

U. E. TUOMI.
 MECHANISM FOR OPERATING WINDOW SASH.
 APPLICATION FILED NOV. 2, 1918.

1,306,868.

Patented June 17, 1919.
 2 SHEETS—SHEET 1.

Fig. 1

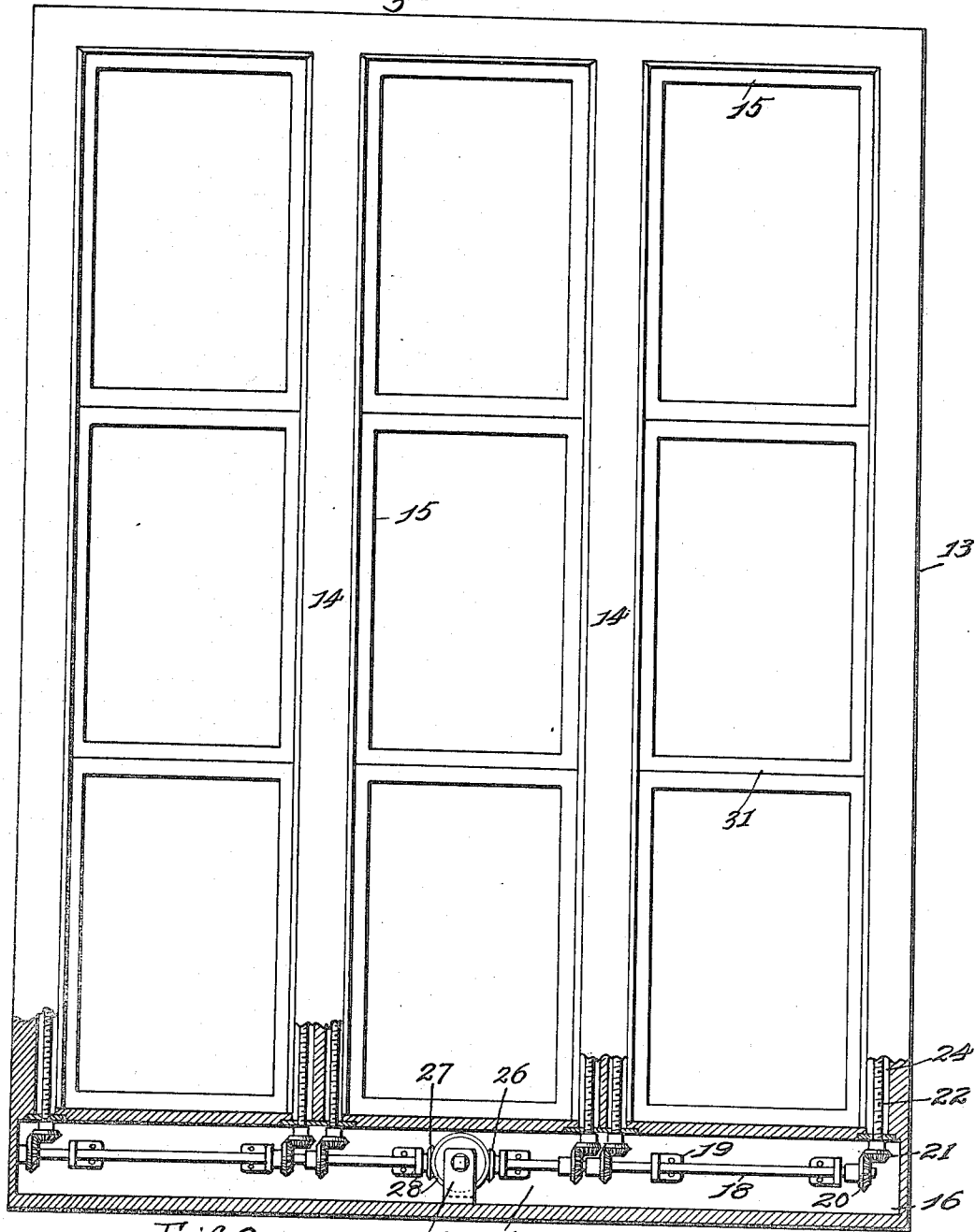
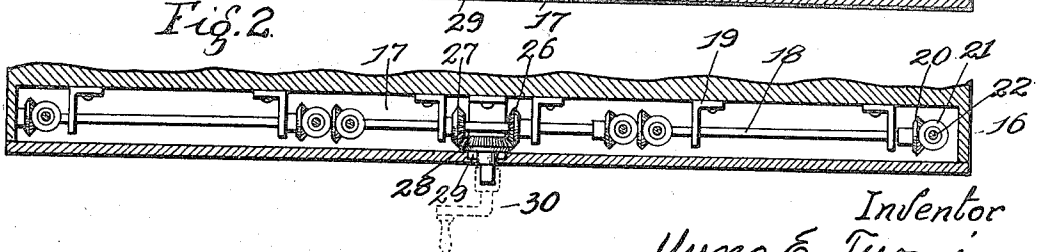


Fig. 2

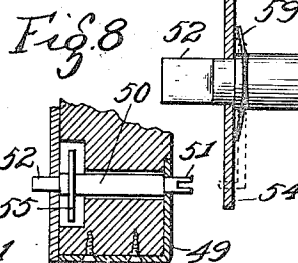
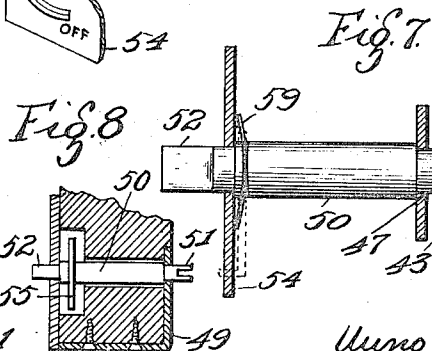
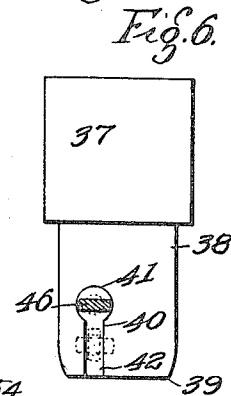
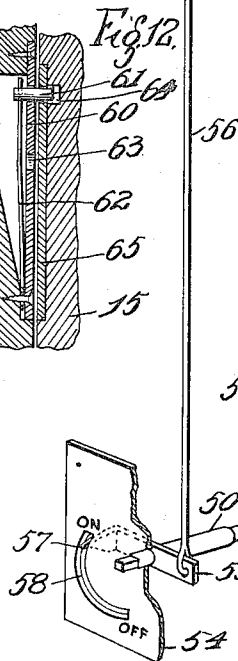
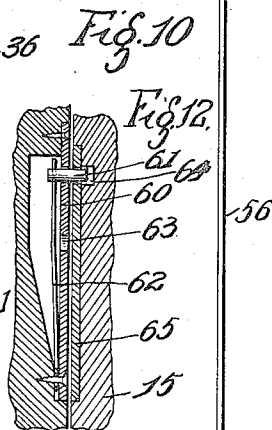
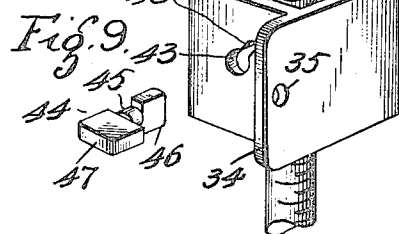
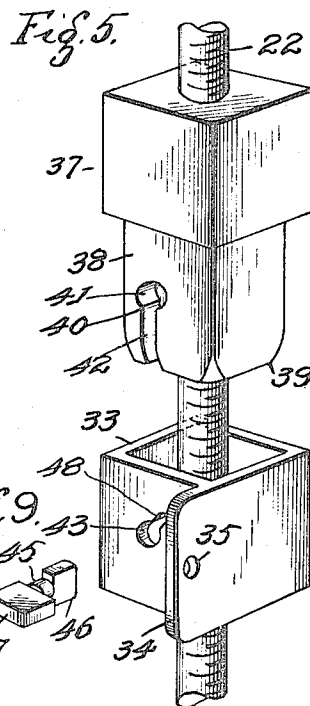
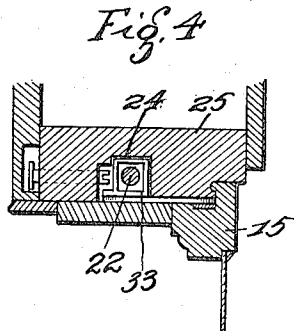
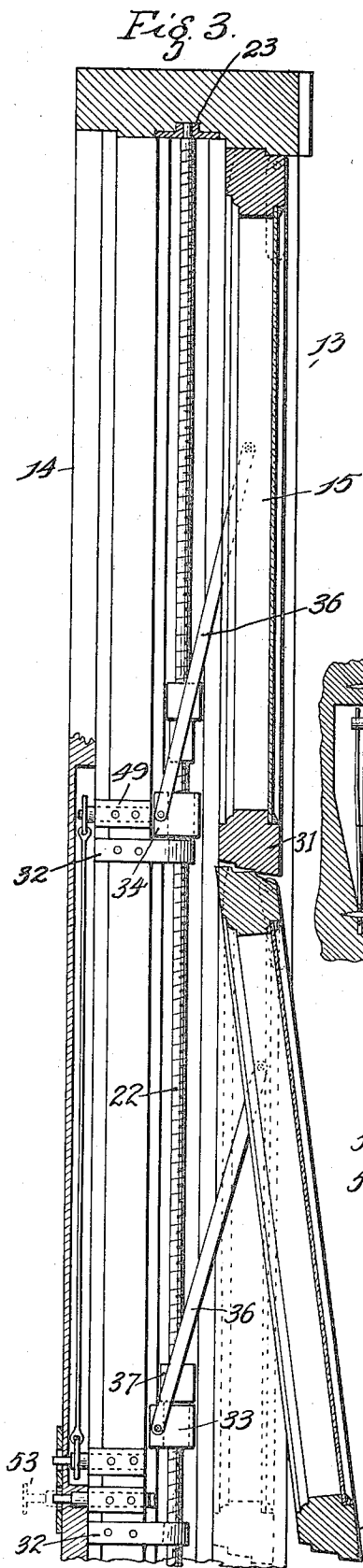


Inventor
 Uuno E. Tuomi

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UNITED STATES PATENT OFFICE.

UUNO E. TUOMI, OF ST. LOUIS, MISSOURI.

MECHANISM FOR OPERATING WINDOW-SASH.

1,306,868.

Specification of Letters Patent. Patented June 17, 1919.

Application filed November 2, 1918. Serial No. 260,792.

To all whom it may concern:

Be it known that I, UUNO E. TUOMI, a citizen of the United States, and resident of St. Louis, Missouri, have invented certain new and useful Improvements in Mechanism for Operating Window-Sash, of which the following is a specification.

This invention relates to improvements in a mechanism for operating window sash, and it consists in the novel arrangement, construction and combination of parts, the detail of construction will be hereinafter fully described and set forth in the claims.

The object of my invention is to construct a mechanism which is concealed in the window frame which supports a plurality of window sash, and by said mechanism any one or plurality of the sash can be opened by the manipulation of the mechanism, from a position in close proximity with the window sill.

Another object of my invention is to equip the frame with a means by which any one or a number of the sash may be placed in and out of operation so that by the manipulation of the opening mechanism a certain number of the sash will open while the others will remain closed.

This structure is adapted for windows which are hinged at the top and open in a swinging manner. The structure in addition to the operating of the sash also acts as a complete lock to prevent the windows from being opened from outside, and the general construction of the sash frame is so arranged as to make an absolute leak-proof joint when the windows are in closed position.

The device although comprising considerable mechanism and from the appearance of the parts as illustrated on the drawing seems to be complicated yet the device is comparatively simple and operative in every respect for the purpose it is intended.

Figure 1, is a side view of a window with a part broken away showing the position and location of the operating mechanism.

Fig. 2, is a horizontal sectional view of the same.

Fig. 3, is an enlarged vertical sectional view showing the sash operating mechanism and the location of the operating parts.

Fig. 4, is a horizontal sectional view to one

side of the window frame showing the position of the operating mechanism.

Fig. 5, is a detail perspective view of one of the operating shafts showing the members positioned thereon by which the window sash are controlled.

Fig. 6, is a side view of the internally screw-threaded nut made use of which comprises one part of the sash controlling mechanism.

Fig. 7, is a vertical sectional view of the sash controlling mechanism showing the key by which the parts are held together or permitted to separate.

Fig. 8, is a horizontal sectional view of a portion of the frame showing the position of the key shaft and the bearings for supporting the same.

Fig. 9, is a detail perspective view of the controlling plug made use of.

Fig. 10, is a detail perspective view of the key shaft operating mechanism by which the upper window sash are controlled from below.

Fig. 11, is a front view of one of the key shaft plates made use of from which the key shafts are manipulated.

Fig. 12, is a fragmental sectional view of the hinge made use of for supporting the window sash in the frames.

In the construction of my invention I provide a suitable window casing or frame 13, which is provided with division posts 14 dividing the frame into several sections in which are hingedly mounted a plurality of window sash 15.

At the bottom of the window frame or casing is provided a suitable box 16 in which is located and supported the general operating mechanism 17. This mechanism consists of a horizontal shaft 18, supported in suitable bearings 19 and on the shaft are provided a plurality of beveled gear wheels 20, which are arranged in mesh with beveled pinions 21, firmly attached to vertical screw-threaded shafts 22. These shafts extend in the frame from the bottom to the top, its upper end seated in a bearing 23 and the shafts are properly located in rectangular recesses 24, formed in the side walls 25 of the casing.

On the shaft 18 is likewise provided a beveled gear 26, keyed to the shaft 18 and a

loose beveled gear 27, acting as a guide and meshing with these beveled gears is a large beveled gear 28 which is supported in the bearing 29, and is operated by a detachable crank 30 shown by dotted lines in Fig. 2.

By the manipulation of the crank 30 this mechanism places all of the vertical screw-threaded shafts 22 in simultaneous rotation.

Against the frame and in approximate alinement with the lower end 31 of the window sash 15, are secured brackets 32 which are arranged to receive the threaded shafts 22 and act as a stop for the sash operating mechanism, which mechanism consists of a hollow box member 33, which is provided with a projecting ear 34, in which is a perforation 35. Through this perforation is inserted a rivet or bolt connecting to the box an operating arm 36, the opposite end of which is pivotally attached to the side of the window sash, and by this arm the sash is opened and closed by the manipulation of the mechanism.

On the shafts 22 are provided internally screw-threaded nuts 37 which are rectangular in form, the bottom portion 38 being of smaller diameter, the lower edge 39 being beveled inwardly so as to act as a proper guide when the nut 37 is to enter into the hollow box 33. This bottom portion 38 is provided with a receiving recess 40 which is shaped with a rounded portion 41 and an elongated portion 42, and recess is designed to properly come into alinement with the opening 43 formed in the box and in which is supported a controlling plug 44, (see Fig. 9). This plug consists of a central rounded bearing portion 45, in its inner end terminating into a rectangular portion 46 and its outer end terminating into a rectangular portion 47, but arranged in an opposite position to the projection 46. The part 46 is inserted through the opening 43 by slightly tilting the plug and allowing it to pass through the diagonal elongation 48, and then allow the bearing portion 45 to properly seat itself through the rounded portion of the bearing. The recess 24 in the frame in which the screw-threaded shafts 22 are located is of such size as to properly permit the box and nuts to ride up and down on the shaft but yet prevent the same from binding during its upward and downward motion.

Against the frame and slightly above the brackets 32 are fastened bearings 49 which properly support the key shafts 50 by which the plugs 47 are manipulated. These key-shafts are provided with a slotted end 51 which are arranged in proper alinement with the plugs when the boxes 33 are resting upon the brackets 32. The front end of the key shafts are made rectangular in form as indicated by the numeral 52 and

over which is adapted to be applied a detachable key 53 shown by dotted lines in Fig. 3.

By this key the shaft 50 can be rotated about one-fourth around so as to bring the slot in the end 51 from a horizontal to a vertical position and in this slot is adapted to be seated the forward or front end 47 of the plug. The general position of the parts is shown in Fig. 7.

As this mechanism is one of the important features of the invention I will now describe the operation of the same.

By referring to Fig. 7, the nut is in a position to be elevated by the turning of the screw-threaded shaft without in any way operating the window sash and on account of the vertical position of the end 46 of the plug it will permit the nut 37 to ride upwardly and pass the end 46 by means of the elongated portion 42 of the recess. When this nut is so passing out the box 33 will remain in position being held in that manner by the plug and key shaft.

When it is desired to operate the sash in order to open the same, the key shaft 50 is turned to bring the end 46 of the plug in horizontal position. This will place that end in a rounded portion 41 of the recess and be located therein as shown in Fig. 6. The opposite end of the plug being vertical which when in this position the rotation of the threaded shafts will cause the nut and the box to ride together on the shaft and in so doing will exert pressure on the sash operating arms 36 causing the sash to swing out from a vertical to a tilted position as that shown in Fig. 3.

In order to properly manipulate the upper windows from the bottom of the frame I place on the front of the partitions 14, a plate 54 which supports a plurality of key shafts 50, the bottom two controlling the bottom nuts, the center two controlling the center nuts and the upper two the upper nuts. The upper and center series of key shafts as supported in the plate 54, are not provided with the slotted inner ends but merely have bearing so that the key shaft which is in alinement with the nuts on the center and upper series of the window sash are manipulated.

In order to manipulate the key shafts in the upper part of the frame I provide on the shafts a cross-bar 55 to which are attached rods or wires 56 and when the lower key shaft is turned it operates the upper key shaft in unison. The cross-bar on the lower shaft is provided with a projection 57 which operates in a curved slot 58 formed in the plate which is marked on and off, the projection 57 acting as indicator or pointer to show how the nuts are turned so as to open the window or leave it closed.

By this arrangement the operator by the manipulation of the keys below can determine just which one of the window sash he desires to open and which one he desires to leave closed and then by turning of the crank 30 the specified windows will be opened. The general mechanism in the frame is concealed by placing over the same strips as that shown in the illustration.

10 The lower set of key shafts are held in frictional contact by means of the spring 59 which is for the purpose to hold the shaft so that the slot will remain in vertical alignment so that the end 47 of the plug will properly seat itself therein when the nut and box is brought back to its normal lowered position.

In Fig. 12, I show a pivot hinge by which each of the sash are hingedly mounted in position in the frame. This hinge consists of a plate 60 embedded in the casing, the same being provided with a pin 61 which freely operates in the opening. Said pin having a bore on its upper end through which is passed a spring 62, the opposite end of the spring being held in rigid connection with the plate and frame and when it is desired to remove the sash from the hinge an instrument or tool is inserted through the opening 63 formed in the plate, and brought in contact with the spring 62 thereby pressing the pin 61 rearwardly so as to release it from the opening 64 formed in the hinge plate 65 laid flush in the sides of the window sash.

The connecting edges of the window mesh with one another and with the frame or casing and are so arranged as to make an absolute water and dust-proof joint. This general arrangement is clearly illustrated in Figs. 3 and 4.

Having fully described my invention what I claim is:

1. A window of the character described in combination with a window frame, a plurality of window sashes, screw threaded shafts located in the frame, an operating mechanism for rotating the screw-threaded shafts, nuts located on the screw threaded

shafts and in close proximity with each of the sash, a box operating in conjunction with the nut, an arm pivotally connected to the box and to the side of the window sash and a means for placing the box in operative connection with the nut when desiring to open the window and to release the same therefrom for keeping the window closed, and a means for indicating the position of the mechanism, substantially as specified.

2. A window of the character described comprising a frame, a plurality of sash hingedly mounted therein, screw threaded shafts located in the frame between the sash and on the outer edge of the sash, nuts located on the sash to be raised and lowered by the rotation of the shafts, a box mounted over the shaft to receive the nut, and means for holding the box in operative position with the nut and for releasing the same therefrom, a means for operating the mechanism to release any one or number of sash and keep the same closed while the remainder are being opened, and a mechanism for placing the shafts in rotation, substantially as specified.

3. A window of the character described comprising a window frame, a sash hingedly mounted therein at the top, a threaded shaft located on each side of the sash and nut operating on the shafts, a hollow box to receive the nut, a controlling plug carried by the box arranged to be seated in the nut, a key for operating the same and controlling its action, and a mechanism for rotating the shafts simultaneously for placing the nuts in a raised or lowered position and a connection between the box and the sash for opening the sash during the manipulation of the nut, substantially as specified.

In testimony whereof, I have signed my name to this specification, in presence of two subscribing witnesses.

UUNO E. TUOMI.

Witnesses:

ALFRED A. EICKS,
B. AUSTINE.