June 21, 1938. J. J. NUDING ET AL 2,121,094

BACK-SET METAL SASH

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Fig. 1.

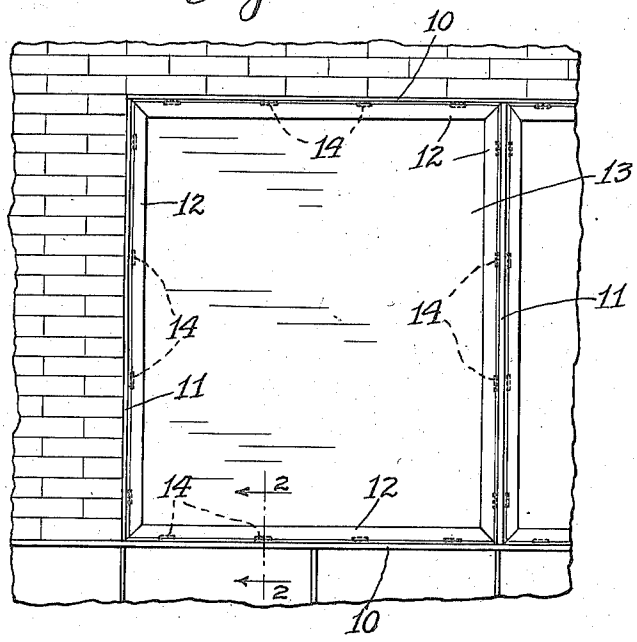


Fig. 2.

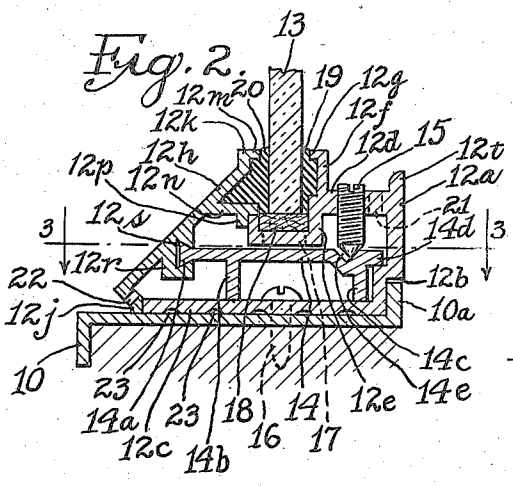
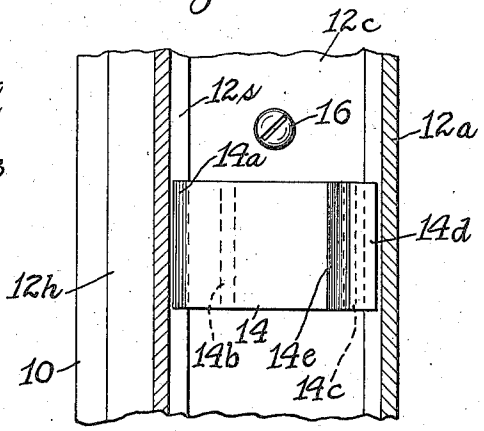


Fig. 3.



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BACK-SET METAL SASH

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17 Claims. (Cl. 20—56.4)

Our invention pertains to an improved construction of metal sash for use particularly with plate glass windows of the kind commonly used in stores and for other display purposes, although we do not limit its use to constructions of that kind.

In making metal sash of the kind referred to, it has been necessary to make the sash in two parts, one constituting the main sash portion which is inside of the glass and the other constituting the outside portion of the sash which must be removed to place the glass in the sash, since it is usually not feasible to mount the glass in the sash from the inside thereof. With sash of the kind described, it is important to secure the parts of the sash together inside of the glass supported by the sash for two reasons, first, unsightly fastening devices are eliminated, which would otherwise appear on the outer portion of the sash, and second, tampering with the sash construction is prevented. By our invention, we provide a sash construction in which the outer portion of the sash is secured in place from the inside of the glass, making a sash of the type known as back-set sash, and in connection with this construction we make the portions of the sash in such a manner that in the first place dangers of concentration of pressure on the glass are avoided which otherwise might readily crack the glass, and again pinching of the glass in securing the portions of the sash together, is prevented, thus preventing breakage of the glass for this cause. By our invention we further arrange that the interior of the composite sash construction provides clear passages for the drainage of the water of condensation which frequently accumulates on windows of the kind under consideration, and which, unless provision is made to prevent it, frequently collects in the sash construction and in cold weather freezes in said construction in a manner to prevent the free flow of the condensed water through the sash to the drainage openings provided therein.

The above and other advantages of our invention will more readily appear by reference to the accompanying drawing illustrating a preferred embodiment thereof, in which

Fig. 1 shows in front elevation a window provided with a sash construction in accordance with our invention,

Fig. 2 is a vertical sectional view to an enlarged scale of the sash construction shown in Fig. 1 taken along the line 2—2, and

Fig. 3 is a horizontal sectional view of the construction shown in Fig. 2, taken along the line 3—3.

Similar numerals refer to similar parts throughout the several views.

As shown in Fig. 1, our sash construction is mounted in a frame having horizontal members 10 and vertical members 11 in which the sash members 12 are mounted to support the glass 13. The sash members 12 contain at suitable intervals, locking members 14 by which the inner and outer portions of the sash are secured together.

The construction of the sash is more clearly shown in Figs. 2 and 3. As seen in Fig. 2, the lower frame member 10 is preferably of metal and in the form of a Z-bar with its outer leg extending downwardly and its inner leg extending upwardly. The inner portion 12*a* of the sash rests upon the frame member 10 and against the inner leg 10*a* thereof, a suitable rabbet 12*b* being preferably provided to contain the leg 10*a*. The base member 12*c* of the inner portion 12*a* of the sash is of substantially uniform thickness and no thicker than required to impart necessary strength to the structure in view of the size and weight of the glass 13 to be supported by the sash. The upper part of the inner portion 12*a* of the sash, is provided with a horizontally disposed member 12*d* from the inner edge portion of which an upwardly opening grooved portion 12*e* is supported. The inner edge of the part 12*d* has also extending therefrom, an upwardly extending flange 12*f* from the upper edge of which, a lip 12*g* extends towards the glass 13. The inner portion 12*a* of the sash, just described, is an integral structure extending the entire length of each edge of the glass supported by the sash, and is preferably made by extruding metal in plastic condition through suitable dies by pressure, so that the shape described and shown in Fig. 2 may be accurately produced in practically any length required for the purposes under consideration.

The front portion 12*h* of the sash consists principally of a plate like structure in an oblique position with its lower edge portion inwardly extended and terminating in the edge portion 12*j* which rests against the outer edge of the base portion 12*c* of the inner sash portion 12*a* and upon the frame member 10, the upper edge of the sash portion 12*h* being extended upwardly a short distance at 12*k* and provided with a lip 12*m* which is at substantially the height of the lip 12*g* and extends towards the glass 13. Just above the front edge of the groove portion 12*e* of the back sash portion 12*a*, the sash portion 12*h* is provided with a horizontally disposed member

12n extending over and engaging the front edge portion of the groove portion 12e, which horizontally disposed portion 12n is provided with a downwardly extending flange 12p limiting the possible movement of the front sash portion 12h towards the glass 13. Below the horizontal portion 12n, the front sash portion 12h is provided with a longitudinally extending enlarged portion 12r containing a longitudinal dovetail groove 12s containing the head 14a on the outer edge of the locking member 14, said head being of the same form as and fitting the groove 12s with a sliding fit. The locking member 14 is supported close to and just below the groove portion 12e of the sash portion 12a by downwardly extending members 14b and 14c, so that if there is any sagging of the groove portion 12e, it will be supported by the locking members 14 distributed along the length of the sash portions. The locking member 14 is extended at its inner edge at 14d to extend over and rest upon a corresponding shoulder portion of the inner sash portion 12a, which additionally supports and gives stability to the locking member 14. The locking member 14 is provided in its upper surface with a V-shaped groove 14e to receive a pointed set screw 15 extending vertically with threaded engagement through the horizontal member 12d of the inner sash portion 12a, said set screw being so disposed that when the outer sash portion 12h is moved tightly into engagement with the outer edge of the groove portion 12e and with the outer edge of the base portion 12c, said set screw will still not be in alignment with the mid-portion of said groove 12e so that the tendency of the set screw will continue to be to move the locking member 14 horizontally towards the upper portion of the inner sash portion 12a, thus tightly clamping the sash portions together. For this condition the lips 12g and 12m are spaced a greater distance than the thickness of the glass 13, so that there is no possibility of pinching the glass by locking the sash portions together.

In mounting the sash described, the inner sash portions 12a are first secured to the frame members 10 and 11, for example by screws 16, suitable clearance holes 17 being provided in the groove portion 12e of the inner sash portion 12a, to permit this to be done, the outer sash portion 12h and the locking members 14, being removed at the time, and the set screws 15 being moved from possible contact with said locking members. Small blocks 18 of suitable material, for example, wood or rubber, are then placed in the groove portion 12e to receive the weight of the glass 13 and equalize it and the glass 13 is then put in place, after first applying putty or similar sealing material 19 to the flange portion 12f of the inner sash portion 12a. When the glass 13 has been mounted as described, the locking members 14 are placed in the dovetail slot 12s and moved longitudinally in said slot until the inner ends of said locking members are in line with the set screws 15 employed, and after the upper portion of the outer sash portion 12h has had putty or similar sealing compound 20 applied to it, the outer sash portion 12h and its locking members 14 are slid towards the inner sash portion 12a, the support of the outer sash portion 12h and of the locking members 14 above described, serving to effect the engagement of the said parts above referred to, with the inner sash portion 12a, and bringing the grooves 14e sufficiently into alignment with the set screws 15, so that the set screws are then screwed down until their lower pointed ends press tightly against the inner surfaces of the grooves 14e to tightly hold the sash portions together, which serves to firmly press the putty or other sealing material 19 and 20 against the glass 13 and securely hold the latter in place, without the possibility of pinching the glass by the lips 12g and 12m. In Fig. 3 we illustrate one of the locking members 14, to show that it has a length only sufficient to certainly engage the corresponding set screw 15, and to also illustrate the relation between the locking member and one of the screws 16, since it will be apparent that the holes made to receive the screws 16 cannot be in the same lines transversely of the sash as the set screws 15, and at the same time permit the locking members to be slid into place as above described.

The outer sash portion 12h is preferably made by extruding metal through dies in the manner above referred to for sash portion 12a, and the locking members 14 are preferably similarly formed, the only difference being that the locking members 14 are cut from a long length of the extruded metal, so as to form the short length locking members above described.

At the rear edge of the horizontal portion 12d, the inner sash portion 12a is preferably provided with an upwardly extending flange member 12t forming a groove or gutter between said flange portion 12t and the flange portion 12f to collect the water of condensation that may run down the glass 13. Drainage openings 21 are provided at intervals longitudinally of the condensation gutter to drain the water collected therein, into the interior of the sash construction, where such water of condensation collects and flows across the bottom member 12c of the inner sash portion 12a, to and through the drainage openings 22 through the lower and rearwardly extending edge of the front sash portion 12h. It will be observed that the locking members 14 present no obstruction whatever to the flow of water through the sash construction, so that there is no stoppage of said flow to the drainage openings 22, and furthermore when the weather is cold enough to freeze the water in the sash construction, the flow of the water of condensation from the drainage openings 21 into and through the sash construction to the drainage openings 22, will not be completely stopped and interfered with until a very considerable amount of water has collected and frozen in the sash, which is a condition seldom met in using sash of the kind described. The lower surface of the base portion 12c of the inner sash portion 12a, is preferably provided with shallow grooves 23 to contain cement or suitable sealing compound, by which the joint between the member 12c and the corresponding frame member is sealed.

While we have described the use of cushioning blocks 18 in the groove portion 12e, it will be understood that if the sash construction described is used without such blocks there is still no concentrated pressure upon the edge of the glass 13, on account of the groove portion 12e being straight and parallel with the edge of the glass, so if for any reason the blocks 18 that are used disintegrate and permit the glass 13 to rest directly on the metal of the groove portion 12e, there is still no danger of cracking the glass, due to concentrated pressure.

In addition to the advantages above described for our sash construction, it will be observed that ample clearance is provided between the base member 12c and the groove portion 12e of the

inner sash portion 12*a*, so that the corners of the sash construction may be securely held together by means of connection angles or bars within and rigidly secured to the ends of the inner sash portions at the corners of the sash, for example by rivets or screws, without in any way interfering with applying the outer sash portions and locking members in the manner described, which facilitates building the sash complete in the factory if preferred. It will also be observed that no fastening devices of any kind are required to hold the locking members 14 in engagement with the outer sash portions 12*h*, and that said locking members may be quickly moved to any desired positions on said outer sash portions. It will further be observed that the same size and material of locking members 14 may be used with many different materials for the sash portions 12*a* and 12*h*, and since the latter are preferably of extruded metal in long lengths, the number of parts involve in making any sash is reduced to a minimum. It will be understood that the sash portions described, as well as the locking members 14 may be made of any material susceptible of being manipulated by extrusion, and it will be understood that while we prefer to form the sash portions and locking members by extruding the metal of which they are made in the manner described, we do not limit ourselves to constructing said sash portions and locking members in that manner.

In addition to the advantages of the sash construction above pointed out, it will be observed that the construction described is of advantage for the part of the sash above the glass 13, in that the close fit of the locking members 14 with the adjacent outer surface of the groove portion 12*e*, and the fit of the sash portion 12*h* against the outer edge of the groove portion 12*e*, prevent downward displacement of the outer sash portion 12*h* at the top of the sash, relatively to the adjacent inner sash portion 12*a*, thereby maintaining the miters of the sash portions 12*h* at the corners of the sash, in proper position.

In using the locking members 14 with the side members of the sash, said locking members may conveniently be held in alinement with the corresponding set screws during assembly, by indenting the dovetail groove 12*s* just below each of said locking members, for example, by means of a hammer.

While we have shown our invention in the particular embodiment above described, it will be understood that we do not limit ourselves thereto as we may employ equivalents without departing from the scope of the appended claims.

What we claim is:

1. In a metal sash, the combination of inner and outer stop members for holding the edge portion of a sheet of glass between them, said inner member having a base portion, a vertical inner wall extending upwardly from the inner edge of said base portion, a horizontal wall extending outwardly from the upper portion of said vertical inner wall, and an upwardly opening groove portion in front of and supported by the outer edge of said horizontal wall and constituting a glass receiving and supporting groove the bottom wall of which is above and spaced from said base portion, said outer stop member extending from said base portion to the top of said groove portion to enclose the outer side of said inner stop member and having a dovetail groove extending longitudinally along its inner surface, locking members having enlarged heads in said dovetail groove and adjustable longitudinally therein and extending under said horizontal wall, and set screws extending downwardly through said horizontal wall and engaging said locking members to hold said outer stop member against said inner stop member after mounting a sheet of glass in said glass receiving groove.

2. In a metal sash, the combination of inner and outer stop members for holding the edge portion of a sheet of glass between them, said inner member having a base portion, a vertical inner wall extending upwardly from the inner edge of said base portion, a horizontal wall extending outwardly from the upper portion of said vertical inner wall, and an upwardly opening groove portion in front of and supported by the outer edge of said horizontal wall and constituting a glass receiving and supporting groove the bottom wall of which is above and spaced from said base portion, said outer stop member extending from said base portion to the top of said groove portion to enclose the outer side of said inner stop member and having a dovetail groove extending longitudinally along its inner surface, locking members having enlarged heads in said dovetail groove and adjustable longitudinally therein and extending under said horizontal wall, and set screws extending downwardly through said horizontal wall and engaging said locking members to hold said outer stop member against said inner stop member after mounting a sheet of glass in said glass receiving groove, the upper surfaces of said locking members being closely adjacent to the bottom wall of said glass receiving groove to afford additional support thereto.

3. In a metal sash, the combination of inner and outer stop members for holding the edge portion of a sheet of glass between them, said inner member having a base portion, a vertical inner wall extending upwardly from the inner edge of said base portion, a horizontal wall extending outwardly from the upper portion of said vertical inner wall, and an upwardly opening groove portion in front of and supported by the outer edge of said horizontal wall and constituting a glass receiving and supporting groove the bottom wall of which is above and spaced from said base portion, said outer stop member extending from said base portion to the top of said groove portion to enclose the outer side of said inner stop member and having a dovetail groove extending longitudinally along its inner surface, locking members having enlarged heads in said dovetail groove and adjustable longitudinally therein and extending under said horizontal wall, and set screws extending downwardly through said horizontal wall and engaging said locking members to hold said outer stop member against said inner stop member after mounting a sheet of glass in said glass receiving groove, said vertical inner wall having a flange extending above said horizontal wall to form a condensation gutter, and said horizontal wall having drainage openings through it draining water from said gutter into said inner stop member, and said outer stop member having drainage openings through its lower edge portion to drain water from said inner stop member.

4. In a metal sash, the combination of inner and outer stop members for holding the edge portion of a sheet of glass between them, said inner member having a base portion, a vertical inner wall extending upwardly from the inner edge of said base portion, a horizontal wall extending outwardly from the upper portion of

tending outwardly from the upper portion of said vertical inner wall, and an upwardly opening groove portion in front of and supported by the outer edge of said horizontal wall and constituting a glass receiving and supporting groove the bottom wall of which is above and spaced from said base portion, said outer stop member extending from said base portion to the top of said groove portion to enclose the outer side of said inner stop member and having a dovetail groove extending longitudinally along its inner surface, locking members having enlarged heads in said dovetail groove and adjustable longitudinally therein and extending under said horizontal wall, and set screws extending downwardly through said horizontal wall and engaging said locking members to hold said outer stop member against said inner stop member after mounting a sheet of glass in said glass receiving groove, each of said stop members comprising a length of extruded metal having a uniform shape of cross-section throughout, and said locking members comprising short portions of a long bar of extruded metal having a uniform shape of cross-section throughout.

10. In a metal sash, the combination of inner and outer stop members for holding the edge portion of a sheet of glass between them, said inner member having a base portion, a vertical inner wall extending upwardly from the inner edge of said base portion, a horizontal wall extending outwardly from the upper portion of said vertical inner wall, and an upwardly opening groove portion in front of and supported by the outer edge of said horizontal wall and constituting a glass receiving and supporting groove the bottom wall of which is above and spaced from said base portion, said outer stop member extending from said base portion to the top of said groove portion to enclose the outer side of said inner stop member and having a dovetail groove extending longitudinally along its inner surface, locking members having enlarged heads in said dovetail groove and adjustable longitudinally therein and extending under said horizontal wall, and set screws extending downwardly through said horizontal wall and engaging said locking members to hold said outer stop member against said inner stop member after mounting a sheet of glass in said glass receiving groove, said locking members having supporting portions resting on said base portion and having longitudinal grooves in their upper surfaces provided with inclined surfaces engaging the lower ends of said set screws, whereby tightening said set screws presses said outer stop member tightly against said inner stop member.

11. In a metal sash, the combination of inner and outer stop members for holding the edge portion of a sheet of glass between them, said inner member having a base portion, a vertical inner wall extending upwardly from the inner edge of said base portion, a horizontal wall extending outwardly from the upper portion of said vertical inner wall, and an upwardly opening groove portion in front of and supported by the outer edge of said horizontal wall and constituting a glass receiving and supporting groove the bottom wall of which is above and spaced from said base portion, said outer stop member extending from said base portion to the top of said groove portion to enclose the outer side of said inner stop member and having a dovetail groove extending longitudinally along its inner surface, locking members having enlarged heads in said dovetail groove and adjustable longitudinally therein and extending under said horizontal wall, and set screws extending downwardly through said horizontal wall and engaging said locking members to hold said outer stop member against said inner stop member after mounting a sheet of glass in said glass receiving groove, said locking members having longitudinal grooves in their upper surfaces provided with inclined surfaces engaging the lower ends of said set screws, whereby tightening said set screws presses said outer stop member tightly against said inner stop member.

12. In a metal sash, the combination of inner and outer stop members for holding the edge portion of a sheet of glass between them, said inner member having a base portion, a vertical inner wall extending upwardly from the inner edge of said base portion, a horizontal wall extending outwardly from the upper portion of said vertical inner wall, and an upwardly opening groove portion in front of and supported by the outer edge of said horizontal wall and constituting a glass receiving and supporting groove the bottom wall of which is above and spaced from said base portion, said outer stop member extending from said base portion to the top of said groove portion to enclose the outer side of said inner stop member and having a dovetail groove extending longitudinally along its inner surface, locking members having enlarged heads in said dovetail groove and adjustable longitudinally therein and extending under said horizontal wall, and set screws extending downwardly through said horizontal wall and engaging said locking members to hold said outer stop member against said inner stop member after mounting a sheet of glass in said glass receiving groove, said locking members having longitudinal grooves in their upper surfaces provided with inclined surfaces engaging the lower ends of said set screws, whereby tightening said set screws presses said outer stop member tightly against said inner stop member, the inner wall of said glass receiving groove and said outer stop member having vertical flanges extending above said glass receiving groove and spaced a greater distance than the thickness of the glass, whereby the engagement of said inner stop member with said outer stop member maintains the spacing of said flanges and prevents pinching of the glass by said flanges.

13. In a metal sash, the combination of inner and outer stop members, said inner member having a glass receiving groove, a horizontal locking member having an outer edge portion held by said outer stop member and an inner edge portion extending into said inner stop member, and a vertical set screw in said inner stop member and engaging the top of the inner edge portion of said locking member to hold said outer stop member against said inner stop member.

14. In a metal sash, the combination of inner and outer stop members, said inner member having a glass receiving groove, a horizontal locking member having an outer edge portion held by said outer stop member and an inner edge portion extending into said inner stop member, and a vertical set screw in said inner stop member and engaging the top of the inner edge portion of said locking member to hold said outer stop member against said inner stop member, said locking member being movable longitudi-

nally of said outer stop member and having continuing holding engagement therewith.

15. In a metal sash, the combination of inner and outer stop members, said inner member having a glass receiving groove, a horizontal locking member having an outer edge portion held by said outer stop member and an inner edge portion extending into said inner stop member, and a vertical set screw in said inner stop member and engaging the top of the inner edge portion of said locking member to hold said outer stop member against said inner stop member, said outer stop member having a longitudinal groove holding said locking member, whereby said locking member may be moved longitudinally of said outer stop member.

16. In a metal sash, the combination of inner and outer stop members, said inner member having a glass receiving groove, a horizontal locking member having an outer edge portion held by said outer stop member and an inner edge portion extending into said inner stop member, and a vertical set screw in said inner stop member and engaging the top of the inner edge portion of said locking member to hold said outer stop member against said inner stop member, said locking member having a groove engaging said set screw and drawing said outer stop member towards said inner stop member by tightening said set screw.

17. In a metal sash, the combination of inner and outer stop members, said inner member having a glass receiving groove, a horizontal locking member having an outer edge portion held by said outer stop member and an inner edge portion extending into said inner stop member, and a vertical set screw in said inner stop member and engaging the top of the inner edge portion of said locking member to hold said outer stop member against said inner stop member, said outer stop member having a longitudinal groove holding said locking member, whereby said locking member may be moved longitudinally of said outer stop member, said locking member having a groove engaging said set screw and drawing said outer stop member towards said inner stop member by tightening said set screw.

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