

Sept 10, 1957

L. D. EVANS ET AL

2,805,741

PIVOTED WINDOW SASH WITH SASH SEALING MEANS

Filed April 22, 1954

6 Sheets-Sheet 1

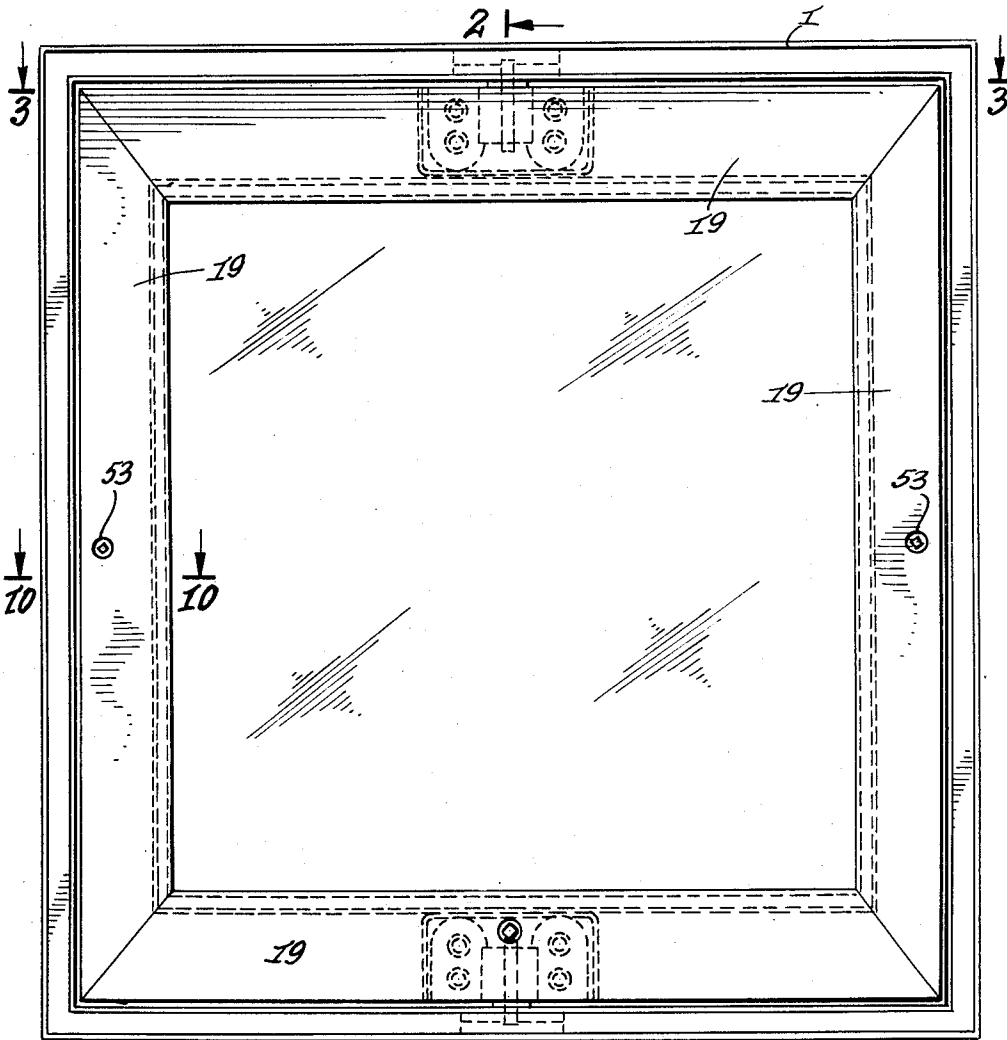
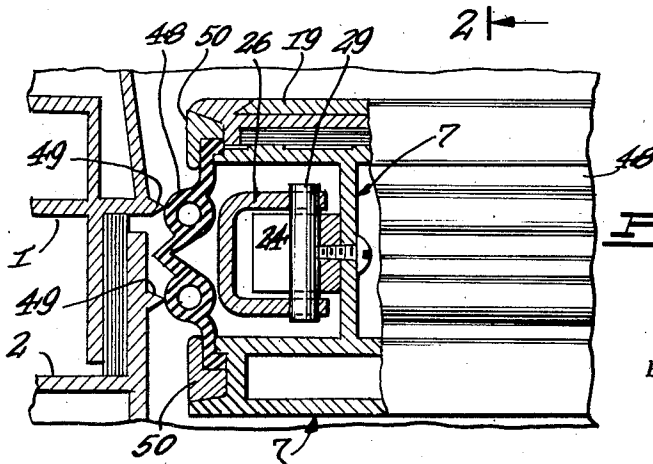


FIG. 1.

FIG. 10.

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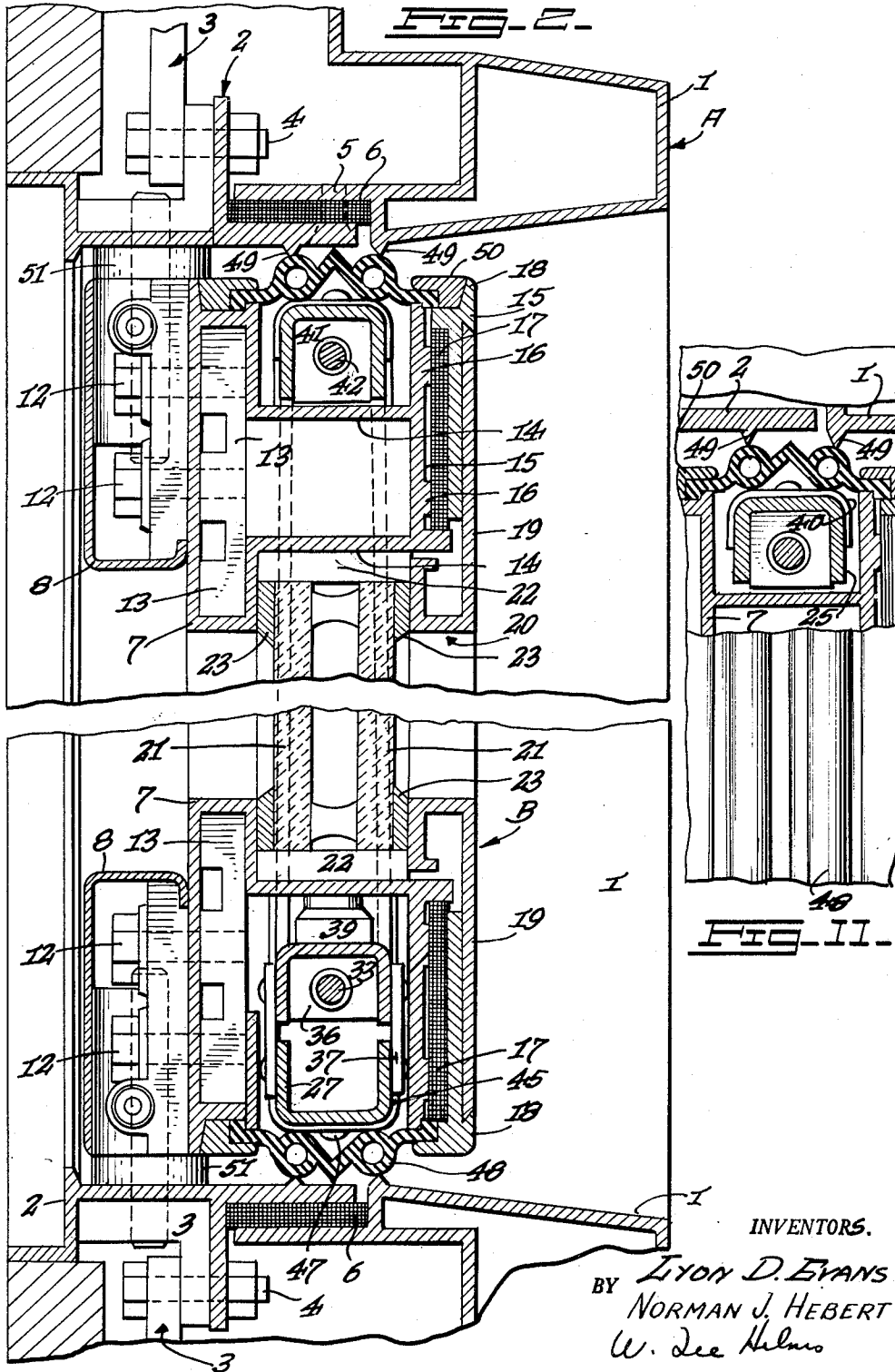
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PIVOTED WINDOW SASH WITH SASH SEALING MEANS

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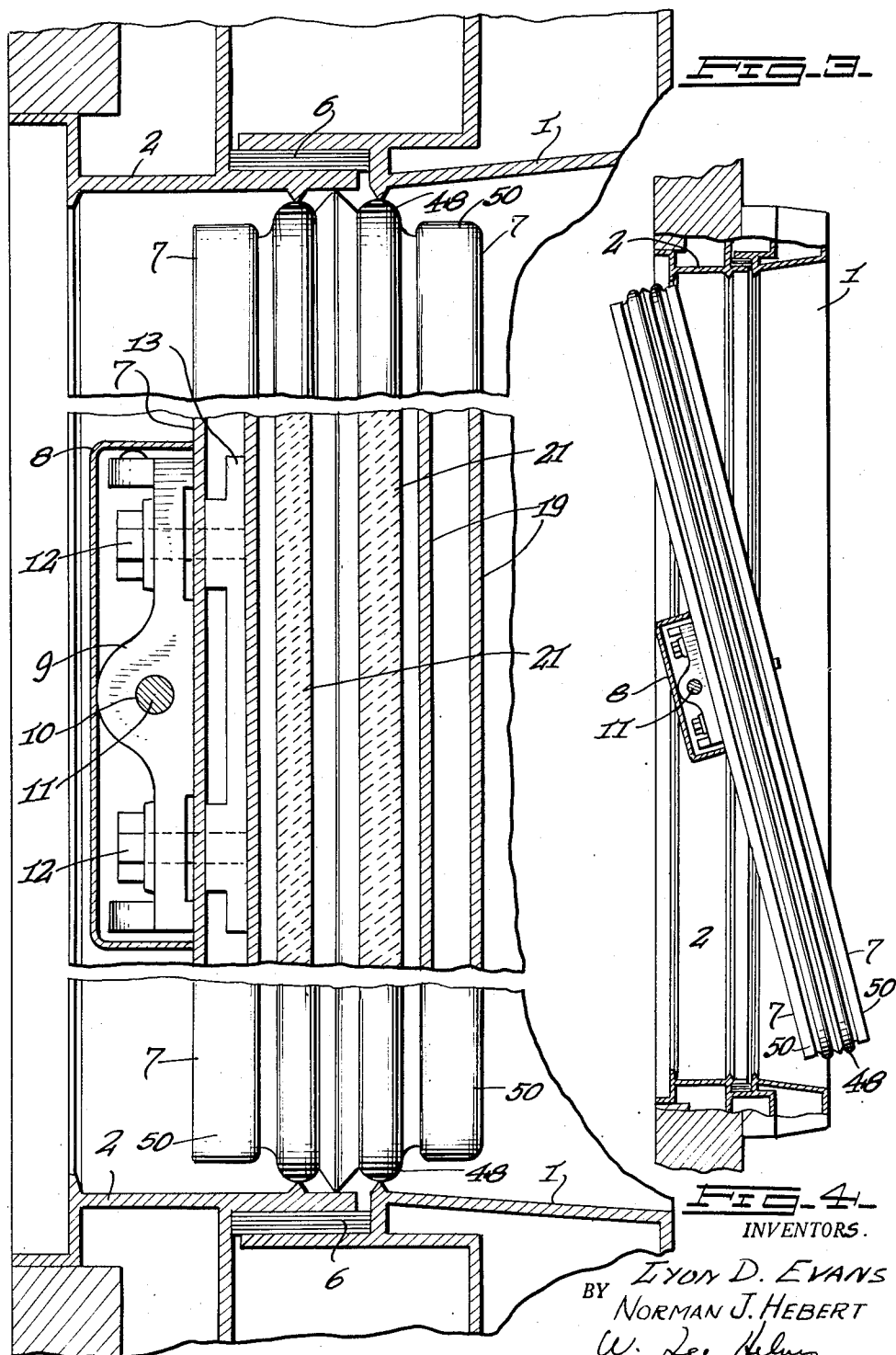
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PIVOTED WINDOW SASH WITH SASH SEALING MEANS

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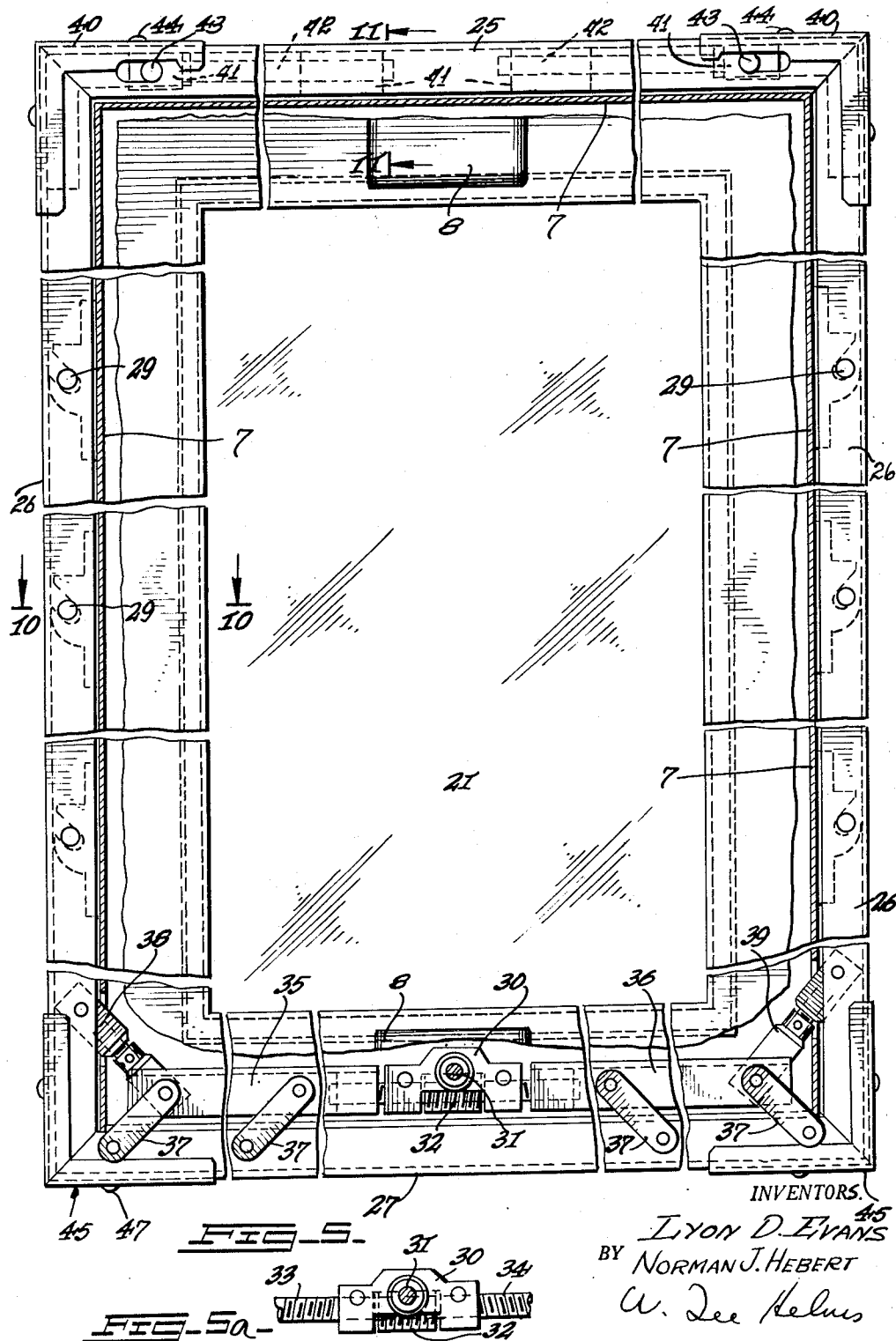
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PIVOTED WINDOW SASH WITH SASH SEALING MEANS

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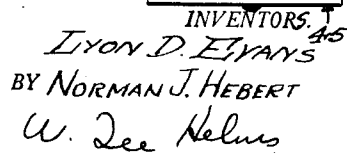


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PIVOTED WINDOW SASH WITH SASH SEALING MEANS

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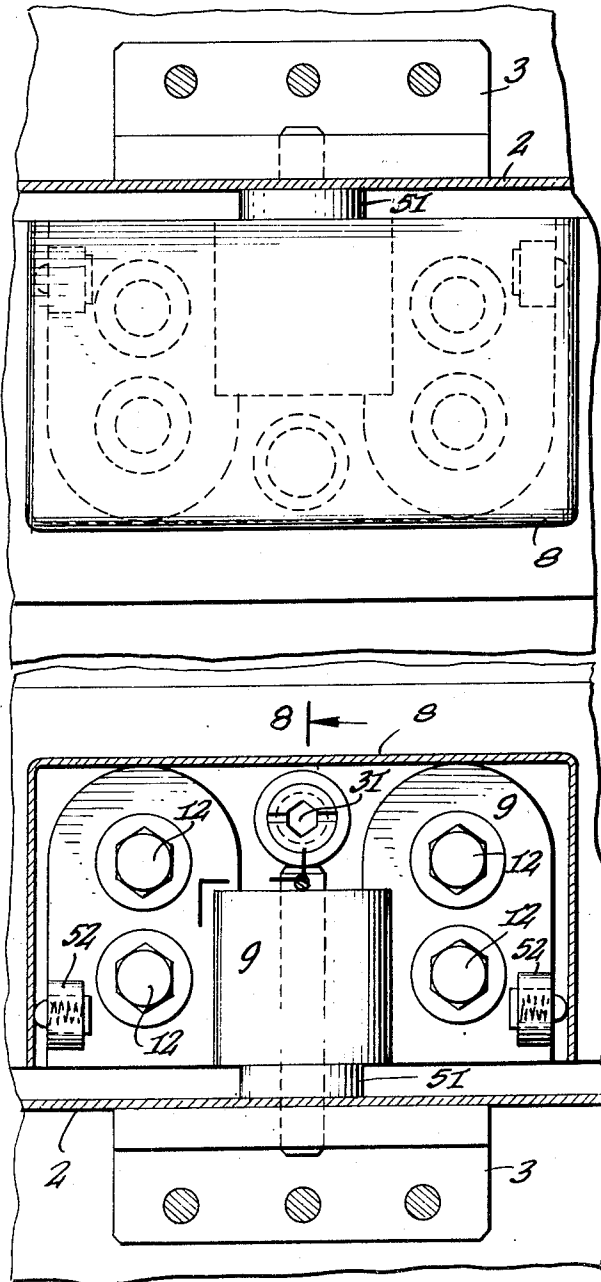
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PIVOTED WINDOW SASH WITH SASH SEALING MEANS

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FIG-7



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FIG-9

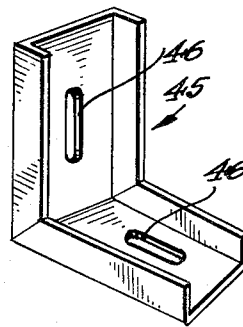
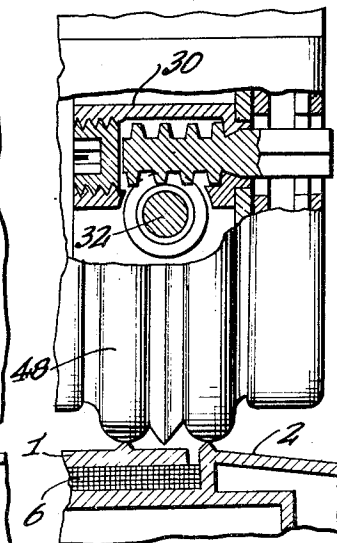


FIG-8



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PIVOTED WINDOW SASH WITH SASH SEALING MEANS

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Application April 22, 1954, Serial No. 424,798

6 Claims. (Cl. 189-69)

This invention relates to a pivoted window, and more particularly to a pivoted window adapted to effect a weathertight seal against atmospheric elements.

It is an object of this invention to provide a pivoted window having resilient means peripherally disposed thereabout adapted to effect a weathertight seal with coacting frame.

It is another object of this invention to provide a metal window prepared from extruded longitudinal members.

It is another object of this invention to provide a metal window comprising a frame piece made from extruded longitudinal members and a pivoted sash prepared from extruded longitudinal members.

It is another object of this invention to provide a pivoted window adapted to be rotated through an arc for easy cleaning of the outside face of the window pane thereof.

It is another object of this invention to provide a window sash having a peripherally disposed weather strip thereabout, and having means for expanding said weather strip to effect a weathertight seal to a coacting frame.

It is another object of this invention to provide an all metal window sash having a peripherally disposed resilient weather strip, and further having pressure bars disposed beneath said weather strip and adapted to move said weather strip outwardly from the sash.

These and other objects of this invention will become apparent on reading the following descriptive disclosure taken in conjunction with the accompanying drawings, in which:

Fig. 1 is a front view of a rectangular embodiment of a window of this invention;

Fig. 2 is a sectional view taken substantially on line 2-2 of Fig. 1;

Fig. 3 is a view taken substantially on line 3-3 of Fig. 1, parts being broken away;

Fig. 4 is a top view of the window showing the window frame in section, and showing the sash pivoted at an angle relative to the window frame;

Fig. 5 is a view of a broken away sash, partly in section, showing interior construction of the sash and showing the pressure bars disposed in a closed position;

Fig. 5a is a detailed view of the worm and gear operating mechanism adapted to rotate a right-handed and left-handed screw threaded rod;

Fig. 6 is a view similar to that of Fig. 5, but showing the sash pressure bars disposed in an open position;

Fig. 7 is a view of the sash broken away in part and showing a bottom pivot housing;

Fig. 8 is a view broken away in part and partly in section and taken substantially on line 8-8 of Fig. 7;

Fig. 9 is a view of the slotted angle bars used in the sash construction;

Fig. 10 is a view taken substantially on line 10-10 of Figs. 1 and 5, and taken through a lateral or side wall of the window frame and sash; and

Fig. 11 is a view taken substantially on line 11-11 of Fig. 5.

Referring to the drawings, and more particularly to Figs. 1 to 3, there is shown a metal window prepared from extruded longitudinal elements and consisting of a

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window frame generally designated by the letter A and a window sash generally designated by the letter B.

The window frame A comprises a plurality of tubular extruded metal sill members 1. The sill members 1 are disposed exteriorly of the face of the building into which the window is inserted. A window frame extruded structural element, generally designated by the numeral 2, is secured to the sill structure of the building, generally designated by the numeral 3, by means of nut and bolt assemblies 4. The extruded tubular sill 1 is secured to the structural extruded metal window element 2 by means of a plurality of removable screws 5, a longitudinal separator plate 6 of noncompressible material, for example Micarta or other nonmetallic material, is disposed between the sill 1 and the window element 2 to effect a firm rattleproof and watertight seal between the elements 1 and 2.

The sash B comprises a plurality of longitudinal extruded tubular elements 7 having U-shaped recesses therein, said recesses being disposed outwardly of the elements 7. In the embodiment of this invention shown in the drawings, a rectangular sash and window sill is shown, but it is apparent that other configurations such as five-sided, six-sided and other windows and sash are operable within the scope of this invention. The sash B is provided at its interior, centrally disposed and secured to both the top and bottom longitudinal elements, with a pivot housing 8. Interiorly of the pivot housing 8 (Fig. 3) is a pivot yoke 9. The yoke 9 is provided with a centrally disposed aperture 10, and a pivot pin 11 is disposed therein. The yoke 9 is secured to the sash B through the tubular elements 7 having apertures provided therein to receive securing bolts 12. To effect a firm grip of the bolts 12 to the sash B, a filler block 13 is disposed within the tubular elements 7 and provided with screw threaded apertures to receive bolts 12.

The extruded tubular sash member 7 has a substantially T-shaped opening or aperture, and the shape of the extrusion itself is generally T-shaped having the longitudinal walls 14 of the T section of the extrusion disposed outwardly toward the sill 1, when the sash is disposed in a closed position (Fig. 2). The base 15 of the stem of the T-shaped extrusion 7 is provided with a pair of securing ridges 16.

A noncompressible plate piece 17, for example Micarta or other synthetic material, is disposed upon the ridges 16 and a first longitudinal support member 18 of extruded metal is disposed over the noncompressible plate piece 17. A locking plate 19 is provided with screw holes, not shown, and adapted to be secured by means of conventional screws, not shown, through members 18 and 17 and into the ridges 16. The locking plate 19 is provided with a U-shaped end section generally designated by the numeral 20.

The glass window pane employed in the sash of this invention is preferably of the Thermopane variety, namely double wall glass window pane 21, for insulation against transmission of heat and cold. The insulating window pane, for example Thermopane, is disposed between a T section of the tubular element 7 and the U-shaped section 20 of locking plate 19. The window pane 20 is separated from contact with the metal of extruded element 7 by means of longitudinal spacer bars 22. The window pane 21 is firmly held in place between extruded elements 7 and 19 by means of conventional putty 23.

It is apparent that if the window pane 21 is broken and therefore is to be replaced, removal of the locking plate 19 by removal of the screws, not shown, for securing said plate 19 will permit insertion of a new window pane.

Vertically disposed U-shaped recesses of the sash B are provided with a plurality of slotted flanges 24. These

slotted flanges 24 are secured to that section of the stem of the T-shaped tubular element 7 that is disposed away from the window pane 21, and constitutes the base of the recess. In other words, the U-shaped recess of the tubular elements 7 which are disposed about the four sides of the rectangular sash B are provided with slotted flanges 24 only in the vertically disposed tubular elements 7. The slots of the flanges 24 are disposed at an oblique angle upwardly from the horizontal plane and away from the window pane 21. Manifestly the flanges 24 on the two vertical sides of the sash are disposed in opposed relation (Figs. 6 and 7).

A plurality of U-shaped pressure bars, consisting of a top pressure bar 25, two lateral pressure bars 26 and a bottom pressure bar 27, are disposed within the U-shaped recesses of tubular elements 7. These pressure bars 25, 26 and 27 are movably secured to one another and adapted to move toward or away from the center of the window pane 21. The pressure bars 25, 26 and 27 are motivated by means of a hand operated worm and gear assembly 28, shown in detail in Fig. 8. The pressure bars 26 disposed on each side of the window sash are provided with a plurality of pins 29, which pins traverse the two legs of the U-shaped bars and are adapted to engage the slots of the flanges 24. The worm and gear assembly 28 is provided with a housing 30 and a key operated worm gear 31. The worm gear 31 is adapted to rotate the second worm gear 32 disposed at substantially right angles to the gear 31. The gear 32 is adapted to rotate both a left-handed threaded rod 33 and a right-handed threaded rod 34 by conventional means, not shown.

The left-handed threaded rod 33 is threadingly disposed within a left travel block 35, and the right-handed threaded rod 34 is threadingly disposed into a right travel block 36. Rotation of the worm gear 31 causes the travel blocks 35 and 36 to move away from or toward each other, depending upon the direction of rotation of the worm gear 31. The travel blocks 35 and 36 are provided with movable link bars 37 secured to said blocks and to the bottom U-shaped pressure bar 27, so that outward movement of the travel blocks 35 and 36 will effect outward movement of the pressure bar 27 away from the window pane 21 (Fig. 5).

The travel block 35 is pivotally secured by means of adjustable link 38 to one of the lateral U-shaped pressure bars 26, and the travel block 36 is pivotally secured by means of adjustable link 39 to the other of the lateral U-shaped bars 26. As can be seen in Figs. 5 and 6, simultaneous outward movement of the travel bars 35 and 36 causes simultaneous outward movement of the lateral U-shaped pressure bars 26 away from one another and therefore away from the fixed window pane 21 of the sash B. Conversely, inward movement of the travel blocks 35 and 36 causes inward movement of the pressure bars 26 with the pins 29 slidably engaging the slots of the fixed flanges 24.

In order to effect inward and outward movement of the top U-shaped pressure bar 25, the lateral pressure bars 26 are secured at their tops to corner flanges 40 which overhang and embrace the pressure bar 25. The said top pressure bar 25 is provided with blocks 41 (Fig. 2), and a rod 42 is fixed to the outermost block and is slidable in the innermost block. Each corner flange is secured to the outermost block by a screw 44, the said top surfaces of the pressure bar 25 being slotted to permit movement of said screw with the block in which it is projected. A transverse pin 43 is secured to one end of each outermost block 41 and in each case is disposed under a finger of the appropriate corner flange 40. It is apparent that the combined outward and upward movement of each lateral pressure bar 26 releases the top pressure bar 25, whereas the combined inward and downward movement of the lateral pressure bars causes the corner flanges 40 to bear down on the block pins 43. The

downward movement of the outer block, in each case, will be transmitted to the inner block by the rod, and the downward pressure will substantially be equalized both centrally and at the ends of the said upper pressure bar.

The bottom U-shaped pressure bar 27 is movably secured to the lateral U-shaped pressure bar 26 by means of corner flanges 45 (Fig. 9) having longitudinal slots 46 in each of the lugs of the corner flanges. The corner flanges 45 are movably secured to their respective U-shaped bars 26 and the bottom bar 27 by means of headed bolts 47, the head of the bolts being such as to engage the side walls of the slots.

The resilient peripheral weather strip 48 is disposed about the sash and exteriorly of the pressure bars 25, 26 and 27. The resilient weather strip 48 is preferably made of rubber or synthetic rubber, or other equivalent flexible material, and is preferably of the cross section configuration shown in Figs. 2, 10 and 11. This cross section configuration of the resilient weather strip 48 is such as to possess a pair of substantially circular apertured pressure engaging sections adapted to engage the pressure bar of the sash and corresponding ridge 49 of both the sill 1 and the window structural element 2.

The weather strip 48 is secured to the T-shaped tubular extruded member 7 of the sash by means of longitudinal securing strips 50. These longitudinal securing strips 50 are removably secured to the respective sections of the shaft by conventional means, for example, removable screws, not shown. The weather strip 48 is so disposed about the pressure bars 25, 26 and 27 and the corresponding corner flanges 40 and 45 so as to present an exterior surface adapted to be moved outwardly by the outward movement of the pressure bars and their corresponding corner flanges 40 and 45. The weather strip 48 is disposed on top of the corner flanges 40 and 45, thereby preventing the pinching of the strip 48 by inward movement of the pressure bars 25, 26 and 27 at the respective corners thereof.

The pivot yoke 9 is separated from the window structural frame piece 2 by means of a washer 51 (Fig. 7). A pair of spring loaded snap pressure securing pins 52 are secured interiorly of the housing and to the yoke 9. These snap pins 52 effect a tight fit of the yoke to the pivot housing 3. The pivot pin 11 is disposed through a respective aperture in the window structural member 2 and into a suitable aperture provided therefor in the building structural framework 3.

In the operation of the pivoted window of this invention, the window sash B, after being unlatched from securing latches of conventional design, generally shown by the numeral 53, may be rotated through an angle, as shown in Fig. 4, thereby permitting cleaning of the pane surfaces which normally lie outside of the building.

The window of this invention is particularly adapted to produce a weathertight seal against rain and the elements in general upon closing the window so that the weather strip 48 engages the coacting ridges 49 of the sill 1 and window frame piece 2.

A particularly effective weathertight position is obtained by this invention by rotation of the worm gear 31, thereby causing simultaneous outward movement of all four U-shaped pressure bars 25, 26 and 27 along with outwardly disposed movement of the corresponding corner flanges 40 and 45. This outward movement of the pressure bars and their corresponding flanges causes an outward movement of the peripherally disposed resilient rubber weather strip 48 causing the circular tubular sections of the weather strip 48 to firmly and vigorously engage the ridges 49 against any possible seepage of rain through the seal formed between the strip 48 and the corresponding longitudinal ridges 49.

Having described our invention, what we claim and desire to secure by Letters Patent is as follows:

1. In a pivoted window structure comprising a window

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sash and a frame to which is secured by a pair of opposed pivot pins the sash having a cavity at each side and its top and bottom, a U-shaped movable bar disposed within each sash cavity, resilient means carried by said sash sides adapted to be engaged by said bars, to effect a weathertight seal of the sash in the frame, and means disposed within said sash for simultaneously actuating said bars and said resilient means to produce a water tight juncture with said frame, opposed diagonally slotted members carried by the sash sides, and a plurality of guide pins carried by the sash-side U-shaped bars adapted to engage the walls of said slots whereby said U-shaped bars may be moved outward and upward, and connections between the bottom U-shaped bar and the sash-side U-shaped bars.

2. A pivoted window structure in accordance with claim 1, in combination with an angle plate embracing each corner of the U-shaped bar assembly and connected thereto for movement of the U-shaped bars relative to one another.

3. A pivoted window structure in accordance with claim 1, in combination with an angle plate embracing each corner of the U-shaped bar assembly and connected thereto for movement of the U-shaped bars relative to one another, rods slidably connected to and lying within the top U-shaped bar, the inner ends of the rods lying within the center area of said top U-shaped bar, blocks to which the outer ends of the rods are fixed, and means connecting the top angle plates to said blocks.

4. A pivoted window structure in accordance with claim 1, in combination with an angle plate embracing each corner of the U-shaped bar assembly and connected thereto for movement of the U-shaped bars relative to one another, said plates constituting normally top and normally bottom plates in accordance with the position of the window structure in use, rods slidably connected to and lying within the top U-shaped bar, the inner ends of the rods lying within the center area of said top U-shaped bar, blocks to which the outer ends of the rods are fixed, means connecting the top angle plates to said blocks,

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and studs carried by each block and projecting through the side of said top U-shaped plates, the top angle plates engaging said studs.

5. In a pivoted window structure comprising a window sash and a frame to which is secured by a pair of opposed pivot pins the sash having a cavity at each side and its top and bottom, a U-shaped movable bar disposed within each sash cavity, resilient means carried by said sash sides adapted to be engaged by said bars, to effect a weathertight seal of the sash in the frame, and means disposed within said sash for simultaneously actuating said bars and said resilient means to produce a water tight juncture with said frame, opposed diagonally slotted members carried by the sash sides, and a plurality of guide pins carried by the sash-side U-shaped bars adapted to engage the walls of said slots whereby said U-shaped bars may be moved outward and upward, and adjustable connections between the bottom U-shaped bar and the sash-side U-shaped bars.

6. A pivoted window structure in accordance with claim 1, in which said bar actuating means comprise a key operated worm gear, a second worm gear disposed at substantially right angles to and operatively engaged by said key operated gear, a threaded rod rotatably connected at its inner end to said second gear at each end thereof, travel blocks connected to the outer ends of said rods, and link bars connecting said travel blocks to said bottom and said sash-side U-shaped bars.

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