

Feb. 7, 1928.

1,658,693

H. SMITH

MEANS FOR OPENING OR CLOSING SLIDING WINDOWS AND THE LIKE

Filed April 6, 1926

2 Sheets-Sheet 1

Fig. 1.

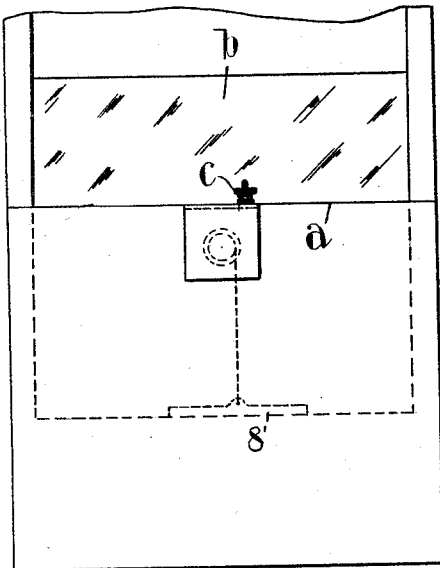


Fig. 2.

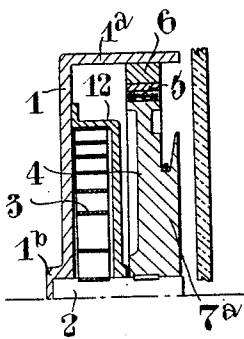
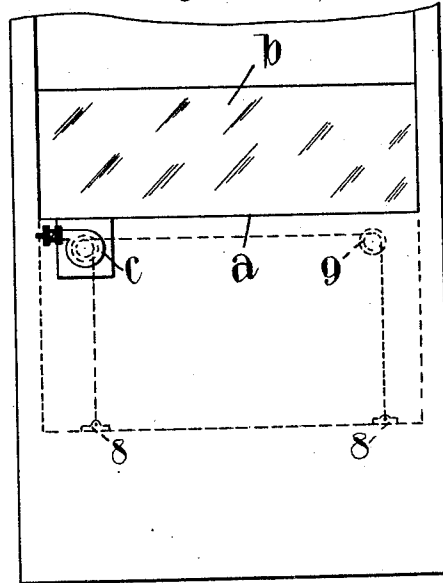


Fig. 9.

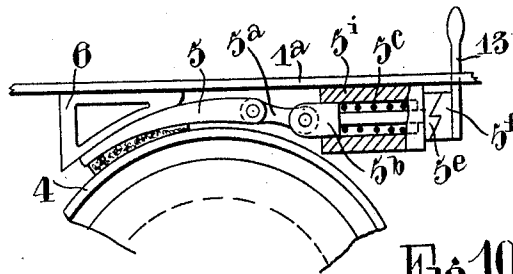


Fig. 10.

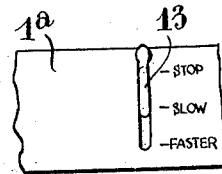


Fig. 11.

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2 Sheets-Sheet 2

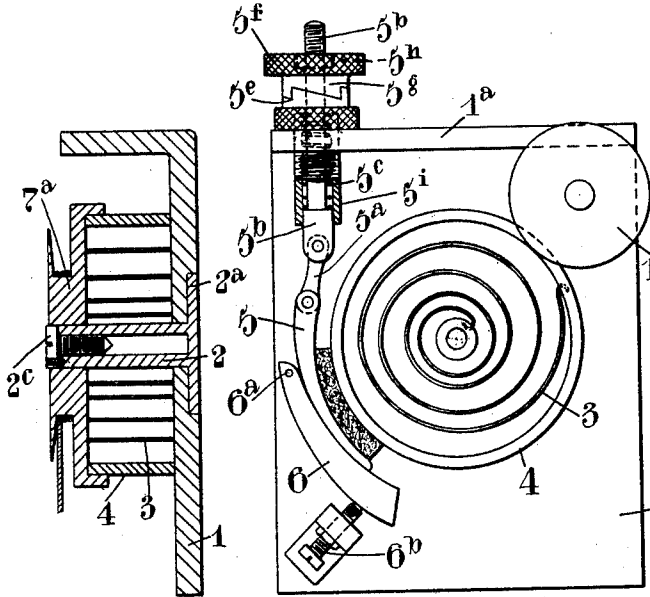


Fig. 3

Fig. 4

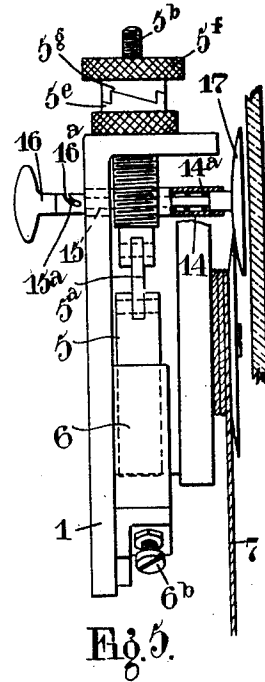


Fig. 5

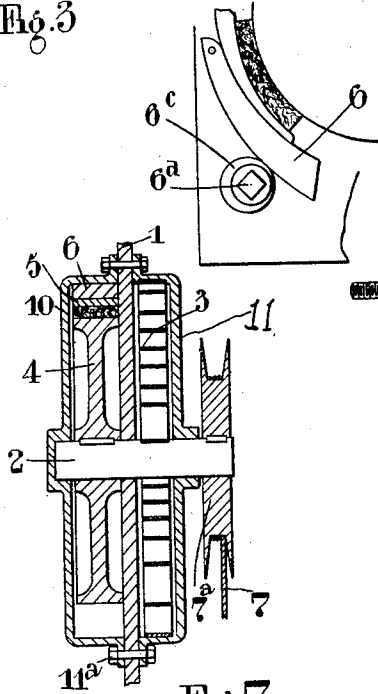


Fig. 7

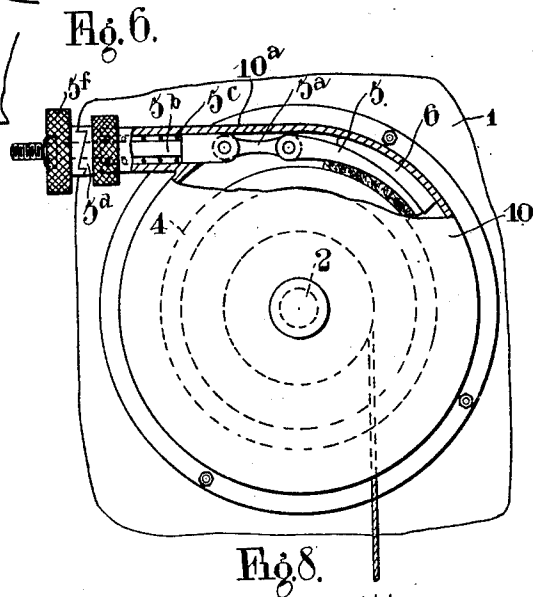


Fig. 8

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# UNITED STATES PATENT OFFICE.

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MEANS FOR OPENING OR CLOSING SLIDING WINDOWS AND THE LIKE.

Application filed April 6, 1926, Serial No. 100,132, and in Great Britain March 9, 1926.

This invention relates to means for closing or opening windows, doors or other sliding panels or members (hereinafter referred to as "windows") operating on the principle described in my prior United States patent application No. 66,374.

The invention has for its object the provision of certain improvements adapted to facilitate and cheapen the manufacture of the window-operating and control means while providing a compact form of device which is self contained and may be readily applied in association with a window of a motor car, railway carriage, ship's saloon or the like.

A further object of the invention is to provide, in combination with means of the above character for controlling a window, a device adapted to prevent the rattling or play of the window within its bed or guiding grooves.

The invention comprises the provision of a device for opening or closing a window which includes a rotary member or drum located with its axis at right angles to the plane of the window and having operative connection with the window and in association with which a brake device is provided for controlling the rotation of the drum. The rotary member is mounted in association with a spring adapted to cause the movement in one direction of the window and the braking means comprise a member or shoe having a wedge-like action upon the brake drum in one direction of movement.

According to the invention the means for preventing rattling or play of the window comprise a plunger element adapted to bear with resilient pressure towards the window and carrying a resilient pad of rubber or other material, preferably of dished or cupped form so that when pressed against the window by its resilient means it engages the window with a suction action. Manipulative means are provided for moving the resilient pad or suction element into and out of engagement with the window.

In the accompanying drawings:—

Figures 1 and 2 are general diagrammatic front elevations of a motor car door showing a sliding window and indicating the positions or mounting of a device according to the invention thereon;

Figure 3 is a central sectional elevation of a window-raising and control device according to the invention;

Figure 4 is a rear view of one form of the device seen in section in Figure 3;

Figure 5 is a side elevation of the device shown in Figure 4;

Figure 6 is a detail view showing an alternative mode of adjustment for the abutment member seen in Figure 4;

Figure 7 is a sectional side elevation of an alternative form of window-raising and control device according to the invention, while

Figure 8 is a front view of the device shown in section in Figure 7;

Figure 9 is a fragmentary sectional elevation of another alternative form or arrangement of the device for raising and controlling a window according to the invention, and

Figure 10 is a fragmentary view illustrating the part of the device shown in Figure 9 associated with the brake shoe or member and its manipulating means;

Figure 11 is a detail plan view of the top of the plate seen in Figures 9 and 10 showing the lever form of control in association with an indicator.

In carrying the invention into effect according to one convenient mode, by way of example, a plate, bracket or frame member 1 is provided and adapted to be connected to or mounted upon the framing of a motor car door or the like adjacent the sill *a* of the window *b* (see Figure 1 or 2). This plate or frame 1 carries the window-raising and control means (indicated by the general reference *c*—Figures 1 and 2) according to the invention and may be secured in the desired position by aid of screws or it may be so mounted that it may be displaceable or readily detachable from the door for inspection or repairs by the aid of any suitable means, such as hinges or catches, or by being mounted in grooves within which it may be slid into position and secured.

The plate 1 is formed with or has mounted upon it a short stub axle or spindle 2 extending therefrom towards the window so that the axis of the spindle is at right angles to the plane of the window. This stub axle may be hollow and internally threaded at

its inner end while having a flange or disc 2<sup>a</sup> for securing it to the plate 1. The plate is preferably formed with an angle-piece 1<sup>a</sup> which is adapted to reside over the sill of the window.

A flat spiral spring 3 has its inner end anchored to the stub axle while its other end is secured to the inner periphery of a rotary member 4 which is in the form of a casing for the spring, the arrangement being such that the spring is adapted to promote rotary motion in the casing member 4.

It is preferred that the rotary member should take its bearing upon the stub axle. The outer periphery of the rotary casing or drum 4 is adapted to function as one member of a braking device and to this end its outer periphery may be turned or otherwise formed for engagement with a brake member or shoe. If desired, the casing may be flanged on one or both sides at its outer periphery with a view to providing a guide for the operations of a brake shoe or member adapted to co-operate with the periphery of the rotary casing.

The preferred form of brake shoe or member comprises a wedge-shaped piece 5 of curved form adapted to slide with an arcuate movement upon the outer periphery of the brake drum and operate in association with a correspondingly formed abutment surface member 6. The shoe may have a fibrous or woven brake lining. An abutment surface is provided and may be carried by the mounting plate or it may be supported upon any suitable fixture, the arrangement being such that the brake shoe 5 may be drawn into intimate contact with the brake drum in one direction of rotation thereof with a wedge-like action between the drum 4 and the abutment 6, while in the other direction of motion the shoe is pushed away by the movement of the drum. Manipulative control means are provided for determining the position of the brake shoe as will be hereinafter described.

The operative connection between the rotary member and the window is by means of a flexible connection 7 wound upon a drum or pulley surface coaxial with the stub shaft. According to one form a pulley or the like 7<sup>a</sup> of lesser diameter than the brake drum 4 is mounted alongside such and may be integral with the drum 4 or may be formed as a separate piece secured thereto; for example, the pulley may be in one with a cap for the drum, as shown in Figures 3 and 5, where the drum 4 has a disc-like lateral lid or closure member mounted on the shaft 2 and fitting over the drum. The pulley and drum may be laterally secured by a screw 2<sup>c</sup> engaging the screw thread of the hollow axle 2.

According to an alternative form, the rotary brake casing may be laterally extended

to afford a drum or pulley surface upon which the flexible connection may be wound. The flexible connection 7 (or connections) may be in the form of a wire or in the form of a tape or web of leather, gauze or other material, such being connected to the window by means of a suitable clip or fastening 8.

According to one arrangement (see Figure 1) of mounting the device the flexible connection may unwind over the vertical centre line of the window so that the pull is directed immediately in line with the centre of gravity. In this case the window clip 8 has an extended transverse contact with the window with a view to enabling the latter to be smoothly raised and lowered within its grooves. Alternatively (see Figure 2), a pair of flexible connections 7 may be employed which may be interwound upon one and the same pulley member, or a pair of pulley members side by side may be employed. In this latter case a guide pulley (or pulleys) may be employed for directing the pull of the flexible connections at the desired points upon the lower edge of the window. Also, in this form the device may be mounted towards one side (for example, the hinged side) of the door and one flexible connection 7 may extend vertically beneath the device to a clip or fastening 8 while the other is carried out at right angles over a guide pulley 9 to the opposite side of the window and down to a second clip 8.

The brake shoe 5 is preferably pivotally connected (or by the aid of a link 5<sup>a</sup>) to a plunger rod 5<sup>b</sup> upon which a spring 5<sup>c</sup> operates normally tending to thrust the brake shoe 5 into engagement with the rotary member 4 and abutment 6. This spring-pressed plunger 5<sup>b</sup> may be housed within a cylindrical casing member 5<sup>d</sup> or other guiding means may be provided, and a screw cap or other device may be employed for the purpose of varying the tension of the spring. The outer end of the plunger is adapted to be connected to (or have mounted thereon) manipulative control means. For example, the end of the rod may be screw threaded and engaged by a correspondingly screw-threaded knob or handle device so that rotation of the latter causes the brake shoe to be withdrawn from its arresting position while rotation in the other direction permits the full braking action to take place. The knob device may be provided with a pointer adapted to co-operate with an indicator or scale which may show the arresting or stop position, an indication for slow movement of the window and an indication for fast or freer movement of the window.

According to another form of manipulating means, the outer end of the plunger casing member 5<sup>c</sup> may have a collar 5<sup>d</sup> the

outer surface of which is provided with a plurality of cam teeth 5<sup>a</sup>. Upon the outer end of the spindle 5<sup>b</sup> is rotatably mounted a knob or cap 5<sup>c</sup> the inner side of which is provided with a plurality of cam teeth 5<sup>d</sup> corresponding with the cam teeth 5<sup>a</sup>. The cap 5<sup>c</sup> may be secured in position by a nut 5<sup>e</sup> upon the rod 5<sup>b</sup>.

In operation the rotation of the knob causes the cam teeth to rise upon one another and promote an axial displacement of the spindle 5<sup>b</sup> together with the brake shoe 5. The cam teeth are arranged so that should the person operating the window tend to turn the knob too far, the teeth slip over one another and the knob drops back to its original position, thus preventing the shoe from being withdrawn too far away from the brake drum and thus allowing the spring to slam the window up without restraint.

It is necessary under all conditions to provide means whereby the brake is never completely withdrawn from its action upon the drum and to this end a cam device as described above may be employed or, alternatively, a stop device may be provided, either in association with the plunger or in connection with the rotary knob or control member, so as to limit the amount to which the shoe may be withdrawn.

The provision of a stop or equivalent means for limiting the movement of the shoe affords a modified braking action which may be conveniently utilized in connection with a window for a driver's seat so that the driver may push down the window and put out his arm for signalling. When the driver withdraws his arm the window will return slowly to its closed position automatically owing to the brake setting.

In carrying the invention into effect according to the mode illustrated in Figures 7 and 8, a plate 1 is provided with a shaft 2 which is rotatably mounted in bearings formed by a pair of casings 10 and 11 which are provided, respectively, over a brake drum member 4 and a spring member 3, the casing 10 with the brake drum 4 residing on the outer side of the plate 1. If desired, the plate 1 may form a third or central bearing for the shaft or it may be provided with a clearance around the shaft. The brake drum 4 is keyed or otherwise secured to the shaft 2 and the spring 3 has its inner end fixed to the shaft 2 and its outer end anchored to the casing 11. Both the casings 4 and 11 may be secured to the plate 5 by the aid of flanges with which they may be provided and small bolts or screws 11<sup>a</sup>.

The shaft 2 is positioned with its axis at right angles to the plane of the window and the inner end of the shaft has fixedly mounted upon it a pulley 7<sup>a</sup> from which the

flexible connection 7 extends to the lower edge of the window.

The casing 10 is provided with an extension 10<sup>a</sup> substantially tangential to the drum 4 and adapted to operate as a housing for a spring plunger 5<sup>b</sup> upon which the brake shoe 5 is carried. The plunger 5<sup>b</sup> may be controlled by a knob 5<sup>c</sup> having cam teeth which operate in association with similar cam teeth on a collar member of projection 5<sup>d</sup> corresponding to that described in connection with Figure 4. Between the shoe 5 and the casing 10 an abutment member 6 is mounted.

In this form of the invention the plate 1 need not be provided with an angular portion but may be a plain rectangular or circular member adapted to be secured adjacent the sill in the desired position and it may be so mounted that the extension 10<sup>a</sup> with the manipulating member 5<sup>c</sup> may extend from the casing horizontally or vertically or in any other situation which may be found most convenient to the hand of the operator according to the nature of the application of the invention or the situation in which the device is to be employed.

According to another modification as illustrated in Figures 9, 10 and 11, a mounting plate 1 is provided with a portion 1<sup>b</sup> adapted to act as one of the bearings for a rotary shaft 2, the other bearing being provided by a casing 12 secured to the inner side of the plate 1. This casing is adapted to enclose the spring 3 which is secured to the shaft on the one hand and to the casing 12 on the other.

Outside the casing and nearer the window a brake drum 4 is rigidly mounted upon the shaft and has laterally associated with it a pulley 7<sup>a</sup> which may be formed integral with the drum or may be separate therefrom and attached thereto. Alternatively, the pulley may be mounted directly upon the shaft 2.

The angular part 1<sup>a</sup> of the plate 1 is adapted to support the abutment 6 of the brake shoe 5, the latter being provided with a spring-pressed plunger 5<sup>b</sup> of the kind already described mounted in a housing or casing 5<sup>c</sup> carried by the angular part 1<sup>a</sup> of the plate. The control movement of the plunger may be effected by cam means indicated by the general reference 5<sup>e</sup> in Figure 10 so that by the partial rotation of the member 5<sup>e</sup> axial movement is imposed upon the plunger and the brake shoe. Rotary motion may be communicated to the member 5<sup>e</sup> by means of a lever 13 which extends upwardly through a slot 13<sup>a</sup> in the angle portion 1<sup>a</sup> of the plate. An indicator shown at 13<sup>b</sup> may be provided for showing the different positions of the lever.

Instead of providing a lever which operates transversely of the angle portion 1<sup>a</sup>, the lever may be mounted so that it operates longitudinally thereof or in a direction par-

allel to the window. In this case the arm 13, instead of operating upon the shoe and the plunger with a rotary action, may function through a simple pivoted leverage or sliding cam.

In each of the forms described above it is preferred to mount the abutment 6 upon a pivot, such as 6<sup>a</sup> (see Figure 4) so that its position with respect to the drum may be adjusted. The adjustment means may comprise a set screw 6<sup>b</sup> or the movement of the abutment towards and away from the drum may be effected by a pivoted eccentric member, such as 6<sup>c</sup>, shown in Figure 6. The position of the eccentric may be adjusted by a key applied to the squared end 6<sup>d</sup> of the eccentric mounting.

The means for preventing rattling of the window may be applied to any of the forms in which the invention is carried into effect but is illustrated in the drawings in association with Figures 4 and 5. Towards one corner of the plate 1 in any suitable situation a housing or guide sleeve 14 is provided for a spring 14<sup>a</sup> which is adapted to act upon a plunger rod 15. The outer end of the plunger rod extends through the plate and is provided with a pin 15<sup>a</sup> adapted to be engaged in a cam slot 16<sup>a</sup> in the sleeve of a knob or manipulating member 16. The spring operates so that it tends to force the plunger 15 towards the window and by rotation of the knob 16 and the operation of the slot 16<sup>a</sup> upon the pin 15<sup>a</sup>, the plunger may be retracted. The outer end of the plunger is provided with a rubber cushioning member which is preferably in the form of a dished or cup-shaped disc 17. When the anti-rattling device is put into action the spring 14<sup>a</sup> presses the dished disc or washer 17 against the window so that it engages therewith with a suction action and prevents the same from rattling or having undue play in its guide grooves. The member 17 may be retracted out of engagement with the window by a simple turn of the knob 16.

As an alternative to providing an abutment member having a fixed surface against which the shoe slides, a member may be provided which has a roller or ball contact with the shoe member or a plurality of rollers and balls may be provided. For example a pair of rollers may be disposed with their axes parallel and so that the back of the shoe slides against these rollers, or a single roller may be provided in the region of the centre of movement of the shoe.

Having now described my invention, what I claim as new and desire to secure by Letters Patent is:—

1. A device for raising or lowering sliding windows and the like comprising a rotary brake drum and a pulley drum coaxially mounted and positioned with their axes at right angles to the plane of the window,

a spiral spring operatively connected with the pulley drum, a flexible element upon the pulley drum operatively connecting the drum with the window, a brake member adapted to engage the brake drum with a wedge-like action in one direction of rotation thereof, an abutment between which and the drum the brake member is adapted to move and manipulative means for determining the operative functions of the brake member.

2. A device as claimed in claim 1 and having the pulley drum located at a tangent to the centre line of the window so that the flexible member exerts a pull vertically below the centre of gravity thereof.

3. A device as claimed in claim 1 and having a shaft whereon the brake drum, pulley and spring are mounted, extending at right angles to the plane of the window.

4. A device for raising or lowering sliding windows and the like comprising a mounting plate adapted to be secured parallel to the plane of the window, a stub axle extending from said plate towards the window and at right angles to the plane thereof, a rotary brake drum, pulley and a spring mounted on said axle, a flexible member wound upon the pulley and connected to the window, a brake member adapted to engage the drum with a wedging action in one direction of rotation thereof and manipulative means for controlling the operative functions of the brake member.

5. A device as claimed in claim 1 and wherein an indicator is provided in association with the manipulative means to show the operative position of the brake member.

6. A device as claimed in claim 4 and wherein an indicator is provided in association with the manipulative means to show the operative position of the brake member.

7. A device as claimed in claim 1 and comprising a spring tending to thrust the brake member into engagement with the brake drum and wherein the abutment member is mounted towards one end upon a fixed pivot about which it may rotate and means are provided for adjusting the angular position of the abutment about the pivot.

8. A device as claimed in claim 1 and comprising a spring tending to thrust the brake member into engagement with the brake drum and wherein the abutment member is mounted towards one end upon a fixed pivot about which it may rotate, and an eccentric member is provided for adjusting the angular position of the abutment about the pivot.

9. A device for raising or lowering sliding windows and the like comprising a mounting plate parallel with the plane of the window and having a right-angled part at its upper end adapted to lie along the window sill, a rotary drum and a pulley member coaxially mounted and positioned on the

mounting plate with their axes at right-  
angles to the plane of the window, a spiral  
spring operatively connected with the pulley,  
a flexible element upon the pulley operative-  
ly connecting it to the window, a brake mem-  
ber adapted to engage the brake drum with  
a wedge-like action in one direction of ro-

tation, and manipulative means for deter-  
mining the operative functions of the brake  
member.

In testimony whereof I have signed my  
name to this specification.

HENRY SMITH.