal center line of the link. This action is also insured or can be attained by locating the axis 21, to one side of the longitudinal center line of link for instance by offsetting or inclining the bearing slot 35, approximately as shown in Fig. 5 so that the axis 21, will be located outwardly beyond the longitudinal center line of the link when the parts are in position with the door closed, and will be located inwardly beyond said center line when the door is held open and the link is in reversed arm-locking position, as in Fig. 3. By this offset arrangement of the axis 21, with respect to the center line of the link, the link will always be quickly started on its outward swing by the arm when the door starts to open, and the link will also more quickly assume arm-locking position on being reversed.

The formation and arrangement of the parts is such that the door can be held open at any desired point between closed and completely opened positions, simply by securing the socket 30, nearer to or farther from the gage or guide edge 11. If the socket 30, is located nearer to the edge 11, the range of swing of the door will be reduced as the arc of swing of the link will be shortened and the link will more quickly assume the reversed or locking position. If the socket is secured at a greater distance from edge 11, the opening swing of the door before being locked will be increased as the possible arc of swing of the link will be lengthened and the link will not so quickly assume the reversed door locking or holding position.

Peculiar advantages in the durability and power of the spring are also attained by the employment of the spring approximately as shown, in view of the distribution of strain to the several coils 5, and ends 50, and avoidance of concentration of strain on the coils or on the junctions between the loop 51 and the spring coils. These coils do not tightly embrace the rod 12, but the strain is distributed through the coils and to the ends 50.

The device of this invention is exceedingly strong and durable and is adapted for use in various connections in controlling the movement of swinging members.

It is evident that various changes might be resorted to in the forms, arrangements and constructions described and hence I do not wish to limit myself to the exact disclosure hereof.

What I claim is;—

1. A door spring closer and holder comprising a base plate having an edge adapted to be located approximately flush with the vertical edge of a door frame to which the

plate is secured and adjacent to the hinged edge of the door, said plate having outwardly projecting parallel widely-separated lugs provided with a pivot rod spaced outwardly from the face of the plate and a distance to one side of and parallel with said plate edge, an arm swinging on said rod as an axis and recessed at its fulcrumed end to form longitudinally projecting ears and a transverse portion, said ears receiving said pivot rod and located between said lugs, an arm actuating spring bearing against said plate and against said transverse portion of said arm, attaching means adapted to be secured to said door, and a link fulcrumed to said means and at its free end pivotally joined to the free end of said arm and adapted to assume reversed arm-locking position to hold the door open.

2. A door closer and holder consisting of a base plate adapted to be secured to a door frame and provided with and carrying a pivot rod, a swinging arm having a longitudinal slot and mounted at one end to swing on said rod as an axis, an arm actuating plate adapted to be secured to a door, a link at one end fulcrumed to said socket plate and at its free end pivotally joined to the free end of said arm by an axis offset to one side of the longitudinal center line of the link, said link when in reversed door holding position projecting into said slot of the arm with said offset axis arranged inwardly beyond the longitudinal center line of said link.

3. In combination, a base, an arm hinged at one end to the base to swing on a trans-

verse axis, operating connections at the free end of the arm and adapted to be applied to a door to swing the same, the hinged end of said arm being recessed to provide spaced end projections and a transverse web spaced a distance from said axis, spring coils loosely embracing said axis and having lateral ends bearing against said plate and an oppositely projecting arm actuating portion bearing inwardly and centrally against said web.

4. A door closer and holder consisting of a base plate adapted to be secured to a door frame and having a vertical axis, a swinging door-closing-and-holding arm mounted on said axis and at its free end having a transverse axis, an arm-actuating spring mounted on said axis and bearing against the plate and arm, a socket plate separate from said base plate and adapted to be secured to a door, a relatively-short link fulcrumed to said socket plate and at its free end having an inclined offset slot receiving said axis of said arm to pivotally join the free ends of the arm and link by an axis arranged outwardly beyond the longitudinal center line of the link when the door is closed, and arranged inwardly beyond said center line of the link when the link is in reversed arm-locking position and the door is held open by the arm and link.

In testimony whereof I affix my signature in presence of two witnesses.

NORMAN B. WILDER.

Witnesses:

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J. GRIER MILLER.