Nov. 5, 1935. G. H. ELWELL 2,020,277

AUTOMATIC CLOSING DEVICE FOR CASEMENT WINDOWS AND THE LIKE

Original Filed Nov. 18, 1932

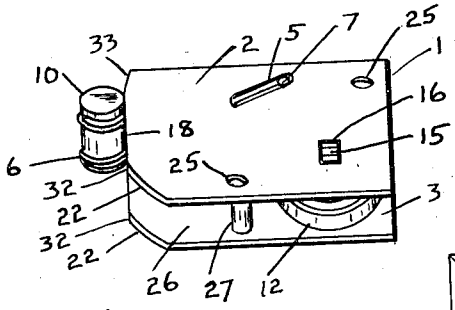


FIG 1

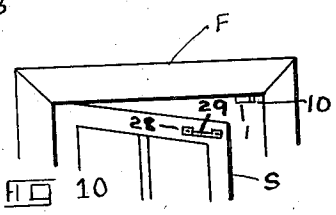


FIG 10

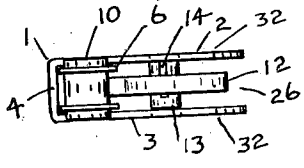


FIG 3

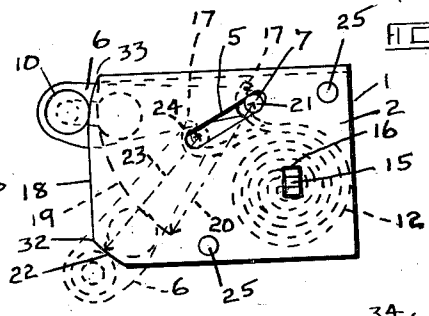


FIG 2

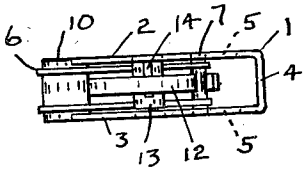


FIG 4

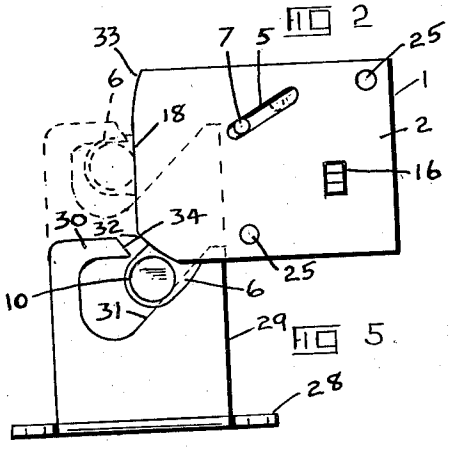


FIG 5

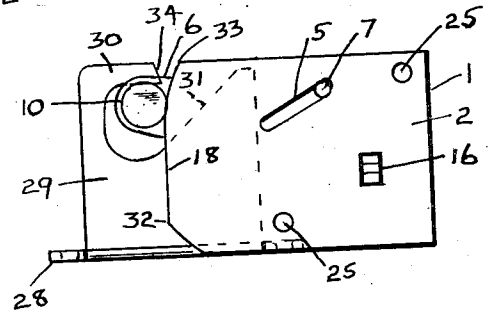


FIG 6

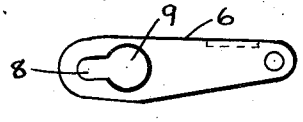


FIG 7

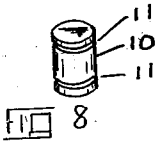


FIG 8

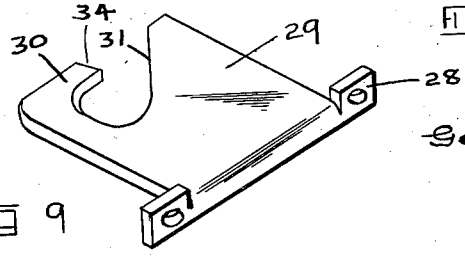


FIG 9

INVENTOR

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AUTOMATIC CLOSING DEVICE FOR CASEMENT WINDOWS AND THE LIKE

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Application November 18, 1932, Serial No. 643,161
Renewed March 22, 1935

5 Claims. (Cl. 292—71)

This invention relates to automatic closing devices for casement windows and the like, and the objects of the invention are to provide a closing device having great efficiency of performance, a low cost of production and compactness of structure; to provide a closing device having a maximum distance of window-sash drawing capacity; and to provide a closing device the members of which may be installed without close adjustment. With these and other objects in view, as will more fully hereinafter appear, the invention consists in certain features of novel construction and arrangement of parts hereinafter described, illustrated by the accompanying drawing and particularly pointed out wherein patentable novelty is claimed for certain features of the device, it being understood that, within the scope of what hereinafter may be claimed, various changes in form, proportion, size, adaptability and minor details of the construction can be made without departing from the spirit or modifying any of the advantages of the invention.

The character of the invention may be best understood by reference to one illustrative structure embodying the invention and illustrated by the accompanying drawing of which the Figure 1 is a perspective top and front view of one member of the device; the Figure 2 is a top view of the said member of which certain interior parts are illustrated by dotted lines; the Figure 3 is a left-hand end elevation of the said member; the Figure 4 is a right-hand end elevation of the said member; the Figure 5 is a top view of both members so relatively positioned as to be in readiness for operation, the dotted positions illustrating the members in process of operation; the Figure 6 is a top view of both members in interlocked relation; the Figures 7 and 8 are detail views of parts of mechanism; the Figure 9 is a perspective top view of a second member; and the Figure 10 is a fragmentary elevation of a swinging structure and frame with members of the device attached.

Your petitioner is aware that the art discloses closing devices for swinging structures in which the device permanently connects and controls the swinging structure with and from a support upon which the structure swings. The petitioner is further aware that it is old in the art to provide a closing device for installation upon a support for engagement, directly or through the agency of a second member, by a structure swinging on the support as the structure nears a closed position, the device thereby, upon such engagement, being operated to a certain point against spring tension that, from such point, said operation may be continued by spring tension. Without exception, so far as the petitioner is aware, this latter class of closing devices employs a toggle mechanism having a spring controlled lever or disk which first must be operated to a center at which the spring has its maximum tension and past which center the lever or disk must be forced before the device is capable of functioning to automatically close a swinging structure upon the untensioning of the spring. Such class of toggle closing devices provides the spring lever or disk with two at-rest positions between which the movement of the lever or disk is equally divided by the tensioning and untensioning of the spring element which, in both of said positions of said lever or disk, has a minimum tension. It is the purpose of this invention, therefore, to provide for a swinging structure a closing device which is an improvement upon the toggle spring device in that the improvement may provide for the tensioning of a spring upon a full movement, in one direction, of the lever or disk as may be accomplished by means of moving the swinging structure to an open position, thus providing in readiness for performance a fully tensioned spring the force of the untensioning of which is adapted to be applied to the final closing of the swinging structure.

Referring more particularly to the drawing, the member of the device containing the mechanism comprises the support or casing 1 made of sheet material and formed in U-shape to provide a top portion 2, a bottom portion 3 and a rear portion 4 connecting the portions 2 and 3. Each of the top and bottom portions 2 and 3 is provided with a slot 5 relatively oblique, as regards said rear portion 4, the superimposing slot 5 being illustrated by the Figures 1, 2, 5 and 6. The parallelly armed lever 6 is mounted at one end within the casing 1 by means of the pivot pin 7 the extremities of which slidingly engage within the oblique slots 5 to adapt said lever for a swinging reciprocating movement. The free ends of the parallel arms of the lever 6 are provided with superimposed perforations 8, each of said perforations 8 being provided with an enlargement 9. A cylindrically shaped stud 10, having the spaced peripheral grooves 11, is adapted to be passed into the enlargements 9 and shifted forwardly into the smaller perforations 8 into which the reduced circumference of the stud 10 at the peripheral grooves 11 is adapted to fit. A spring 12 of helical form, in which the convolutions are in a common plane, is mounted within the casing 1 by means of the post 13 having the longitudinally extending slot 14 within which the

inner end 15 of the spring 12 rests, the ends of the post 13 being formed to fit within the angularly formed perforations 16 of the top and bottom portions 2 and 3 of the casing 1 to prevent the turning of the post 13 within said perforations 16. The outer or free end 17 of the spring 12, under tension, is engaged by the pivot pin 7 so as to be carried thereby in the travel of the pivot pin 7 within the oblique slots 5 to further tension the spring 12. The left-hand edge of each of the top and bottom portions 2 and 3 of the casing 1 is substantially perpendicular to the rear portion 4 excepting that adjacent said rear portion 4 both of said left-hand edges are slightly rounded off and at the forwardly end of said edges the corners are removed, as illustrated by the Figure 1. The said left-hand edge of each of the top and bottom portions 2 and 3 of the casing 1, in the form just explained, provides, with special regard to the course and the relative position of the oblique slots 5 thereto, a cam surface 18 upon which the stud 10 is adapted to ride, the cam surfaces 18 cooperating to define a course which, from its base 33 adjacent the rear portion 4 of the casing 1, continuously recedes from the course of an arc 19 described on a radius 20 and having its center at 21, the low spring tension position of the sliding pivot pin 7. The peak 32 of the cam surfaces 18, adjacent the open face 26 of the casing 1, terminates in an arc 22 described by the radius 23 having its center at 24, the high spring tension position of the sliding pivot pin 7. The top and bottom portions 2 and 3 of the casing 1 are provided with superimposed screw-holes 25 adapted to receive screws presented thereto from either direction, thus adapting the casing 1 for attachment beneath a top surface of a frame F in the position illustrated by the Figure 1, or in the reversed position in which the top portion 2 becomes the bottom portion and the bottom portion 3 becomes the top portion thereof. The superimposed screw-holes 25, adjacent the open face 26 of the casing 1, are provided with the fixed hollow post 27 to maintain the top and bottom portions 2 and 3 against relative movement. A striker member of the device is made of heavy sheet material having the attaching end 28 in a plane perpendicular to the plane of the shank portion 29, said shank portion 29 having a cam portion 31 and a hook portion 30 provided with a cam-edged point 34.

In use, the casing 1 containing the mechanism of the device is attached, as aforesaid, to a window frame F, the open face 26 of the casing 1 placed flush against the casement window sash S. The casement window sash S is then partially swung open and the striker member of the device is attached to the sash S by means of screws inserted within the screw-holes of the attaching means 28 so that the shank 29 is properly aligned for insertion within the open face 26 of the casing 1, at the left-hand side of the post 27, as the window sash S is swung into closed position within the frame F. The members of the device being installed as aforesaid, the lever 6 is manually swung to ride the stud 10 over the cam surfaces 18 from the base 33 to the peak 32 thereof and onto the arc of rest 22. The said manual movement of the lever 6 forces the pivot pin 7 to slide forwardly within the slots 5, the pivot pin 7 carrying the outer end 17 of the spring 12 and thus moving against the increasing tension of said spring 12 until the stud 10 moves onto the arc of rest 22 when the tension of the spring 12 not only ceases to increase but the untensioning influence of the spring 12 is suspended thus permitting the stud 10 to rest on said arc 22 without the aid of a detent. With the stud 10 of the lever 6 at rest upon the arc 22 (as illustrated by the dotted position in the Figure 2 and also by the full line position in the Figure 5), and with the cam portion 31 of the striker shank 29 in engagement with the stud 10 upon the near closing of the window sash S, the stud 10 thereby is operated laterally off of the arc 22 and behind the hook portion of the striker member of the device, the stud 10, thus interlocked with the striker member, is thrown along the cam surfaces 18 to the base 33 by the untensioning of the spring 12 upon the return of the pin and slot connection of the lever 6 to its normally retired position, the thrown stud 10 carrying the striker member within the casing 1 and hence the casement window sash S within the frame F. Upon swinging open the window sash S, the striker, attached thereto and interlocked with the stud 10, pulls the stud 10, and hence the lever 6, across the cam surfaces 18 and onto the arc of rest 22 before the striker member becomes detached from its interlocked engagement with said stud 10, thereby tensioning the spring 12 and leaving the stud 10 in readiness for a reengagement by said striker member upon the closing of the sash S. The action of the lever 6 within the casing 1, upon the opening and closing of the sash S, is that of a swinging and simultaneous reciprocating movement, the spring control of the sliding pivot pin 7 being regulated by the movement of the stud 10 over the cam surfaces 18, the tension of the spring 12 being exerted substantially longitudinally of the lever 6, therefore, as the stud 10 rides forwardly over and to the peak 32 of the cam surfaces 18, the lever 6 is moved longitudinally against the increasing tension of the spring 12, the untensioning influence of which is exertable to return the lever 6 to its at-rest position, and hence to return the stud 10 from the peak 32 to the base 33 of the cam surfaces 18. The untensioning influence of the spring 12 being suspended while the stud 10 is at rest on the arc 22, all movement of the stud 10 while on said arc 22 must be accomplished by means of operative engagement of the stud 10 by means of either the cam portion 31 of the striker shank 29 or the cam portion 34 of the hook portion 30, the function of the cams 31 and 34 being to move the stud 10, in the instance of the cam 34, out of the path of the advanced hook portion 30 and, in the instance of the cam 31, to move the stud 10 off of the arc of rest 22, but, when the stud 10 is thus moved off the arc of rest 22 and over the peak 32, the untensioning influence of the spring 12 suddenly withdraws the longitudinally extended lever 6 and throws the stud 10 over the cam surfaces 18 the course of which, in the direction of the moving stud 10, is convergent with the arc 19. The latitude of installation of the members of the device upon the frame F and sash S, respectively, dispensing with close adjustment of the relative positions of the members of the device, wholly depends upon the length of the arc of rest 22 and the scope of lateral reach of the cam portion 31 of the striker member. While the device herein disclosed is intended for use in connection with casement windows, it may equally well serve the purpose

as a closing device for doors or any swinging structure supported by a frame.

I claim:

1. A fastening means for a swinging structure mounted on a frame, said means comprising a support having a cam surface, a spring-returned lever having at one end a pin and slot connection with said support and at the free end a rearwardly facing shoulder ridable upon said cam surface to a peak, and means for detaining said shoulder adjacent said peak for operative and interlocking engagement by a striker element.

2. A fastening means for a swinging structure mounted on a frame, said means comprising a support having a cam surface, a lever having at one end a pin and slot connection with said support and at the free end a rearwardly facing shoulder adapted to ride upon said cam surface to a peak as the lever advances on its pin and slot connection, spring means with which said connection is provided to normally maintain said lever against advancement, said cam surface terminating in an arc of which the center is the advanced position of said connection, whereby said shoulder is adapted to be engaged by a striker element having engaging means for removing the shoulder of said lever from off said arc and interlocking with said shouldered lever upon the spring return of said connection and consequent riding of said shoulder to the base of said cam surface.

3. An automatic fastening means for a swinging structure mounted within a frame, said means comprising a casing, a swinging lever provided within said casing, the lever being provided with a head having a rearwardly facing shoulder, a cam surfaced element upon which the shoulder of said lever may ride to a peak of said cam surface within said casing, the said lever and the cam surfaced element having a relative spring return movement, means adapted to maintain the lever adjacent said peak against the tension of said spring return, whereby said shoulder is adapted to be engaged by a striker element having an extremity adapted, as the swinging structure is moved into the frame, to release said lever and to interlock with said shoulder.

4. An automatic fastening means for a swinging structure mounted within a frame, said means comprising a casing, a swinging lever provided within said casing, the lever being provided with a head having a rearwardly facing shoulder, a cam surfaced element upon which the shoulder of said lever may ride to a peak of said cam surfaced element, a spring mounted within said casing and exerting a relative spring return movement of said lever and said cam surfaced element, and means adapted to separably maintain the lever adjacent said peak against the tension of said spring for engagement by a striker element having an extremity adapted, as the swinging structure is moved into the frame, to release said lever and to interlock with said shoulder and, upon the opening of the swinging structure, to restore the lever to said maintained position.

5. An automatic fastening means for a casement window sash swinging within a window frame, said means comprising a casing having upper, lower and rear walls and open face and ends, a swinging reciprocating lever having a movable connection within said casing, spring means to return said movable connection to a normal position, a stud carried by the free end of said lever, parallel edges of said upper and lower walls at one open end providing cam surfaces of which the forwardly course from said rear wall continually recedes from an arc of which the center is the normal position of said movable connection, the cam surfaces terminating at a peak beyond which the course of said edges form an arc of which the center is the extended position of said movable connection, said stud, during the forwardly movement of said lever, riding on said cam surfaces to tension said spring, but said tension, while the stud is positioned upon said last-named arc, being suspended for engagement of the stud by a striker element having an extremity adapted, as the window sash is swung into the frame, to interlock with and remove said stud from said last-named arc and onto said cam surfaces for the spring return of said lever while interlocked with the striker element and, upon the opening of the casement window, to restore said stud to the tension suspended position.

GEORGE HENRY ELWELL.