April 15, 1930. C. F. SPONSLER 1,754,579

DOOR STAY

Filed July 11, 1929 2 Sheets-Sheet 1

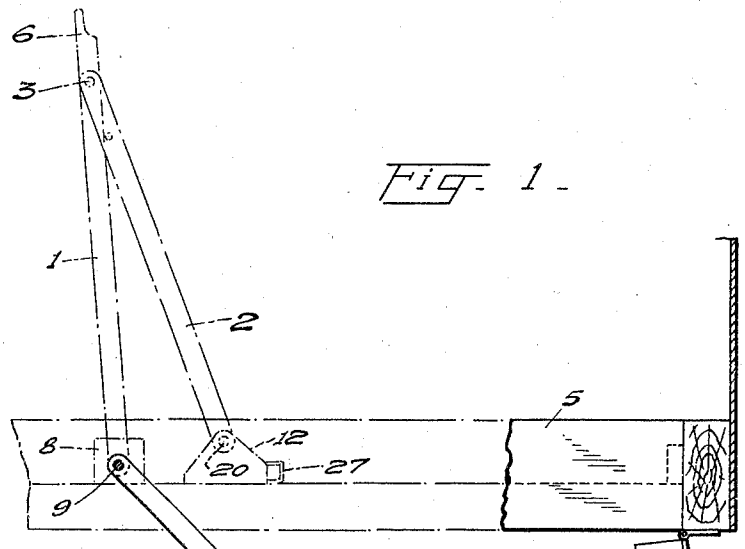


Fig. 1.

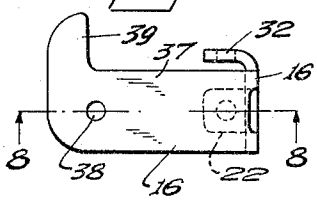


Fig. 7.

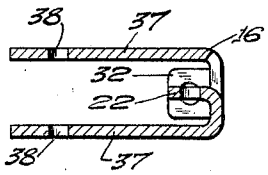


Fig. 8.

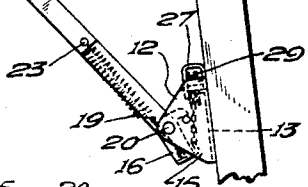
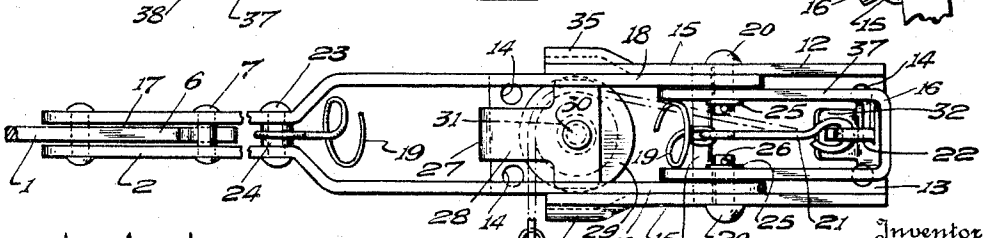


Fig. 4.



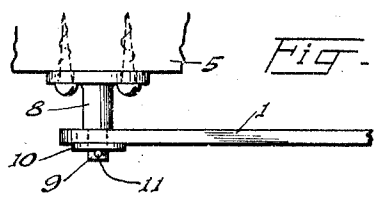


Fig. 9.

33

Inventor

Charles F. Sponsler

By

Fuller & Fuller

his Attorneys

April 15, 1930. C. F. SPONSLER 1,754,579

DOOR STAY

Filed July 11, 1929 2 Sheets-Sheet 2

Fig. 2.

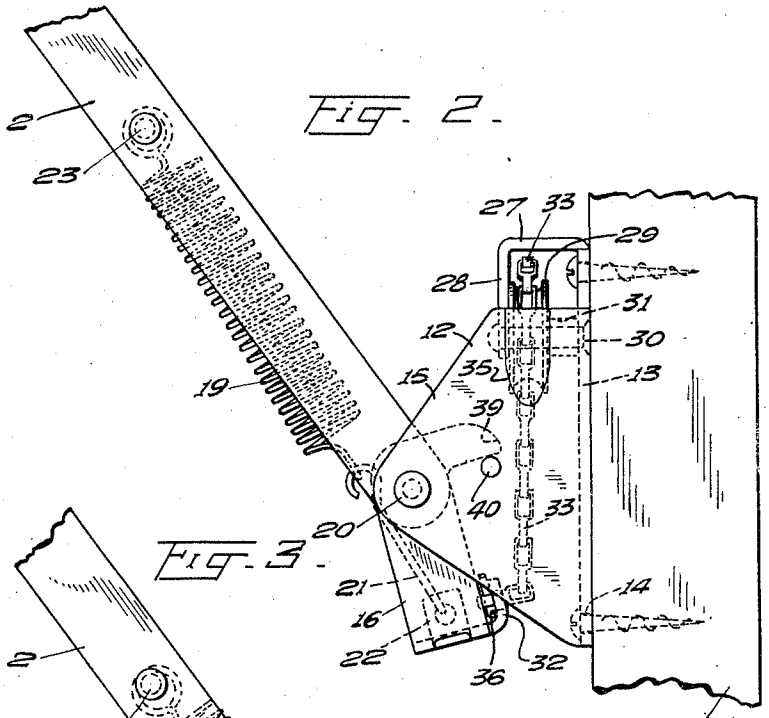


Fig. 3.

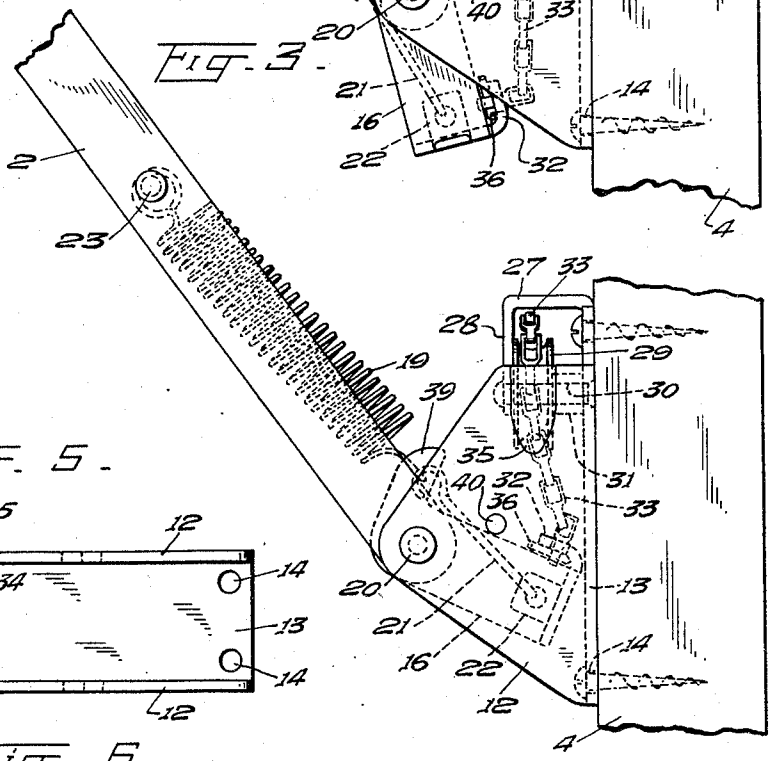
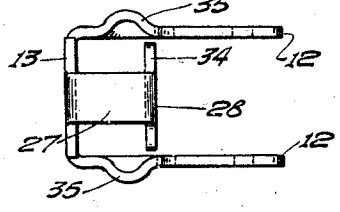


Fig. 5.

Fig. 6.



Inventor

Charles F. Sponsler

By Keller & Keller

Attorneys

Patented Apr. 15, 1930 1,754,579

UNITED STATES PATENT OFFICE

CHARLES F. SPONSLER, OF PHILADELPHIA, PENNSYLVANIA

DOOR STAY

Application filed July 11, 1929. Serial No. 377,574.

This invention relates to door stays for maintaining hinged doors in open position. While the device is especially suitable for application to garage doors, it obviously may be advantageously applied to such swinging members as casement windows and the rear doors of delivery trucks so as to enable such trucks to be operated with the doors open if desired.

The primary object of the invention is to provide a door stay mechanism of a strong and rugged nature consisting of a few simple, cheap and easily manufactured and assembled parts which efficiently co-operate to hold a hinged door or the like rigidly in open position and which may be readily released to permit the door to be closed.

The principal feature of the invention consists in constructing the door stay with two hinged arms or braces, one of which is pivotally connected to the door and the other to a fixed pivot point on the head of the door frame inside of the door, the pivotal connection to the door being made through the instrumentality of a bracket upon which is mounted a rotatable lever to which is attached a spring that is attached to the adjacent arm or brace of the device, the said lever and the arm adjacent thereto having a common pivotal axis, and means being provided for rotating the lever to a position causing the spring to exert a releasing pressure on the arms or braces.

There are other features of the invention pertaining to advantageous details of construction and relations of parts, all as will hereinafter appear and be pointed out in the claims.

In the drawings illustrating the preferred embodiment of the invention:

Figure 1 is a plan view of the door stay, showing its relation to a vertically hinged door and the associated door frame, the parts being shown in full lines in the position occupied when the door is open, and being shown in dot and dash lines in the position they assume when the door is closed.

Figure 2 is a detail plan view of a portion of the construction shown in Fig. 1, the parts being in the position corresponding to the open position of the door.

Figure 3 is a view corresponding to Fig. 2 but illustrating the relation of the parts when the releasing means have been actuated to permit the door to be closed.

Figure 4 is a side elevational view of the portion of the device which is adjacent the door.

Figure 5 is a detail elevational view, looking toward the door, of the bracket by which one of the braces is pivotally connected to the door.

Figure 6 is an elevational view of the bracket shown in Fig. 5, the view being taken in a direction looking away from the hinge of the door.

Figure 7 is a plan view of the rotatable releasing lever.

Figure 8 is a sectional view on the line 8—8, Fig. 7.

Figure 9 is an elevation of the means by which one of the arms or braces is pivotally connected to the head of the door frame, a portion of the adjacent arm or brace and a portion of the door frame being also illustrated.

The door stay mechanism involves two arms or braces, 1 and 2 respectively, which are pivotally connected at 3, preferably by means of a rivet. The arm 2 is pivotally connected at its outer end to the door 4, while the inner end of the brace 1 is pivotally connected to the under side of the head 5 of the door frame at a point inside of the position assumed by the door when the latter is closed. When the door is in the extreme open position which the stay device permits it to assume, the pivotal connection 3 of the arms 1 and 2 lies slightly outside of a line extending from the point of pivotal connection to the door to the point of pivotal connection to the door frame; that is to say, the pivotal point 3 is slightly past center, so that the angle between the arms 1 and 2 on the side facing the door is slightly less than 180 degrees. The point 3 at which the arms are pivotally connected is substantially equidistant from the points at which the arms are respectively pivoted to the door and door

frame, thus permitting the point of attachment to the door and the point of attachment to the door frame to be located at a considerable distance from the hinge and thereby enabling the arms 1 and 2 to form an angle of approximately 45 degrees with the plane of the door when the latter is open. By this means strains in the hinges and in the door itself are minimized when force tending to close the door is applied to the latter. As thus constructed, moreover, the door stay mechanism, when the door is closed, will not project beyond the center of the door opening, and, therefore, cannot interfere with the opposite door leaf or stay attached to such opposite leaf where the doors are arranged in pairs, as is commonly the case for garages. Means are provided for limiting the rotation of the arms 1 and 2 on the pivot 3 when the door is swung open, such means preferably being afforded by providing the member 1 with an extension 6 having a reduced end which is adapted to engage a stop pin or rivet 7 carried by the arm 2 at a point adjacent the pivotal connection 3 of said arms.

The arm 1 may be conveniently pivoted to the cap or head of the door frame 5 by means of a shouldered bracket 8 having a downwardly extending, cylindrical portion or stud 9 of reduced cross-section, a washer 10 which fits over the stud 9 and is retained in place by a cotter 11 serving to hold the arm 1 in assembled relation to its pivot bracket. The base portion of the bracket 8 is preferably formed as a casting which is bored to receive the stud 9, the latter preferably being a piece of cold rolled shafting which makes a driving fit with the body of the bracket.

The bracket 12 to which the outer end of the arm or brace 2 is pivotally connected is preferably fashioned from sheet metal rather than by casting. It is provided with a base 13 which engages the inner face of the door 4 and which is provided with suitable openings 14 for receiving securing screws. Extending outwardly from the base in planes normal to the door are vertically spaced flanges 15 between which are received the outer end of the arm 2 and the rotatable releasing lever 16, said arm and the lever being pivotally connected to the flanges 15 of the bracket. As well shown in Fig. 4, the arm or brace 2 is preferably formed of two rigidly united bars which are spaced apart adjacent the pivot pin 3, as at 17, a distance sufficient to receive the extension 6 of the brace 1 and which are more widely separated at their outer ends 18 so as to contact and be held against vertical shifting by the flanges 15 of the door bracket. This vertical spacing of the sections of the arm 2, at the outer end of the latter, also provides space for permitting the releasing lever 16 and the spring 19 to operate therebetween. The arm or brace 2 and the lever 16 are pivotally connected to the flanges of the door bracket 12 by pivot pins 20, the inner ends of the pins being spaced apart to afford clearance for the hooked member or connection 21 by means of which the outer end of the spring 19 is anchored to a centrally disposed, perforated lug 22 with which the lever 16 is furnished. By this means, as will be apparent from an inspection of Figures 2 and 3, the spring attaching member or link 21 is adapted to pass from one side to the other of the point of pivotal connection of the arm 2 and door bracket 12. The inner end of the spring 19, which has a slight initial tension, is connected to the door bracing arm 2 by means of the rivet 23 and the spacing ferrule 24 through which the latter extends. The pivot pins 20 are retained in assembled relation by means of washers 25 and cotters 26.

The door bracket 12 is also preferably integrally provided with a pulley support 27 of angular form having a portion 28 which is parallel to and is spaced outwardly from the base plate 13 of the bracket 12. Between the portion 28 and the base 13 of the bracket a grooved pulley 29 is rotatably mounted on a rivet 30 which passes through said parts of the bracket, a ferrule 31, which surrounds the rivet and is interposed between the pulley, and the base plate, serving to retain the pulley in proper operating position. Connected to a perforated lug or tab 32 with which the releasing lever 16 is provided at one end is a flexible operating member 33, preferably a chain, which extends over the pulley and hangs vertically downward sufficiently far to be within convenient reach of the operator. To provide lateral support for the outer face of the pulley insuring that the latter shall at all times run reasonably true, the portion 28 of the door bracket is widened or extended vertically at its end, as indicated at 34; and to form a guard for the chain 33 for insuring that the latter shall at all times be positioned in the groove of the pulley, the portions of the flanges 15 of the door bracket, which are immediately above and below the pulley, are channeled or formed with swells 35 which extend past the center line of the pulley. The chain 33 may be conveniently attached to the lug 32 of the releasing lever by inserting one of the links of the chain through the hole in the lug and thereafter inserting a cotter 36 through the link on the opposite side of the lug.

The releasing lever 16 is of angle or bell-crank form and is preferably formed from a single piece of plate metal having vertically spaced portions 37 between which the hooked link 21 for connecting the spring to the lug 22 vibrates. The portions 37 are provided with aligned openings 38 for receiving the pivot pins 20 and each is formed with an arm or lug 39 adapted to engage a stop or pin 40 carried by and extending between the

flanges 15 of the door bracket 12. As will be seen from Fig. 2, rotation of the releasing lever 16 in clockwise direction is arrested by the engagement of the lever arms 39 with the pin 40, while, as will be seen from Fig. 3, the arms of the releasing lever which are on the opposite side of the pivotal axis 20 are adapted to engage the same stop pin 40 to limit counter-clockwise rotation of the releasing lever 16.

The operation of the door stay device is automatic except for releasing the door from the control of the stay and that operation requires little effort and may be quickly accomplished. Assuming the door to be open, a slight pull upon the vertical segment of the chain 33 causes the releasing lever 16 to rotate counter-clockwise about the pivotal point 20, thus shifting it to the position shown in Fig. 3. By this means the line of pull of the spring 19 is caused to pass to the side of the pivotal point 20 opposite to that occupied by it (see Fig. 2) when the spring is serving to retain the arms 1 and 2 in door bracing relation. Due to its changed position the spring 19 then exerts upon the arm or brace 2 a pull causing the said arm to rotate clockwise, thus breaking the hinged joint of the bracing arms. The door 4 is then free to be swung to closed position, the arms 1 and 2 moving inwardly and assuming the positions indicated in dot and dash lines in Fig. 1. During the closing of the door when the axis or line extending from the pivotal point 20 to the point of attachment of the spring to the releasing lever 16 passes through the line or axis extending from the pivotal point 20 to the point of attachment of the spring 19 to the brace 2, the releasing lever 16 is automatically rotated with respect to the door bracket and is caused to assume in relation to the bracket the position it occupies when the door is being held open, as shown in Fig. 2. In this position of the parts, which is effected automatically upon closing the door, the spring is ready to force the arms 1 and 2 past center and retain them in such position as soon as the door is again opened.

A door stay device constructed in accordance with the invention can be used either on a right hand or left hand door, it only being necessary to alter the relation of the chain to the pulley so that in either case it passes over the top of the latter. The device also is advantageous in that it is positioned so that no stooping or kicking is required, while it is out of the way and is protected so as to be unaffected by snow or ice.

I claim:

1. A door stay device comprising a plurality of pivotally connected arms, means forming a fixed pivot for one end of one of said arms, a bracket to which the other of said arms is pivotally connected, a lever rotatably mounted on said bracket, means for actuating said lever, means for limiting the extent of rotation of said lever, and a spring interposed between said lever and the arm pivotally connected to said bracket.

2. A door stay device comprising a plurality of arms, means forming a pivotal support for one of said arms, a bracket forming a pivotal support for the other of said arms, means for pivotally connecting said arms, a lever rotatably mounted on said bracket, means for actuating said lever, and a spring interposed between said lever and the said arm adjacent thereto, said last named arm and the lever having a common pivotal axis.

3. A door stay device comprising a plurality of pivotally connected arms, means for limiting the extent of rotation of said arms, means forming a pivotal mounting for one of said arms, a bracket forming a pivotal mounting for the other of said arms, a bell-crank lever pivotally mounted on said bracket, means for limiting the rotation of said lever, means for operating said lever, and a tension spring interposed between said lever and the arm pivotally connected to said bracket, said last named arm and the lever having a common pivotal axis.

4. A door stay device comprising a plurality of pivotally connected arms, means for limiting the extent of rotation of said arms, means forming a fixed pivot for one of said arms, a bracket adapted to be connected to a hinged door and forming a pivotal support for the other of said arms, a bell-crank lever pivotally mounted on said bracket, said lever and the arm pivotally connected to said bracket having a common pivotal axis, means for limiting the rotation of said lever with respect to the bracket, a tension spring interposed between the lever and the said arm adjacent thereto, a pulley carried by said bracket, and a flexible member connected to said lever and co-operating with said pulley for actuating the lever.

5. A door stay device comprising a plurality of pivotally connected arms, means forming a fixed pivot for one of said arms, a bracket forming a pivotal support for the other of said arms, the arm which is pivotally connected to the bracket being forked adjacent said bracket, a lever rotatably mounted on the bracket, means for limiting the rotation of the lever, means for actuating the lever, and a spring interposed between said lever and said forked arm, said spring being positioned between the sides of said forked portion of the lever.

6. A door stay device comprising a plurality of pivotally connected arms, means for limiting the rotation of said arms with respect to each other, means forming a pivot for one of said arms, a bracket to which the other of said arms is pivotally connected, a lever pivotally mounted on said bracket, means for limiting the rotation of said lever,

a spring interposed between the lever and the arm pivotally connected to the bracket, a pulley carried by said bracket, and flexible means connected to said lever and passing over said pulley for operating the lever, said bracket being provided adjacent said pulley with means for retaining said flexible member in operative relation to the pulley.

7. A door stay device comprising a plurality of pivotally connected arms, means forming a fixed pivot for one of said arms, a bracket forming a pivotal mounting for the other of said arms, said last named arm being forked adjacent said bracket, a lever pivotally mounted on the bracket, means for limiting the rotation of the lever, means for operating said lever, and a spring interposed between the lever and the arm pivotally connected to said bracket, said last named arm and the lever having a common pivotal axis, and said lever being provided with means for attaching said spring thereto.

8. A door stay device comprising a plurality of pivotally connected arms, means for pivotally connecting one of said arms to the head of a door frame, a bracket for pivotally connecting the other of said arms to a hinged door, means for limiting the relative rotation of said arms, a lever pivotally mounted on said bracket, a spring interposed between said lever and the arm pivotally connected to said bracket, and means for actuating said lever to shift the position of the line of action of said spring, said spring when the lever is in one position serving to move the point of pivotal connection of said arms in one direction and when the lever is in another position serving to move the point of pivotal connection of the arms in the opposite direction, and said lever, spring and the adjacent arm being so connected that the said lever is caused to rotate from one position to another during the closing movement of the door.

In testimony whereof I affix my signature.

CHARLES F. SPONSLER.