Sept. 15, 1942. C. R. NAGEL 2,295,681

METAL SASH CASEMENT AND FRAME

Filed Sept. 30, 1940 2 Sheets-Sheet 1

Fig. 1

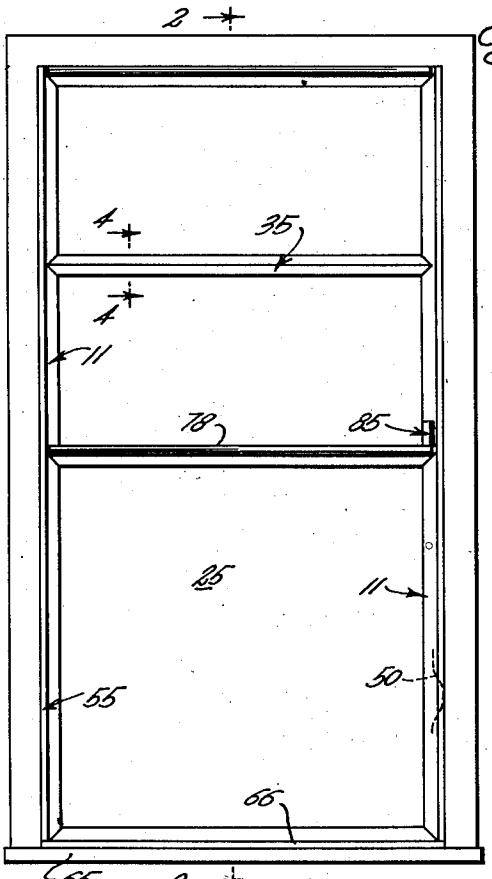


Fig. 2

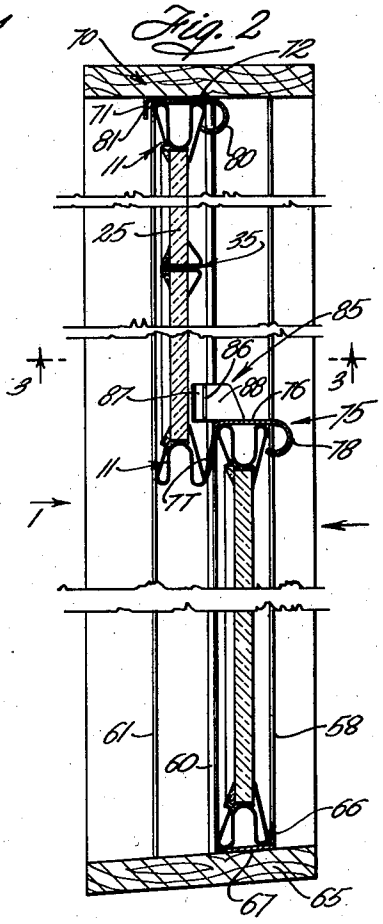


Fig. 3

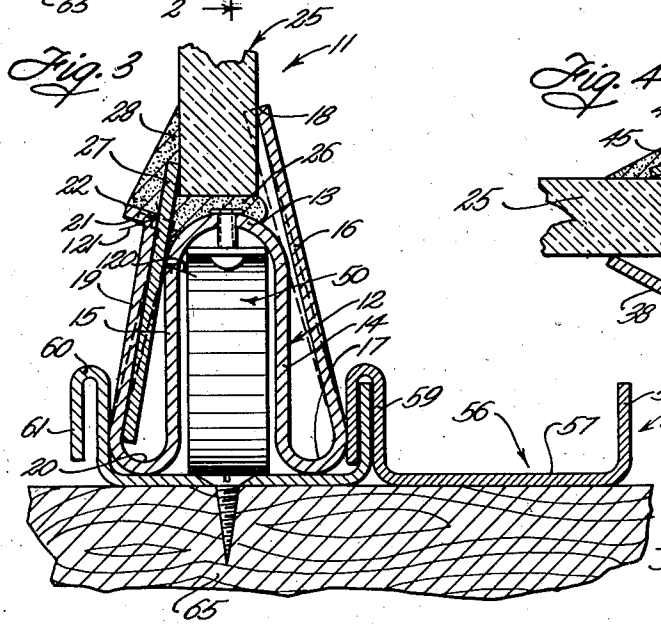
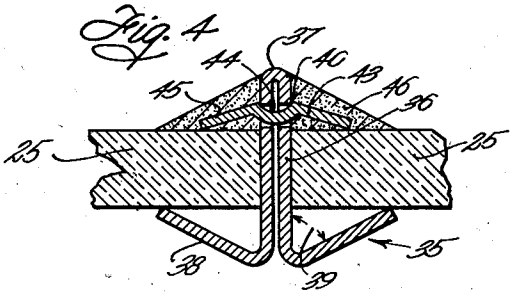


Fig. 4



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Fig. 5

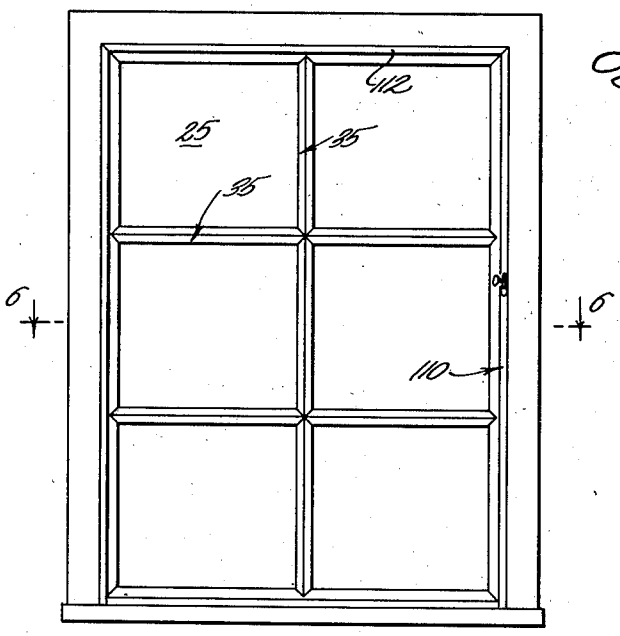


Fig. 6

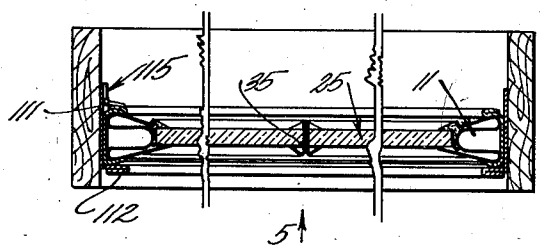
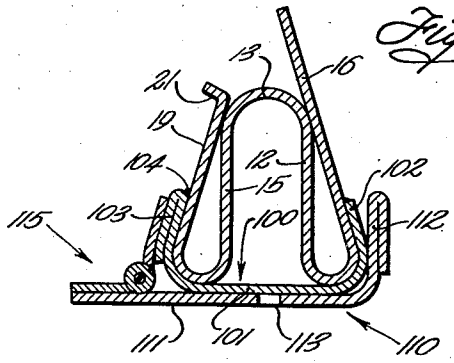


Fig. 7



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Patented Sept. 15, 1942 2,295,681

UNITED STATES PATENT OFFICE

2,295,681

METAL SASH CASEMENT AND FRAME

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Application September 30, 1940, Serial No. 359,100

8 Claims. (Cl. 189—76)

My invention relates to a metal sash and metal frame construction for use in windows, doors and the like whether having glass in the sash or opaque panels. The sash is of a type that may be employed either sliding such as double hung sash for a window or as hinged casement sash.

In many types of metal sash for windows or for folding opaque panels, the design does not permit the glass or panel to be held in place by glazier's points or glazier's nails prior to retaining the glass in place by putty and further most of the metal sash for engaging glass or panels require a bending operation by the person fitting the glass or panels in the metal sash. In other types of construction the edge of the glass or panel fits quite snug into a channel shaped to engage the edge and two sides of the glass in which case the channel must be substantially the correct size and some type of padding utilized in contact with the glass.

In other types the metal of the sash is in the form of quite a wide channel with the edges of the sides curled inwardly and forming a resilient contact with the glass but these structures unless the channel is filled with some suitable material do not adequately retain the glass in place and some of them in fact require a wood filler, the metal of the sash being in effect a covering for such filler.

A main object and feature of my invention as it relates to the construction of the sash proper is in providing an edge support or centering construction for the sheet of glass or panel to engage the edges of such sheet or panel having a resilient flange-like member contacting the glass or panel on one side on a line spaced from the base. On the opposite side I also have a second flange shorter than the first and preferably curled outwardly at its edge, this also being adapted to engage the glass near the base. Both flanges however are yieldable and the second flange due to the curl provides a guide for driving a glazier's point or glazier's nails which cause a wedging outwardly of the second flange, then putty may be filled against the glass at such second flange embedding the glazier's points and thus producing a finished sash made in a simple manner. As a further detail feature of my invention the sash as to the bottom and top rails and the two stiles and main construction of the meeting bar if such is used are constructed from sheet material made with an outwardly facing channel with the web inwardly and two outwardly extending sides and formed integral with each side is the first and second flange being connected thereto by a reverse bend, this giving the resilient construction to the flanges.

A further feature of my invention is in the use of a metal sash bar having reverse folds in the strip of metal forming parallel webs and with a flange on each web bending back at an acute angle. The edges of the glass or panel thus abut the webs and the flanges engage the inside face of the glass. A resilient retaining clip extending through a perforation of the webs engages the outer face of the panels or glass and this may be covered in with putty. My invention also comprehends such details as a meeting rail for sliding sash formed by an outside resilient strip engaging the lower rail of the upper sash. Other features include a cover for the top rail formed of metal and being used as a device for vertically sliding the sash. Other features include forming a frame of sheet metal bent in channel form with a reverse bend as to one flange so that these may be built up forming guideways for sliding sash. With this construction one of the guideways may be crimped around the outside of bars of the rails or stiles of the sash and thus be used in casement sash where it is necessary to have sufficient stiffening.

My invention is illustrated in connection with the accompanying drawings, in which:

Fig. 1 is an elevation of a window illustrating my invention applied thereto taken in the direction of the arrow 1 of Fig. 2.

Fig. 2 is a vertical section through the window on the line 2—2 of Fig. 1.

Fig. 3 is a horizontal section on the line 3—3 of Fig. 2 showing one of the stiles and the side guides for the window, the top and bottom rails of the sash being of a similar construction.

Fig. 4 is a detail section through a sash bar on the line 4—4 of Fig. 1 in the direction of the arrows.

Fig. 5 is an elevation of casement sash as taken from the inside in the direction of the arrow 5 of Fig. 6.

Fig. 6 is a horizontal section on the line 6—6 of Fig. 5 in the direction of the arrows.

Fig. 7 is a section through one of the stiles and may be considered an enlargement of one of the stiles as shown in Fig. 6.

Referring first to the sash construction designated by the assembly numeral 11, this is made up of top and bottom rails and two stiles each formed substantially as follows being provided with an outwardly facing channel 12 having a web 13 and two sides identified as 14 and 15. From the side 14 there extends a long flange 16

connected by a sweeping reverse bend 17. This has the inner edge 18 spaced a considerable distance from the base 13. A second flange 19 extends from the side 15, there being a sweeping curve 20 similar to the curve 17. This flange has an outward flare or curl 21 terminating at an edge 22, this edge being but slightly spaced inwardly of the sash from the web 13. This second flange is thus considerably shorter than the first flange.

In fitting a pane of glass such as 25, note Fig. 3, the glazier proceeds much in the ordinary or conventional manner. The web 13 and the flange 16 may be considered as forming a rabbet over which is smoothed a coating of putty indicated by the body 26. This thus forms a thin film of putty along the web 13 completely around the opening of the sash. The outward curl 21 of the flange 19 and its edge 22 are so proportioned that they allow the glass pane to be fitted through the opening formed by the outline of the edges 22 and bed the glass on the putty smoothed into the rabbet. A series of glazier's points 27 are then driven between the flange 19 and the base 13 of the outwardly facing channel. These points or glazier's nails press against the outer face of the glass pane and cause a wedging action which forces both flanges slightly outwardly from contact with the web, that is, the glass pane is forced inwardly sufficient to bend the web 16 from the dotted to the full line position of Fig. 3 and the driving in of the points wedge the outer flange 19 from the dotted to the full line position of the same figure. The glass pane is thus firmly held in position for the glazier to finish puttying at his convenience. The outer finish of putty 28 is lined up with the edge 22 of the curl 19 and some of this putty is forced into the space between the side 15 of the channel 12 and the flange 19, thus the pane of glass is adequately bedded in putty but the edge 18 of the flange 16 has a contact with the inside of the glass pane. As the miter joints are made in the conventional manner, these are not illustrated in detail, the sheet metal being soldered or brazed at the joints, or other suitable construction.

Where it is necessary to have sash bars, these are constructed as shown in Fig. 4 in which the sash bar 35 is formed of a strip of sheet metal bent to have two parallel webs 36 with a reverse bend 37 causing such webs to be but slightly spaced. Each web has a flange 38 forming an acute angle 39 with the web. The two webs have aligned circular perforations or slots 40. This is to accommodate a resilient locking pin 43 which has a central bent section 44 and two opposite end portions 45 which bear on the opposite sides of the glass panes. In this construction the flanges 38 engage the inside face of the two panes of glass, the locking pins or keys 43 retaining the glass on the outside and then a bedding of putty 46 forms the finish. This trims off with the putty coat 28. These sash bars are mitered and soldered to the stiles and the rails of the sash in a conventional manner.

Where I desire to use the sash for window closure of the sliding sash type, I construct this as shown in connection with Figs. 1, 2 and 3. A convenient manner to retain the sash in adjusted positions when open or to hold up the upper sash is by the use of leaf springs 50, note Figs. 1 and 2, in which one end is secured to the web 13 fitting in the channel 12. The hump is bowed outwardly and the other end slides on the web. These springs engage retaining devices on the sides of the window frame or the space of the channels may be used for chains or bands for counterweighted sliding sash windows.

The window frame assembly 55 employs guide channels 56 for the stiles, these having a web 57, a single flange 58, a double flange 59 having a reverse bend 60 and an outer locking flange 61. These channels are assembled as shown in Fig. 3, the flange 58 of one channel fitting inside of the locking flange 61. At the sill 65, a single angle is used for an inner flange 66 and a sill flange 67. At the lintel or top of the window there is a lintel flange 70 having a water drip, downwardly extending flange 71 and a horizontal flange 72 secured to the lintel of the window frame. By this construction it will be seen that the sliding sash may be fitted in the guides formed by the channels 56 and thus slide vertically. One or both of these may be readily removable in case it is desired to take the sash completely out of the window.

For double hung or sliding sash I employ a meeting rail assembly 75. This includes a sheet metal strip, note Fig. 2, having a horizontal header 76 and a resilient outside strip 77, there being a curled finger grip edge 78 on the inside. A cap for the upper sash 80 has a similar bend 76 and finger grip 78 but has the downwardly curled edge 81 soldered or brazed to the outer short flange 19. When the sash are in the closed position as shown in Fig. 2, the resilient strip 77 rides slightly upwardly over the reverse bend 17 on to the lower portion of the flange 16 on the bottom rail of the upper sash, thus giving an air tight joint connection and having a sufficient resiliency restraining any rattle of the sash often caused by wind.

For double hung sash I have a simple sash lock 85. This includes a hinge 86 with a fixed leaf 87 attached to the upper sash on one of the stiles and has a moving leaf 88 which may be swung over the cap 75. Instead of using the outwardly facing part of the channel 12 in the stiles to provide for the mounting of holding springs such as 50 or for the chains of a suspension means for balancing the sash, this space may be used for weather proofing such as felt, composition rubber or the like. Also, felt or water proofing may be incorporated in both the bottom and the top rails at the outwardly facing channel should this be desirable.

Where it is desirable to provide a casement sash or the equivalent, I employ substantially the same shape framing member for the stiles and top and bottom rail thus employing the channel structure 12 with the flanges 16 and 19 as shown in Fig. 7. In this case however in order to stiffen the construction and provide a definite binding on the edge and closure for the frame of the sash, I use channels substantially the same as used for the guides of the window frame assembly 55. In fact, one of these channels properly bent provides an enclosing channel 100 with a web 101, a single flange 102 on one side, this preferably lapping the flange 16 and a double flange 103 overlapping the flange 19. These inwardly bent flanges of the covering channel are attached to the frame member by solder or brazing indicated at 104. This makes a rigid structure and encloses the outwardly facing channels 12 at both of the stiles and the top and bottom rail. The sash bars may be of the same construction as shown in Fig. 4 and built in the casement sash in the same way.

A suitable frame or casement sash for attachment to the window frame indicated at 110 is formed of sheet metal having a flat base 111 for

attaching to the stiles of the window frame to the sill and to the lintel if desired. This has a reverse bent flange 112 forming a double thickness located on the inside, this giving stiffness and a suitable finish. There are perforations 113 through which screws, nails or the like may be inserted for fastening this simple frame in a wood frame. A hinge 115 is illustrated as having one leaf attached to the base 111 and another leaf secured to the reverse bent flange 103. This gives a substanial attachment of the casement sash to the hinge and hence to the window frame. The illustration shows a sash for opening outwardly as it is the usual practice to have the putty on the outside of the window where it is subject to the weather. If the sash is to swing inwardly on its hinge, of course the frame 110 would be reversed and the hinge secured to the flange 102 of the enclosing channel 100.

It is believed obvious that the metal sash as above described and illustrated is suitable for mounting panels as well as glass and by proper proportions as to the size of the outwardly facing channels 12, may be constructed for different thicknesses of glass, quite a variation in the thickness of panels and even for quite thick sheet metal panels, the principle of construction being substantially the same. In fact, where desired, putty may be entirely omitted and instead of using a series of glazier's points or glazier's nails, a strip of metal may be driven between the curled flange 19 and the base 13 of the upwardly facing channel 12. This strip would then be as indicated by 27 in Fig. 3 as to cross section.

A characteristic of the side members of the sash is that the outwardly facing channels should have a rounded web or base. These may thus be considered as U shaped channels. It is not necessary however that the base be a semi-circle. The outer edge 22 of the flange 19 extends slightly inwardly of the line of the inner portion of the base. This curl or flare 21 should be quite sharp. This construction therefore provides a space and a curved surface on the base for starting a glazier's point. These are usually pressed outwardly as to the glass pane and parallel along the side of the pane. The leading end of the glazier's point or nail is then deflected outwardly by the joining corner of the base 13 and the flange 15 and follows along the inside of the resilient flange 19. When a pane of glass is thus held in place by the glazier's points or nails, there is thus a point of leverage indicated by the arrow 120 of Fig. 3 on the inside and the arrow 121 on the outside, this latter point being adjacent the angle of the curl or flare 21. This construction therefore causes the heads of the glazier's points or nails to press tightly against the glass pane, thus securely holding the same in place whether or not the joint is finished with putty. The putty or the equivalent of course is necessary to make a water-proof glazing for the window. In cases where interior panels or glass is used, a metal strip may be substituted for the glazier's points and will have the same action of retaining the panel in place due to the spring of the two flanges 16 and 19 towards each other, this depending on the rise of metal, the panels may be readily retained in place whether or not putty is used.

Various changes may be made in the details of the construction without departing from the spirit or scope of the invention as defined by the appended claims.

I claim:

1. A metal sash having side members each with an outwardly facing channel having a base and two opposite parallel sides, a first flange connected to one side by a reverse bend extending inwardly beyond the base, a second flange connected to the other side by a reverse bend and having an outward curl positioned slightly inwardly of the base, each flange converging towards the corner formed by the side to which it is attached and the base.

2. A sash construction including in combination a metal channel having a base with outwardly extending sides, a first resilient flange connected to the first side by a reverse bend, a second resilient flange connected to the second side by a second reverse bend, a panel centered adjacent the base, the first flange engaging the panel on one side, one or more retainers fitted between the second flange and the second side of the channel, said retainers engaging the panel by a lever action on the side opposite that engaged by the first flange and a bedding of putty engaging the panel and covering the retainer, the edge line of the putty being defined by an edge of the second flange.

3. A metal sash having a base adapted to be positioned opposite the edge of a pane, a flange connected to one side thereof projecting inwardly beyond the base to form an abutment against which one side of the pane may be positioned, and a second flange connected to the other side of the base but not extending inwardly as far as the first flange so as to permit of insertion of the pane, said second flange being yieldably biased to cooperate with the base to clamp glazier's points therebetween.

4. A metal sash having a base adapted to be positioned opposite the edge of a pane, a flange connected to one side thereof projecting inwardly beyond the base to form an abutment against which one side of the pane may be positioned, and a second flange connected to the other side of the base but not extending inwardly as far as the first flange so as to permit of the insertion of the pane, said second flange being yieldably biased to cooperate with the base to clamp glazier's points therebetween, said second flange having a laterally bent inner edge serving as a ground for putty.

5. A metal sash having a base adapted to be positioned opposite the edge of a pane, outwardly extending sides at the sides of the base, said sides being reversely bent at their outer ends to provide inwardly extending yieldable flanges, one of the flanges extending inwardly a greater distance than the other, and the other of the flanges having its inner edge approximately transversely even with the base whereby a pane may be inserted in the sash within the shorter flange and abutted against the longer flange.

6. A metal sash having a base adapted to be positioned opposite the edge of a pane, outwardly extending sides at the sides of the base, said sides being reversely bent at their outer ends to provide inwardly extending yieldable flanges, said flanges converging inwardly and normally contacting the sides of the base, one of the flanges projecting inwardly a greater distance than the other to form an abutment for a pane, the other flange cooperating with the side of the base to clamp glazier's points therebetween.

7. A metal sash having a base adapted to be positioned opposite the edge of a pane, outwardly extending sides at the sides of the base, said

sides being reversely bent at their outer ends to provide inwardly extending yieldable flanges, said flanges converging inwardly and normally contacting the sides of the base, one of the flanges projecting inwardly a greater distance than the other to form an abutment for a pane, the other flange cooperating with the side of the base to clamp glazier's points therebetween and serving as a ground for putty.

8. A metal sash having a base adapted to be positioned opposite the edge of a pane, outwardly extending sides at the sides of the base, said sides being reversely bent at their outer ends to provide inwardly extending yieldable flanges, said flanges converging inwardly and normally contacting the sides of the base, one of the flanges projecting inwardly a greater distance than the other to form an abutment for a pane, the other flange cooperating with the side of the base to clamp glazier's points therebetween, and having its inner edge laterally bent to serve as a ground for putty.

CHARLES RICHARD NAGEL.