

Feb. 6, 1945.

E. R. TARVIN

2,368,622

WINDOW SASH OPERATOR

Filed May 9, 1941

3 Sheets-Sheet 1

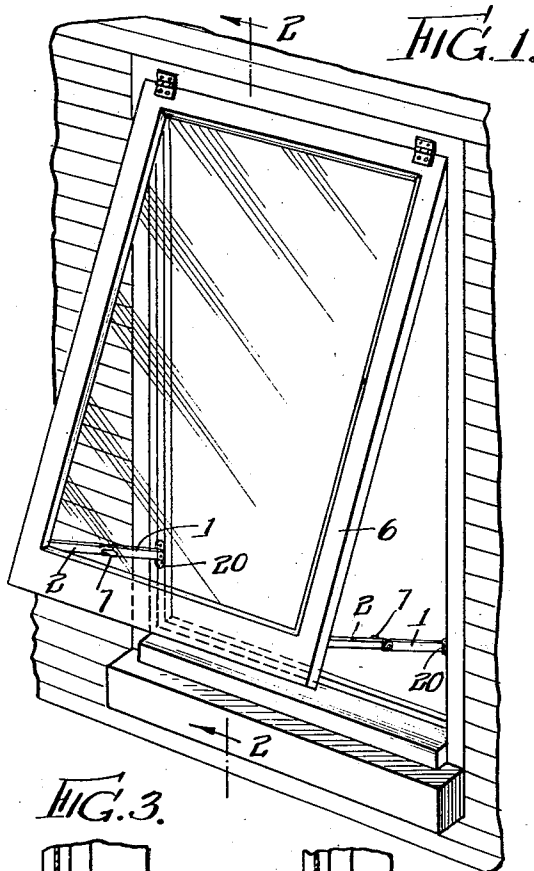


**FIG. 2.**

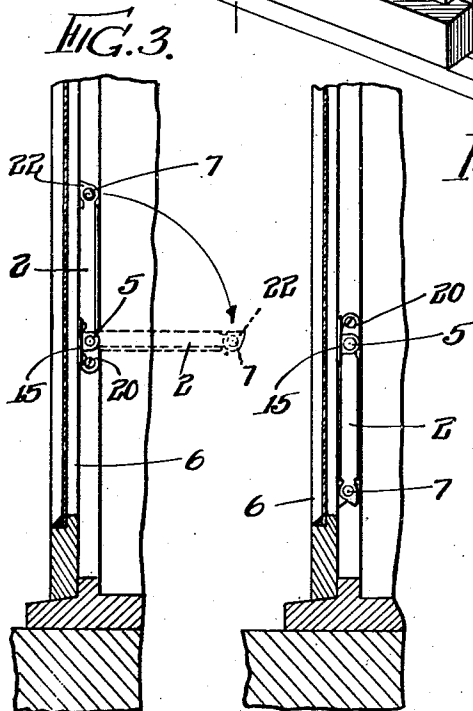
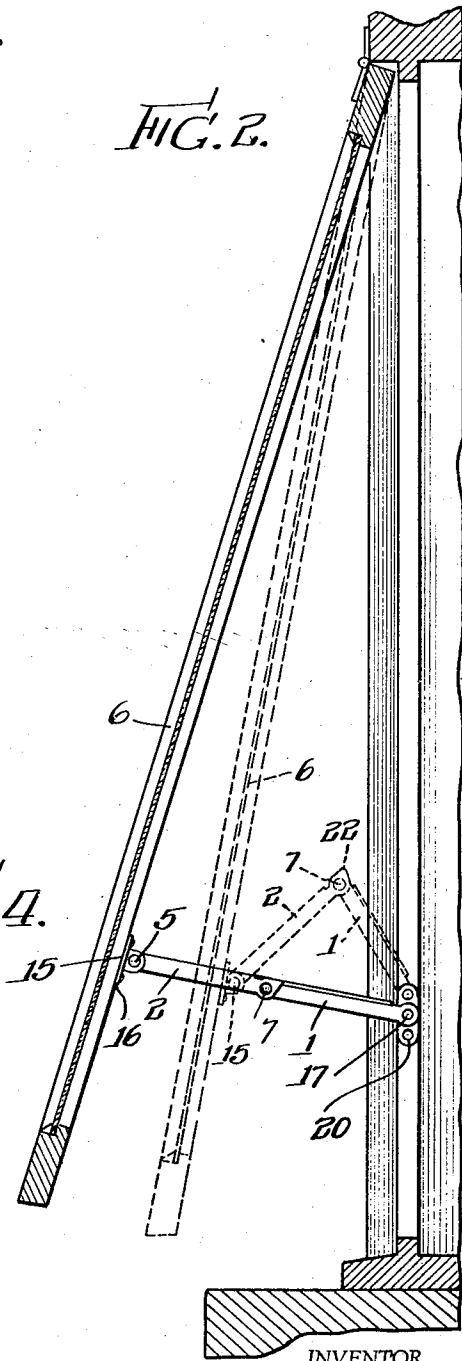
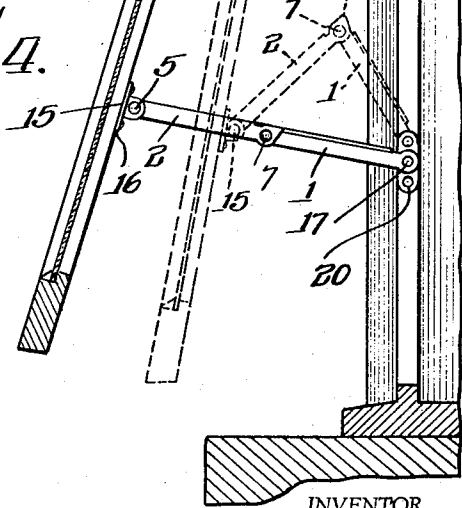


**FIG. 4.**



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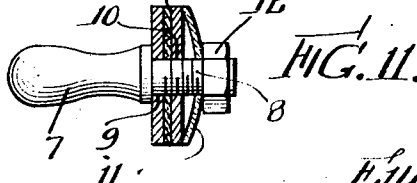
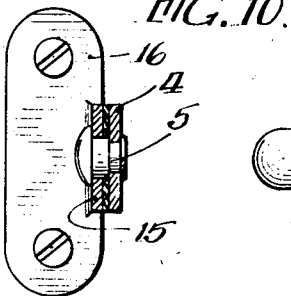
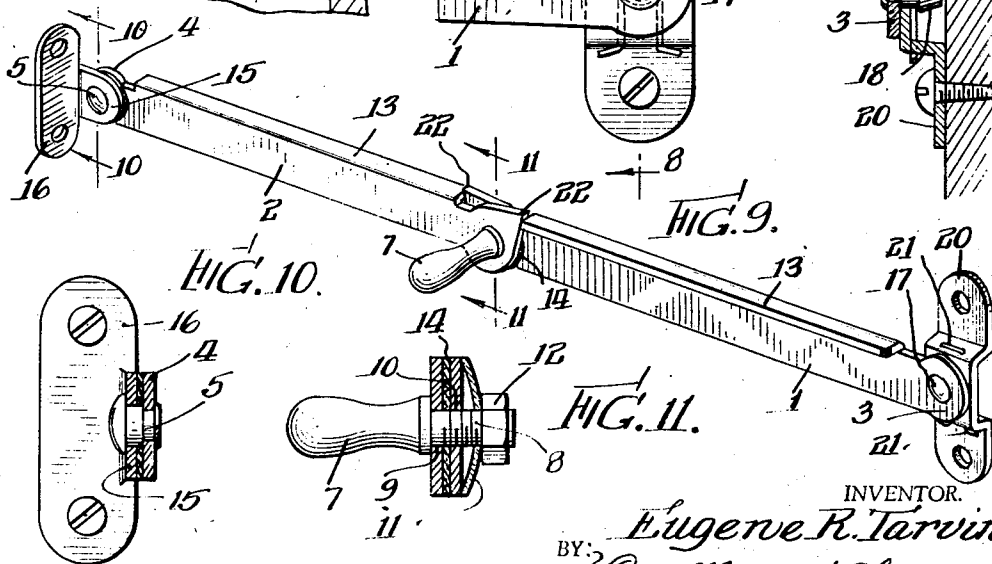
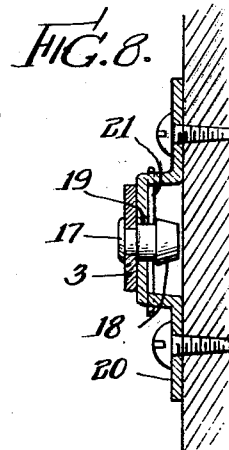
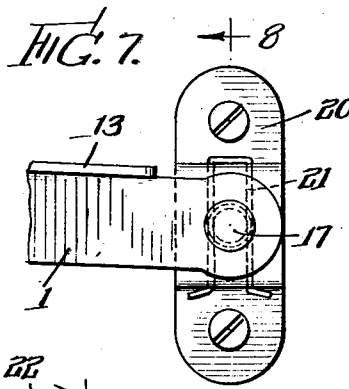
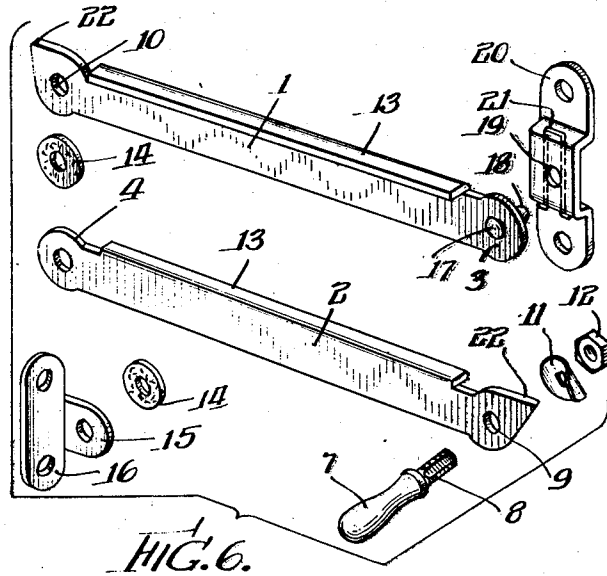
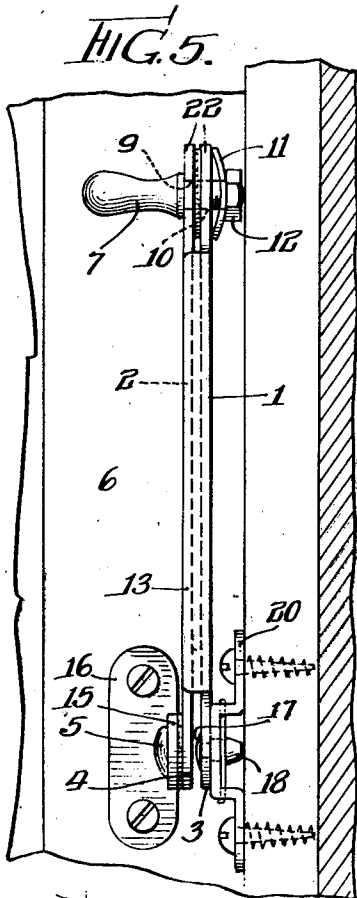
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3 Sheets-Sheet 2



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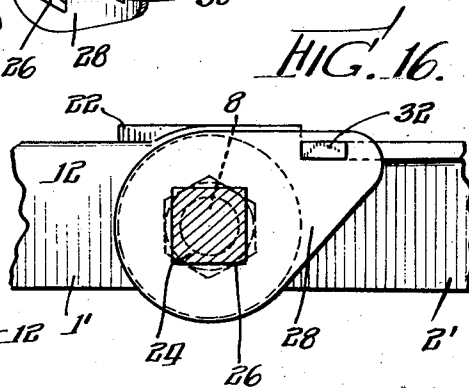
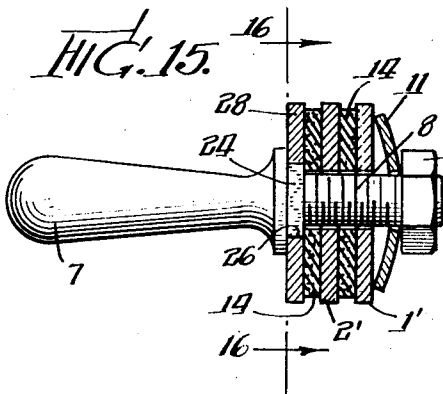
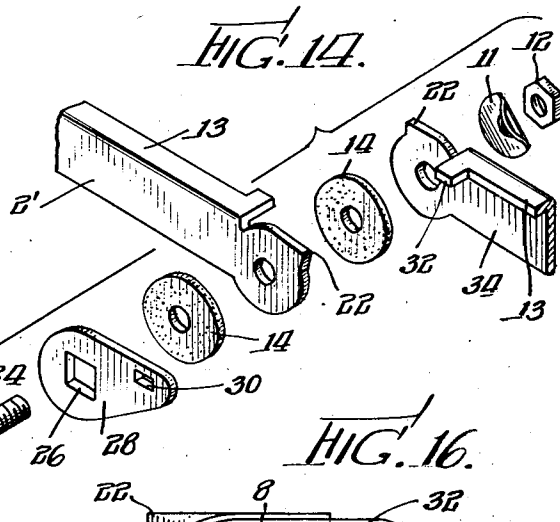
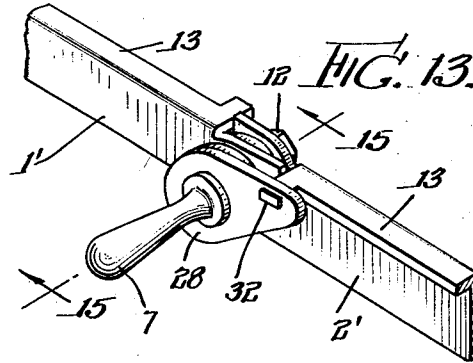
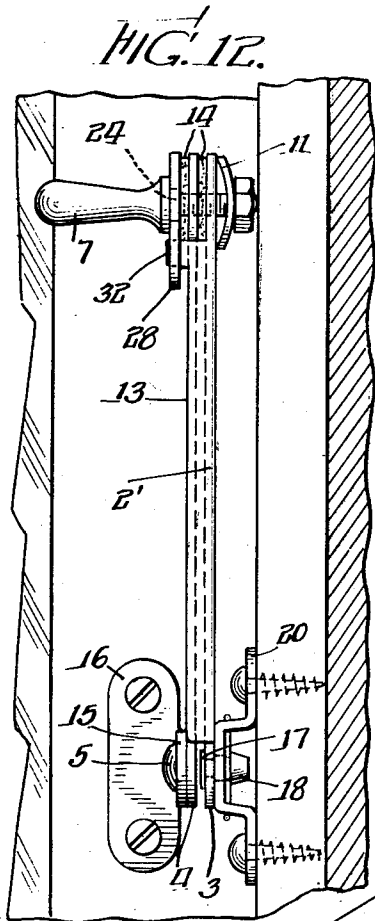
E. R. TARVIN

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WINDOW SASH OPERATOR

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3 Sheets-Sheet 3



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## UNITED STATES PATENT OFFICE

2,368,622

## WINDOW SASH OPERATOR

Eugene R. Tarvin, Sterling, Ill., assignor to  
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a corporation of Illinois

Application May 9, 1941, Serial No. 392,680

2 Claims. (Cl. 268—105)

This invention relates to sash operators of the type used particularly on storm windows and window screens, wherein the window screen is adapted to swing pivotally to an open position, or to a closed position, and wherein the sash operator is formed as a toggle joint having one end of the toggle fastened to the storm sash, and the other end formed to a stationary support such as the window frame.

Among the objects of the present invention are to provide a sash operator of the foregoing type, wherein the pivotal pin between the two members forming the joint for the toggle is provided with a handle to facilitate the opening and closing movement of the pivotally mounted window sash, so that it is not necessary for a person to grasp either one of the members forming the toggle joint with the consequent danger of pinching his hand when the toggle joint is moved either to open or closed position; to provide a window sash operator of the toggle joint type wherein means is provided at the pivotal joint of the two members forming the toggle, which will positively lock the window sash in open position when the two toggle members are moved into parallel or extreme open position.

Yet another object of the invention resides in providing a simple type of tension means for adjustably holding the two members of the toggle joint in various positions of relative adjustment, whereby correspondingly to hold the window sash in such adjusted position, and whereby likewise to hold the window sash in closed position; to provide a sash operator with the foregoing characteristics which is adapted to fold compactly into closed position and, when in such closed position, may swing freely above or below its point of pivotal connection with the window sash whereby to facilitate and permit the attachment of the toggle joint actuator to any portion of the window sash, and to insure its operability in such position when the window sash is closed; to provide an improved construction of toggle joint type of actuator, wherein each lever is provided on adjacent pivotal interconnected ends with an integral nose or lug adapted, when the levers are in straight-line or open position, to lock with an adjacent portion of the other lever, whereby to maintain the toggle joint and the window sash locked rigidly in open position, and thereby eliminate the necessity of having the toggle members swung to and over the center position in order to stay locked; to provide an economical, simple, and easily detachable and attachable means for connecting one of the toggle

operators to the window frame; to provide a simple type of toggle joint connection which will frictionally maintain the two members forming the toggle joint in any adjusted position; to provide a toggle joint type of sash operator formed of sheet metal stampings, which stampings when assembled provide a rugged, compact, economical and efficiently operable type of easily operable device; to provide these and other objects of the invention as will be apparent from a perusal of the following specification when taken in connection with the drawings, which are—

Figure 1 is a perspective view of a window sash provided with an operator or brace at each side thereof, embodying the principles of the invention, and showing the sash in open position;

Figure 2 is a similar view in enlarged vertical section, illustrating the action of the brace or operator, in dotted lines, when it is desired to swing the sash back into closed position;

Figure 3 is a similar sectional view, showing certain portions broken away, and showing the operator in its vertical position in full lines, and showing it moved down into horizontal position in dotted lines;

Figure 4 is a similar view showing the operator or brace moved out into its blocking or vertical position;

Figure 5 is a fragmentary view, on a larger scale, looking directly at the window frame and one side of the sash to which the operator or brace is applied, thus showing the latter in edge view, so to speak, instead of in side elevation;

Figure 6 is an exploded perspective view showing the parts, shown in Figure 5, in separated condition, and showing the parts on a smaller scale than that by which they are shown in Figure 5 of the drawings;

Figure 7 is a side elevation, on a larger scale, of one of the bracket plates that are secured to the opposite sides of the window frame, showing the adjacent link with its pivot stud in position thereon;

Figure 8 is a vertical section on line 8—8 in Figure 7 of the drawings;

Figure 9 is a perspective view of one of the braces or operators in extended position;

Figure 10 is a vertical section on a larger scale, on line 10—10 in Figure 9 of the drawings;

Figure 11 is a vertical section on line 11—11 in Figure 9 of the drawings, on a somewhat larger scale; and

Figures 12, 13, 14, 15 and 16 are views of a modified type of construction, wherein the handle

member is formed rigid with one of the links of the toggle joint, whereby to facilitate the opening and closing movement of the toggle joint.

Referring now to the drawings in detail, Figures 1, 2, and 3 show the toggle joint type of sash operators applied to a window sash or screen, which is preferably pivoted at its upper end to the window frame, and which has attached at its opposite side the other free ends of a link mechanism. The link members are interpivoted at their inner ends to form a toggle joint and, by raising the link members to the position shown in dotted lines in Figure 2, the window sash will be drawn toward the window frame, or to a closed position, whereas by pushing down on the toggle link member to the full length, shown by solid lines in Figure 2, the window sash will be moved outwardly to open position.

Referring now to the details of construction of the sash operator, it will be seen that it comprises two identical links 1 and 2, preferably formed of sheet metal stampings. In Figure 6 these identical links are shown as turned end for end in order to form the toggle joint at the middle of the brace or operator. The outer end of link 2 is provided with a rounded ear-like portion 4 centrally perforated and adapted to slip over and pivotally swing on a stud 5 pivotally fixed to a bracket plate 16, and it is attached to the sash 6 of the window construction.

In addition, the handle 7 is provided with a threaded shank 8, which is adapted to be inserted through holes 9 and 10 in the opposite ends of the links 1 and 2. In addition, this threaded shank also passes through a central aperture of a steel spring washer 11 and likewise through a threaded nut 12 which is provided to hold the toggle joint in operative position. Each of the links 1 and 2 preferably has a lateral flange or lug 13 on one edge thereof, which flange is adapted to engage the unflanged or lugless edge of the other link when the links are folded together, and thus these flanges serve to keep the two links parallel in such closed position, as shown in Figures 3 to 6 of the drawings.

A fibre washer 14 is supplied to the shank 8 to hold the two links spaced apart, and to provide friction in association with the steel spring washer 11, which provides the spring pressure to hold the toggle joint in any adjusted position.

Also, the stud 5 is rigid with the ear 15 of the bracket plate 16 secured to the window sash, as hereinbefore mentioned. A rigid stud 17 passes through the aperture formed in the ear-like portion 3 of link 1 and is rigidly fixed therein. This stud 17 is shaped with an inner head 18, as shown in Figure 8 of the drawings. This head is adapted to pass inwardly through an opening 19 in an outer wall of the bracket plate 20 (see Figure 8), and is fastened to the side of the window frame. A wire spring device 21 is inserted downwardly through the top and bottom wall of the bracket plate 20. The spring device is shaped substantially like a hairpin with the two legs thereof engaging behind the outer end of the head 18, previously described, so that, when the stud is pressed inwardly through the opening 19, the two side legs of the spring device move resiliently away from each other, and then snap under the shoulder of the spring device 21 to grip said stud and hold it against being pulled out. This resilient grip, however, exerts only a moderate force, so that the stud can be pulled out with sufficient force, as the spring device 21 will yield enough for that purpose. Thus the detachable fastener is

like a snap fastener that requires no adjustment or no member to be unfastened in order to retain or release the stud from its operative position.

The links 1 and 2 have at each end a corner or nose portion 22, which engages the end of the flange 13 or a lug on the other link when the two links are in alignment, whereby to hold the sash in open position, as shown more clearly in Figure 9 of the drawings. Thus it will be seen that when the toggle joint is in position to hold the sash operator in open position, the entire sash operator is perfectly straight, or with the two links 1 and 2 in alignment. It will be seen that the positioning of the toggle joint does not come to center when the operator is moved in position to hold the sash in its open position.

The handle portions 7 of the pivotal pin 8 forming the pivot of a toggle joint are advantageous because it is not necessary for the present opening or closing of the sash to touch either the link 1 or 2 or any portion thereof, and therefore the fingers cannot be pinched. In correct operation, by grasping the handle 7, the links 1 and 2 can be opened or collapsed to closed position, to correspondingly swing the window sash.

In addition, it is not necessary to manually adjust with the fingers or a tool any retaining device on the plate 20 in order to retain or release the stud 17 in or from its operative position. Furthermore, in extreme open position, the locking portions 22 abut or contact the inner flanges of the links, and thus lock these links in straight-line position, which corresponds to the extreme open position of the window sash. Obviously, instead of using the entire flanges 13, a couple of short lugs, in lieu thereof, will suffice both for maintaining the links in upwardly closed position, and also in forming stops for the locking corners 22. The shank 8 of the handle is preferably flattened on one side, as shown in Figure 6, and the hole of the spring washer 11 is likewise flanged on one side, whereby to prevent the washer from turning relatively to the shank.

This spring washer 11 and the fibre washer 14 are combined in association with the rounded ends 3 and 4 of the links 1 and 2 to provide sufficient friction to maintain the toggle joint in any adjusted position. Thus it will be seen that by forming links 1 and 2 identically, and particularly of sheet metal, and by forming the associated elements in the manner described, the entire structure is one of utmost simplicity of construction, which reduces the cost of production and the selling price to the consumer, while at the same time it insures a brace or operator that will efficiently work and not get out of order.

In the slightly modified form shown in Figures 12 to 16, inclusive, I have constructed the handle 7 with an angular shoulder 24 which is adapted to engage in a correspondingly shaped aperture 26 in a flat sheet metal washer 28, which is, in turn, provided with a recess or aperture 30 of predetermined angular design, which engages in and connects with a lateral lug 32 of similar cross section formed on the end 34 of link 2'. This lug 32 laterally offsets from the flange 13 of a link 2'.

I also provide an extra washer 14 engaged between the other washer in the assembly, so that the two washers 14 engage between the metal washer 28 and the rounded ears on the end of the links 1' and 2', the spring 11 in conjunction with the nut 12 threaded on the shank 8 of the handle serving to provide sufficient

friction and yielding pressure to hold a toggle joint in any adjusted position. It will be noted that the handle 7 in this construction is formed rigidly and integrally with the washer 28, which, in turn, is formed integrally and connected with the link 2' of the toggle joint assembly, so that a push down or pull up on the handle 7 will more quickly and more effectively serve to shift the link members 1' and 2' relatively to each other, whereby to open or close the window sash relatively to the window frame.

Obviously the invention is not limited to the specific structural arrangement disclosed herein, but is capable of other modifications and changes without departing from the spirit and scope of the present invention.

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

1. In a sash operator, a pair of links connected by a pivot to form a toggle joint at practically the middle of the brace or operator, each link having a nose or corner at said toggle joint in the vertical plane of the flat link itself, and a laterally bent portion of each link to engage said nose or corner of the other link, holding the two links in straight alinement when the sash is in open position.

2. The combination of a pair of links, the adjacent ends of each of said links having substantially rounded portions formed with registering apertures, each of said rounded portions being provided with a wedge-shaped locking nose, a pivot pin having a shank portion threaded and having an adjoining shoulder and a laterally projecting handle portion, a rigid washer having an angular recess passing through said shank and overlying the angular portion of said shank, there being centrally apertured friction washers, a spring metal, centrally apertured washer through which said shank is adapted to pass in assembling said rigid washer, said friction washers, and said resilient washer together, fastener means adapted threadedly to engage the shank to hold said members together, each of said links adjacent the nose portion having an abutment against which the next portion on the other link is adapted to lock when the links are open in extended position, and said rigid washer having an additional slot adapted to receive a projection on one of said links whereby rigidly to connect said handle and shank portion with said last mentioned link.

EUGENE R. TARVIN.