Oct. 31, 1950 C. K. STEINS 2,528,396

DEVICE FOR RAISING NORMALLY CLOSED WINDOW SASHES

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FIG. 1.

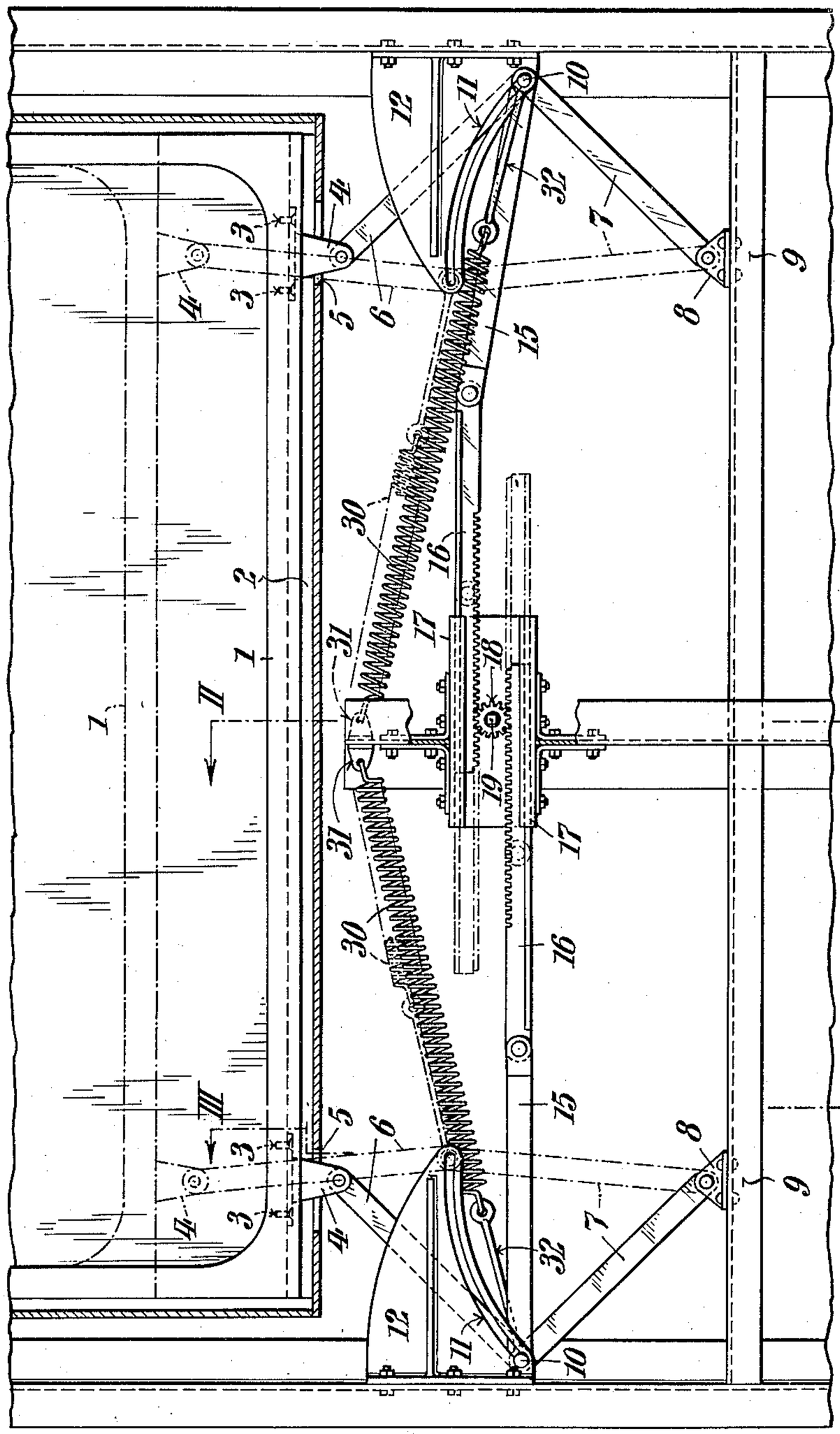

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FIG. 2

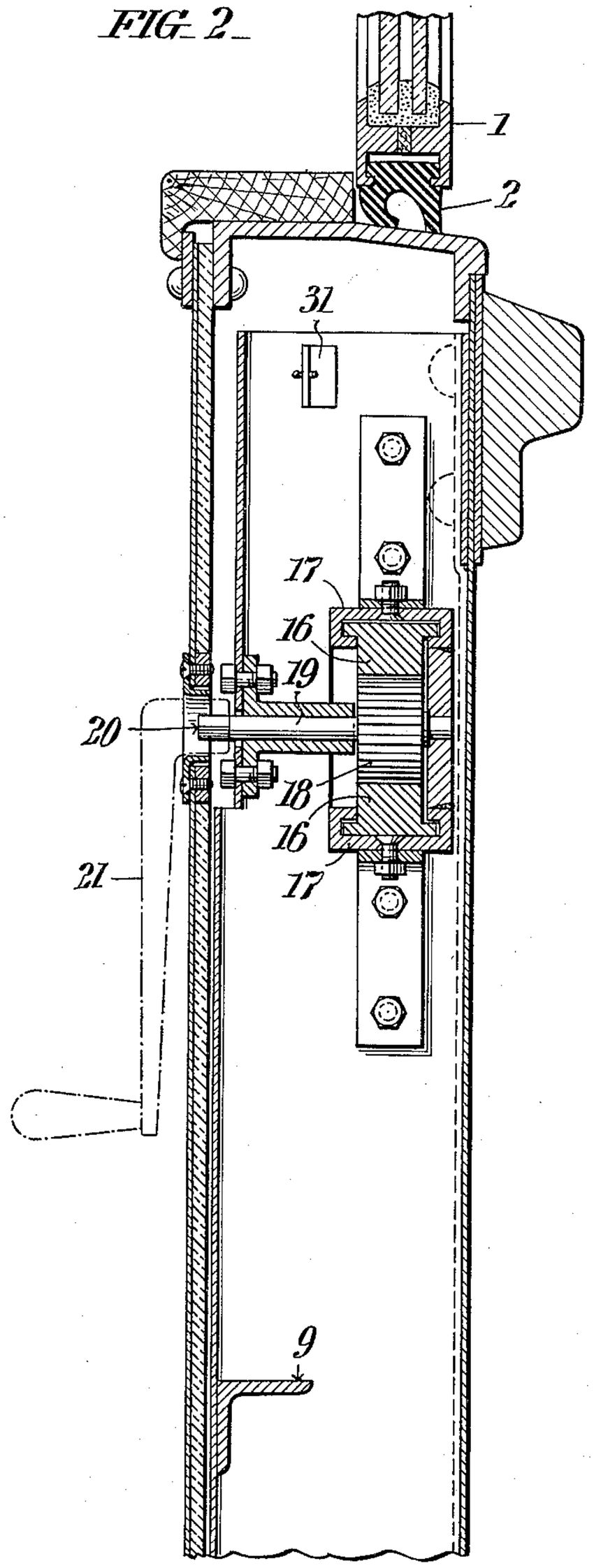
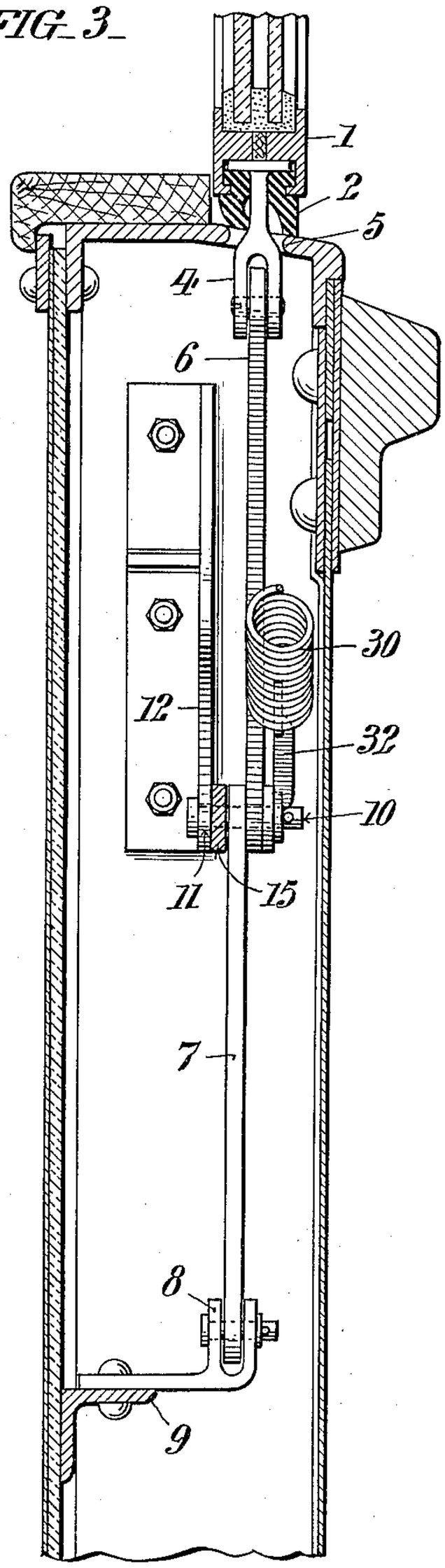


FIG. 3



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UNITED STATES PATENT OFFICE

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DEVICE FOR RAISING NORMALLY CLOSED WINDOW SASHES

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3 Claims. (Cl. 268—122)

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With the installation of air conditioning for railroad cars has come enlargement of the car window and corresponding increase in the weight of the sash and consequent difficulty in raising it; for it is not desired that the window be ever opened except in an emergency, and then only by a trainman. But at times the air conditioning may fail and it may become necessary for the trainman to open windows and my invention relates to a special construction of window-raising apparatus designed for use under such conditions. This window raising device is not to be operated by the passenger but is designed when operated by a trainman to effect powerful and even upward thrust of the window sash without any tendency to skew or tighten, and it is one which is installable in the car wall without weakening any of its structural elements.

More specifically my invention essentially comprises opposed spring influenced toggle-joints each with its own elbow pivot, each said pivot coacting with a curved slot-way in an associated stationary element, and one extremity of said slot-way corresponding to a point slightly beyond and lower than the position of the elbow pivot when the toggle-joint is fully extended, whereas the other extremity of said slot-way corresponds to the point of full collapse of the toggle-joint whereby, when the window is open it is positively restrained against vibratory movement by combined spring influence and the weight of the sash, and when closed it is so held by a definite stop independently of the operating mechanism.

In the accompanying drawings,

Fig. 1 is an elevational view of the sill and adjoining portions of the wall of a railroad passenger coach showing the lower part of the sash which engages the sill, and also showing operating parts within the wall of the car below the sill; for which purpose the inner surface of the car wall is removed.

Figs. 2 and 3 are vertical sectional views along the lines II—II, III—III of Fig. 1.

Referring now to Fig. 1, 1 is the bottom rail of the sash having fitted to it suitable rubber stripping 2. It also has attached to it, preferably by screws 3, depending lugs 4 which may be received in suitable apertures 5 in the sill. To the lug 4 is pivoted the upper link 6 of a toggle joint of which the lower link 7 is similarly pivoted at its lower end to a bracket 8 fixed at 9 upon a structural element in the wall of the car. 10 is the central pivot of the toggle joint and this pivot is received and travels within a curved way 11 formed in a

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bracket 12 also fastened to one of the structural parts of the car wall. The length and contour of the guideway 11 is such as to adapt itself to the movement of the pivot 10 as the toggle joint moves from its shortest position when the window is closed to its point of greatest extension and thence to a little beyond where the motion of the pivot is stopped by the end of the guideway, and the window opened.

In Fig. 1 two such toggle joints are shown pivoted to the lower side of the bottom rail 1 of the window sash and when the sash is in its lower position the toggle assumes the position shown in full lines in said figure. To raise the window a link 15 is attached to the central pivot of the toggle at one end and at the other to a rack bar 16 horizontally guided in ways 17 rigidly mounted within the car wall. The racks of the two bars face each other and both engage a pinion 18 set upon a transverse shaft 19, the inner end 20 of which is specially shaped to engage the crank handle 21.

Heavy coiled tension springs 30 are attached centrally to a structural part 31 in the wall of the car and reach to a link 32, the other end of which is attached to the pivot 10. The tension of these springs at all times tends to pull the pivot 10 towards its innermost position slightly beyond and below its position of greatest extension, and consequently always constitutes a counterbalance to the weight of the window sash. thus facilitating the raising of the window by rotation of pinion 18 transmitted through the racks 16 to the central pivots 10 exerting thrust upon the toggle joints.

There is marked advantage in checking the inward movement of the central pivot 10 of the toggle joints at about the point shown for it affords a definite limit to resist any downward tendency of the sash due to car vibration which the rack and pinion means might not sufficiently resist if the downward thrust were wholly opposed by them. There is also marked advantage in the provision of a positive guide for the toggle pivot compelling its true movement.

Having thus described my invention, I claim:

1. In mechanism for raising a normally closed slidable window sash set in a hollow wall, the combination of a toggle joint mounted below and near each side of the sash; means pivotally connecting the free ends of the upper links of the toggle joint to the bottom sash rail and similar means attaching the free ends of the lower links of the toggle joint to rigid structure in the hollow wall; means for simultaneously operating the

toggle joints including counter-balancing springs attached at their inner ends to a rigid structural part within the hollow wall and at their outer ends to the central pivots of said toggle joints; opposed stationary members each including a curved guideway affording limited movement for the central pivots of the respective toggle joints, one end of each of said guideways corresponding with the position of the toggle joint link free ends when the window is closed, and the other end thereof limiting the movement of the link free ends upon opening the window to a position a little beyond that of greatest extension of said links, whereby undesirable movement of the window is checked by contact of the toggle central pivots with the last mentioned ends of the curved guideways.

2. In a device for raising and lowering a sash the combination of opposed spring pressed toggle-joints each with its own elbow pivot; the upper links of the toggle-joints having their upper ends pivoted to the sash and the lower links pivoted to a fixed point below the sash; curved slot-ways in which the elbow pivots are held, one corresponding to the curved path of each of said elbow pivots; one extremity of each said slot-way reaching to a point slightly beyond and lower than the position of the elbow pivot when the toggle-joint is fully extended, whereby the said elbow joint may be moved by combined manual power and spring pressure to the position of full extension of the toggle to raise the weight of the sash to its upper position, and may thereafter be held by combined spring pressure and the weight of the sash against further movement until manual power is applied to overcome the spring pressure and the weight of the sash as the elbow pivot is carried back over the position of full extension of the toggle-joint.

3. In mechanism for raising and lowering a slidable sash, a pair of opposed spring pressed toggle-joints each consisting of an upper and a lower link and an elbow pivot joining said links,

the upper links of the toggle-joints being pivoted to the sash and the lower links of the toggle-joints being pivoted to a fixed point below the sash, whereby the elbow pivot traverses a curved path about the fixed pivot as the window is raised and lowered, a rigid stationary support piece adjacent one of the elbow pivots, a curved guideway in said support piece having a shape conforming to the curved path of said elbow pivot, said elbow pivot being held in said guideway for movement through said curved path while the sash is raised and lowered, said rigid stationary support piece also having a stop constructed and arranged to limit the advancement of the elbow pivot at a stop point beyond and below the point of maximum elevation of the elbow pivot in said curved path, whereby the rigid support piece provides a rest holding the window against downward movement by reason of the weight of the window when the elbow pivot is moved in said guideway to said stop point.

CARLETON K. STEINS.

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