Jan. 13, 1931. W. A. ROTHHOLZ 1,789,115

AUTOMATIC RELEASING MECHANISM

Original Filed June 7, 1928 2 Sheets-Sheet 1

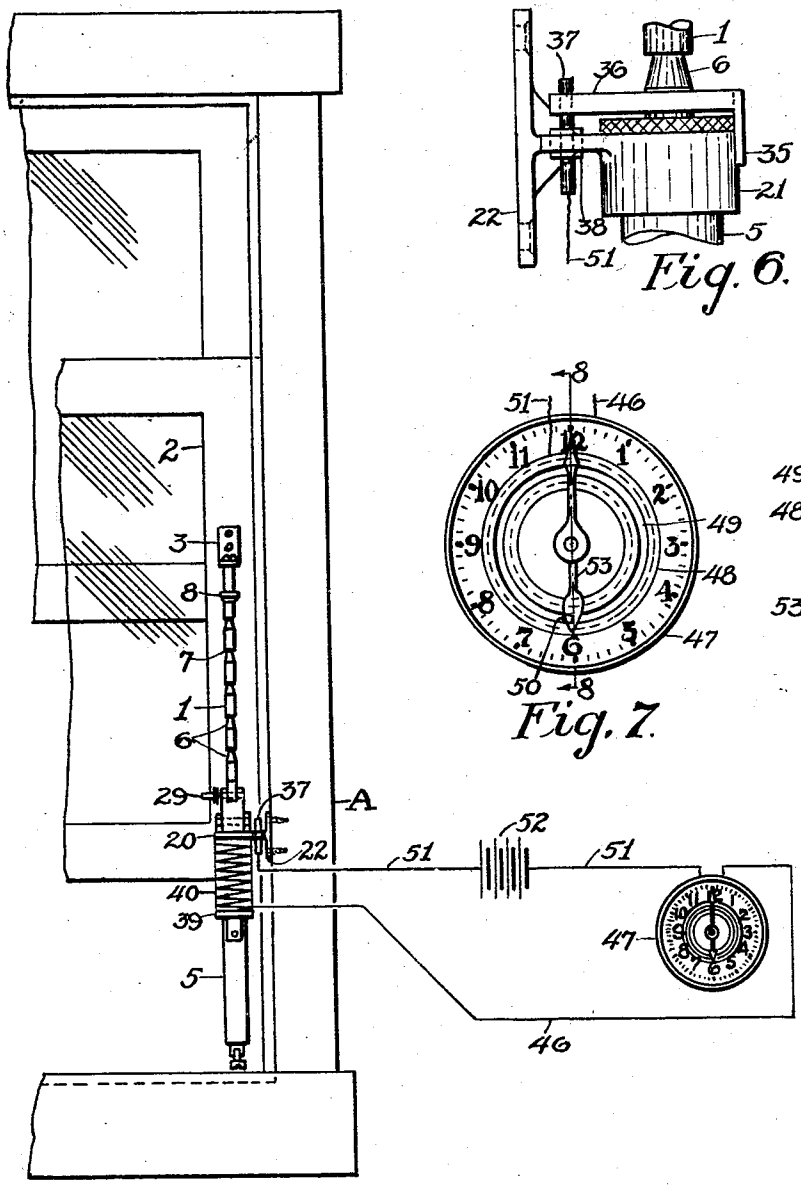


Fig. 1.

Fig. 6.

Fig. 7.

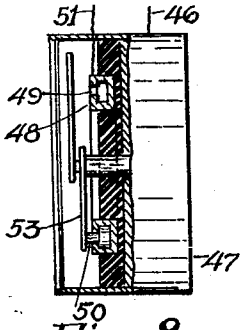


Fig. 8.

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AUTOMATIC RELEASING MECHANISM

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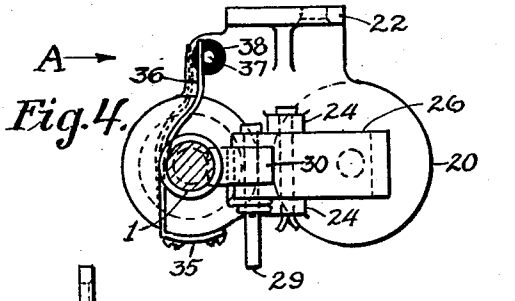


Fig. 4.

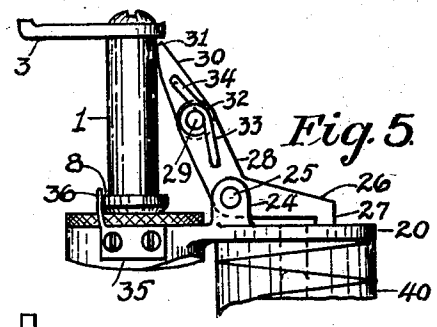


Fig. 5.

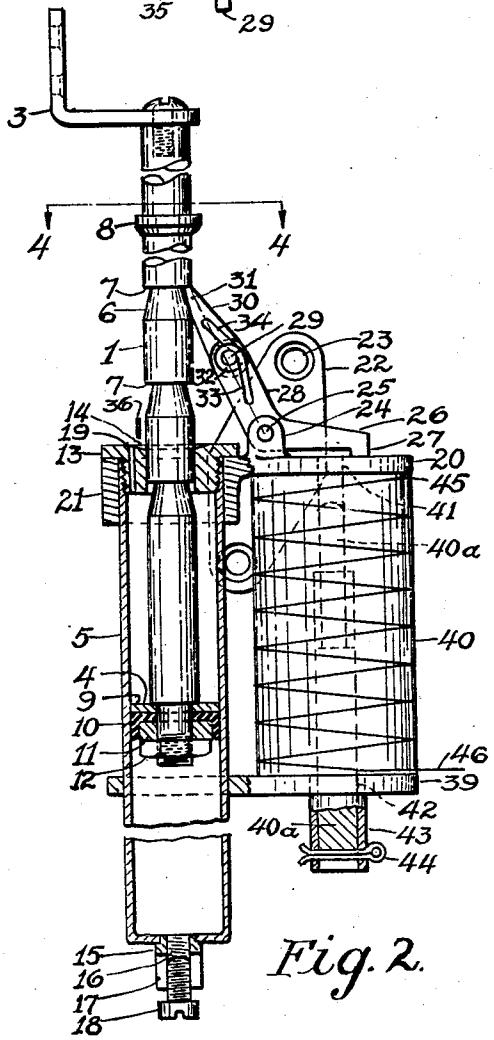


Fig. 2.

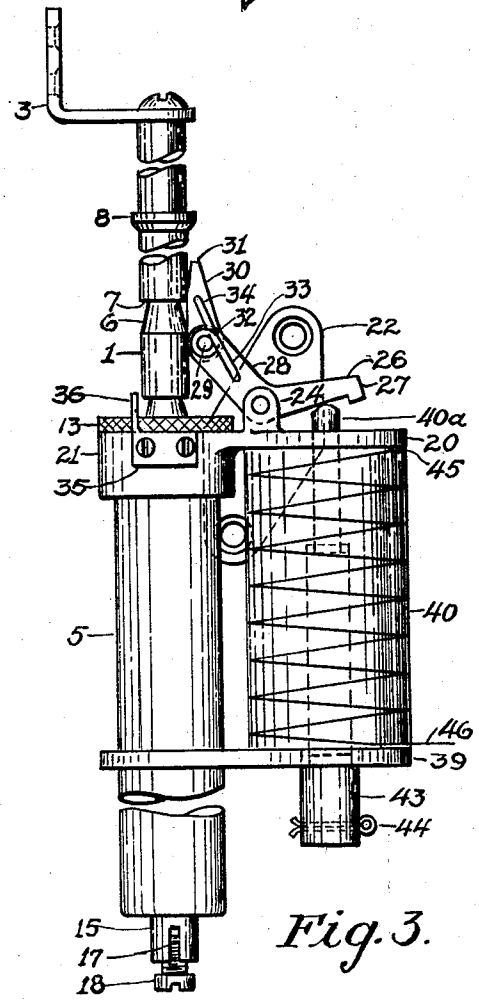


Fig. 3.

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Patented Jan. 13, 1931 1,789,115

UNITED STATES PATENT OFFICE

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AUTOMATIC RELEASING MECHANISM

Application filed June 7, 1928, Serial No. 283,707. Renewed September 29, 1930.

This invention relates to a time-controlled supporting and releasing device for holding a movable object in a vertical plane at a predetermined time and automatic means to allow the movable object to fall by gravity.

The principal object of the invention is to provide a device of this character having means to latch a movable object in a given position and time controlled means to trip the latch so the object can drop by its own weight.

Another object of the invention is to provide a device of this nature having means to latch a movable object in a given position, time controlled means to trip the latch so the object can fall of its own weight and means to cushion the fall of the object.

A further object of the invention is to provide a device having adjustable means to retain a movable object in a variety of set positions, time controlled means to trip the retaining means so the object can fall of its own weight and means to regulate the rate of descent of the movable object.

Other objects will appear as the disclosure progresses. The drawings are intended merely to indicate a possible embodiment of the invention. It is therefore not intended to limit the disclosure to the embodiment illustrated but rather to define such limits in the appended claims.

The invention is herein shown applied to a window sash whose counter weights are less than the weight of the sash or to a window sash without any weights. However I do not wish to limit myself to this specific form of application as this device can be applied to a large variety of uses.

In brief the invention consists of a rod having the upper end fastened to a window sash and the bottom end arranged to slide in a cylinder, a series of notches in the rod for engaging a pawl, and so arranged that the sash can be opened and retained in a variety of positions, and an electromagnet actuated by a time clock for tripping the pawl so as to disengage with the notches and allow the sash to drop by force of gravity.

Figure 1 is a view of a window sash showing the device attached thereto.

Figure 2 is a detached view of the device partly in section showing the sash holding means in set position.

Figure 3 is a similar view as Figure 2 but with the holding means in a released position.

Figure 4 is a section on line 4—4 of Figure 2.

Figure 5 is a fragmentary elevation showing the adjustable sash holding means in the lowered position.

Figure 6 is a fragmentary view looking in the direction of arrow A of Figure 4.

Figure 7 is a view of the clock mechanism for controlling the device.

Figure 8 is a section on line 8—8 of Figure 7.

Referring now to the drawings in detail in which like reference characters denote like parts throughout the specification, numeral 1 designates a vertical rod the upper end of which is attached to a window sash 2 by the bracket 3. Fastened to the lower end of the rod is a piston 4 adapted to move in a cylinder 5.

Cut in the rod 1 is a plurality of sloping notches 6 forming shoulders 7. At the top of the rod is a collar 8 the function of which will be described later.

The piston comprises a plate or follower 9, a leather cup 10, a cup retainer 11, and a piston holding nut 12. The cylinder is threaded at the top to receive a threaded plug 13 having an oil or lubricating receiving pocket 14.

Means are provided in the cylinder to break the suction at the bottom when the piston moves up and also to vent the cylinder when the piston moves down which consists of a tubular member 15 having an interiorly threaded hole 16 and slots 17. Into the threaded hole 16 is inserted an adjusting screw 18. It will thus be seen that on the upstroke of the piston air will be able to pass into the cylinder through the slots 17 and prevent the piston from binding. On the downward stroke of the piston the function of the suction preventing means is reversed. When moving downwardly the rate of descent of the piston and sash can be

regulated by adjusting the air compression formed in the cylinder below the piston. For allowing the sash to drop slowly the opening of the slots 17 is lessened so as to allow the air to pass out gradually, and for allowing the sash to drop quickly the opening is increased so the air can pass out at a faster rate. The plug 13 is vented as at 19 in order to break the suction and prevent air compression in the cylinder above the piston.

Numeral 20 designates a bracket for fastening the device to a window frame as shown in Figure 1. The bracket comprises a hub 21 centrally bored to receive the cylinder 5 and extending vertically from the bracket there is a flange 22 with holes 23 therein for attaching the bracket to the window frame. On the top face of the bracket there extends upwardly lugs 24 having holes therein to receive a pin 25 on which a tripper 26 is mounted. The tripper extends horizontally and has a downwardly extending lug 27 to leave a space above the opening provided for the solenoid core to prevent air binding of said core within the solenoid. The tripper 26 has an upwardly extending arm 28 with a hole through its end to receive a pin 29 which passes through a pawl 30 having its upper end 31 shaped on one side to conform to the contour of the notches 6. Wound around the pin 29 is a coiled torsion spring 32. Said spring has an extension 33 which is inserted into the tripper arm 28 and an opposite extension 34 which is inserted into the pawl 30.

Fastened to the hub 21 of the bracket 20 is a spring 35 having a horizontally extending arm 36 and adapted to contact with an electrical contact post 37 supported in an insulated member 38 in the bracket 20.

Attached to the cylinder 5 by any appropriate means is a support 39 for an electric solenoid 40 which is fastened between the underside of the bracket 20 and the support 39. For the movement of the iron core 40*a* of the solenoid there is a hole 41 provided in the bracket 20.

When an electric current by which this mechanism is operated is open, the bottom end of the core 40*a* drops through a hole 42 in the support 39 into a tubular member 43. Passing through the walls of the member 43 is a pin 44 on which the bottom of the core rests when the solenoid is not energized.

The solenoid 40 is grounded to the bracket 20 at 45. From the solenoid a lead wire 46 runs to a clock 47 and is grounded thereto. Fastened to the clock and insulated therefrom is a circular member 48 having a groove 49 in which is adapted to move a contact member 50. The said contact member can be set to any time place on the clock within the reach of the hands. The lead wire 51 is connected to the circular member 48, runs to a battery 52, and thence connects with the binding post 37.

A form of clock has been described which will operate this device but any type of clock having provisions therein to perform the functions herein described can be used.

The operation of this device is as follows:

To the inside of the window frame as shown at A in Figure 1 the supporting and releasing mechanism is permanently fastened by means of screws passing through the holes in the bracket 20. The bracket 3 which is attached to the top of the rod 1 is fastened to the window sash 2 which is then raised to any desired height within the length of the stem 1. The spring 32 with its extensions 33 and 34 forces the tripper 28 and pawl 30 to take position with its upper end 31 fitting into the notch 6, as shown in Figure 2. The weight of the window sash on the pawl makes its pivot point, which is the pin 29, bear outwardly because the line of force from the weight of the sash is inside of a line drawn from the upper end of the pawl 31 to the pivot pin 29 of the tripper 28 and thereby causes the lug 27 to bear against the bracket 20 and retain the sash in an open or raised position.

The time at which the sash has been predetermined to close is set by placing the contact 50 at the desired position on the clock. At this set time when the clock hand 53 is in contact with the contact member 50 an electric circuit from the battery 52 is closed and the solenoid core 40*a* is pulled up rapidly by the magnetic field of the solenoid 40 and hits the underside of the tripper 26 thereby causing same to pivot on the pin 25 pushing the arm 28 inwardly and downwardly which action pulls the pawl 30 out of the notch 6 as shown in Figure 3, holding this position as long as the electric current is closed and allows the window sash to fall by its own weight. To prevent the sash from lowering too rapidly and with a shock there is provided an air cushion at the bottom of the cylinder 5 by having the cylinder piston compressing the air within the cylinder. The amount of the compression of the air cushion can be regulated by the adjusting screw 18 permitting more or less compressed air to escape through the slots 17. The slots or air passages also provide means for easy lifting of the rod 1 and its attached sash by permitting an inflow of air thus preventing a suction within the cylinder to retard the lifting of the sash.

When the sash reaches a closed position the collar 8 comes into contact with the spring arm 36 pushing same out of contact with the post 37 as shown in dotted lines in Figure 4 thereby opening the electric circuit, causing the solenoid core 40*a* to drop and permitting the spring 32 to cause the tripper 28 and pawl 30 to take the position as

shown in Figure 5 ready for another setting of the sash in a raised position.

For releasing the sash supporting means manually the pin 29 can be used to trip the pawl 30 by giving the pin an inward movement towards the rod 1.

Having described my invention, I claim:

1. In a device of the class described, the combination of a window sash, of a vertical rod attached thereto, a plurality of notches in said rod, a pawl engaging any of said notches, an electro-magnet for tripping said pawl, an electric circuit, time controlled means for controlling the operation of said magnet, a collar at the top of said rod, a spring like contact member, said contact member engaging with a terminal of the electric circuit when the rod and sash are manually raised, and disengaged with the terminal and thereby opening the circuit when the rod is lowered by the said collar forcing the spring like member out of contact with the said terminal.

2. In a device of the class described, the combination of a window sash, of a vertical rod attached thereto, a plurality of notches in said rod, a pawl engaging any of said notches, an electro-magnet for tripping said pawl, an electric circuit, time controlled means for controlling the operation of said magnet, a collar at the top of said rod, and a spring like contact member, said contact member engaging with a terminal of the electric circuit when the rod and sash are manually raised, and disengaged with the terminal and thereby opening the circuit when the rod is lowered by the said collar forcing the spring like member out of contact with the said terminal.

3. In a device of the kind described, a gravity operated notched latch rod having downwardly facing notches, a bell crank pivoted at its angle adjacent said rod and having one arm projecting upwardly and inclined toward the rod, a pawl pivoted to the end of said arm and movable into alinement therewith to engage a notch thereof and movable out of alinement to permit the pawl to disengage from the notch, a spring engaging said arm and pawl and urging the pawl into alinement with the arm, said bell crank having its other arm extending from the pivot away from the rod, and means for engaging the second arm to tilt the first arm toward the rod and bring the pawl parallel to the rod.

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

WILLIAM A. ROTHHOLZ.