H. E. WHITE.

BOTTOM HUNG SASH CONSTRUCTION.

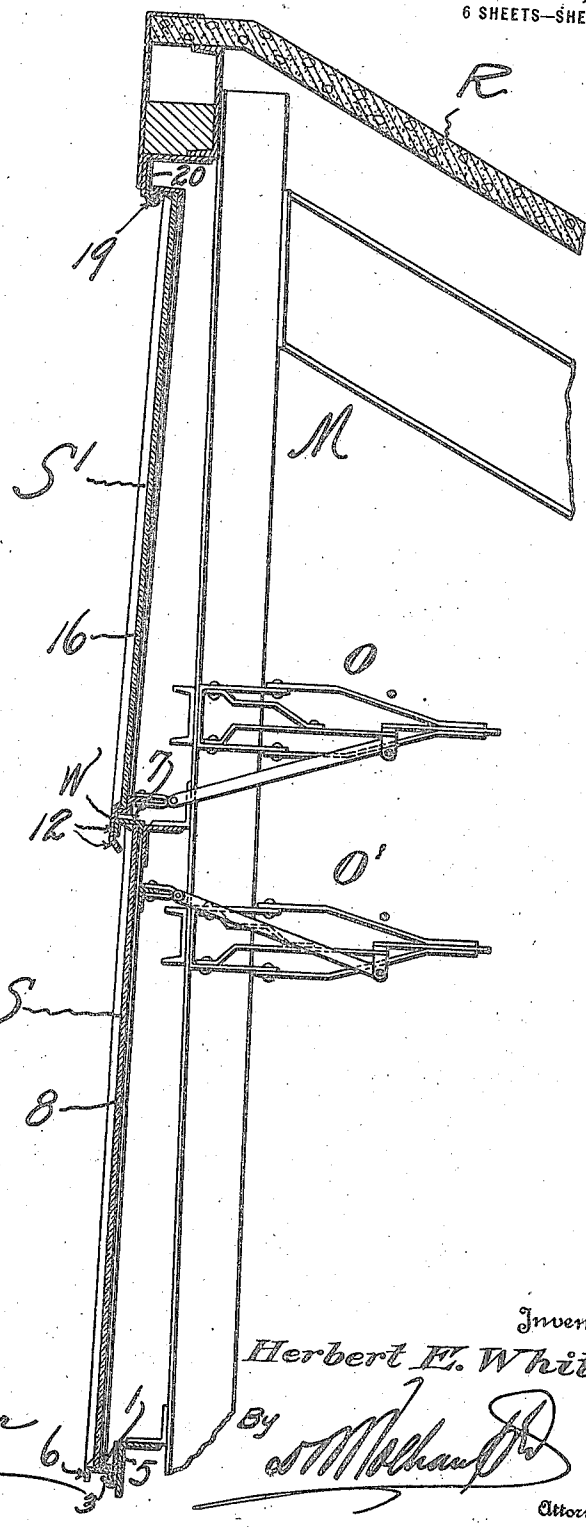
APPLICATION FILED FEB. 10, 1921.

1,433,441.

Patented Oct. 24, 1922.

6 SHEETS—SHEET 1.

Fig. 1.



Witnesses:—

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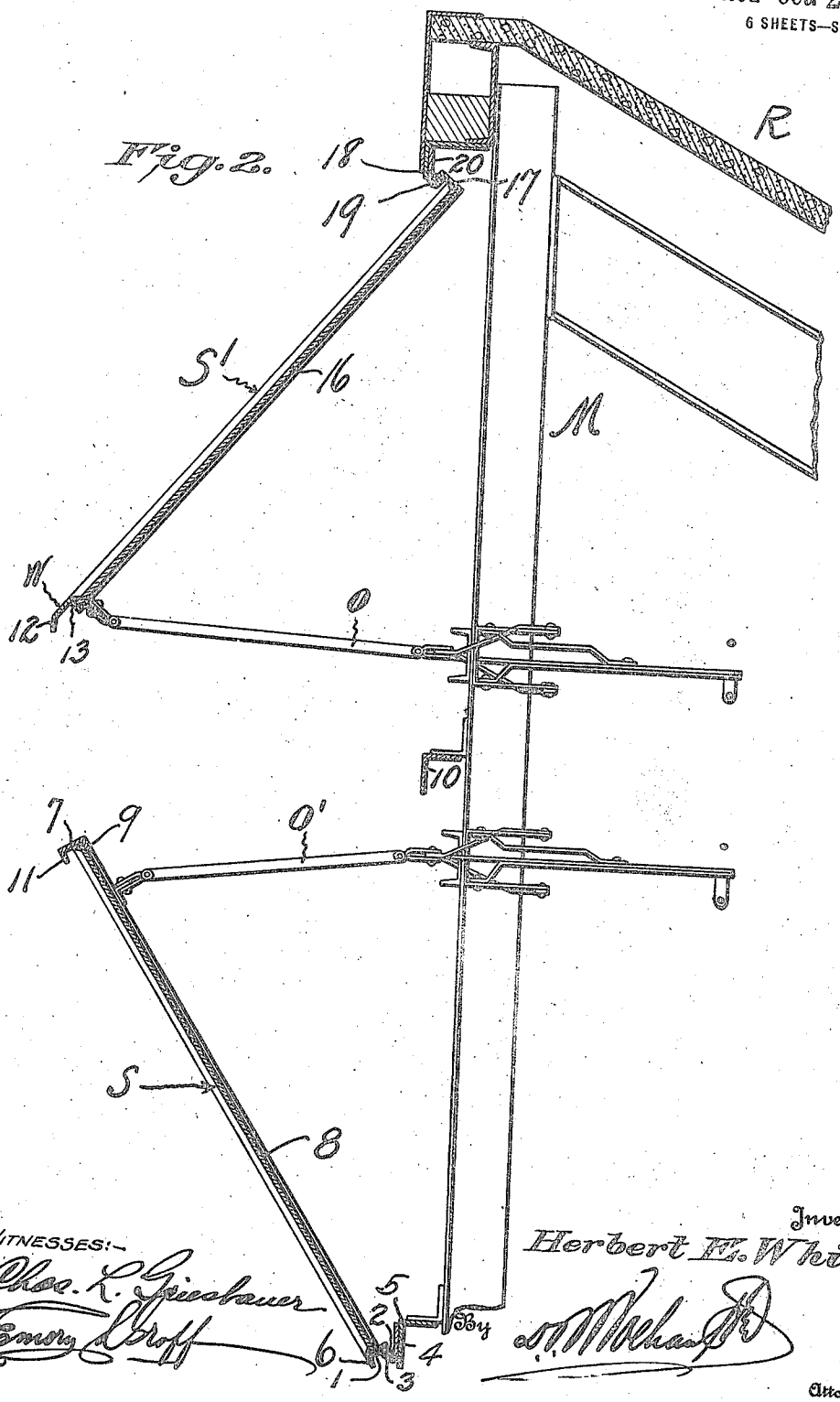
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6 SHEETS—SHEET 2.

Fig. 2.



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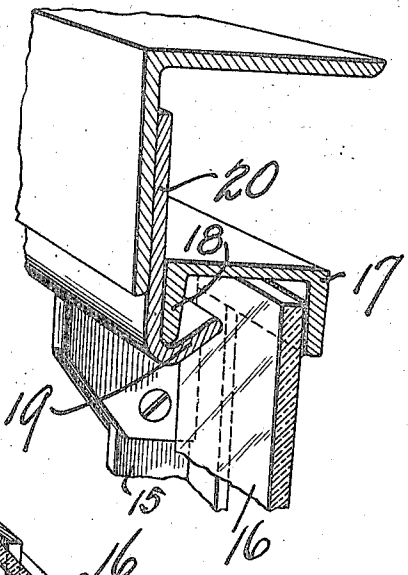
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6 SHEETS—SHEET 3.

Fig. 3.



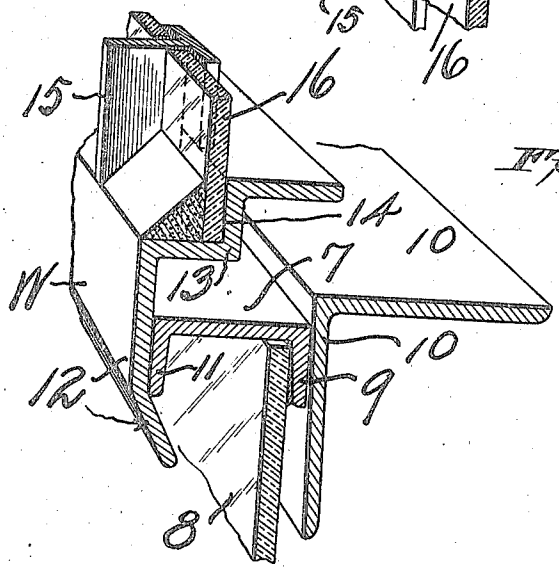
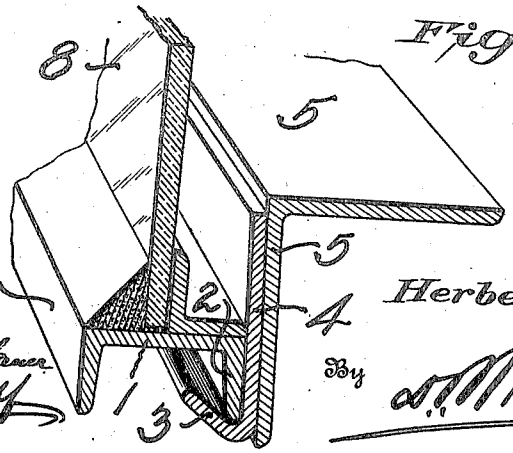


Fig. 4.

Fig. 5.



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6 SHEETS—SHEET 4.

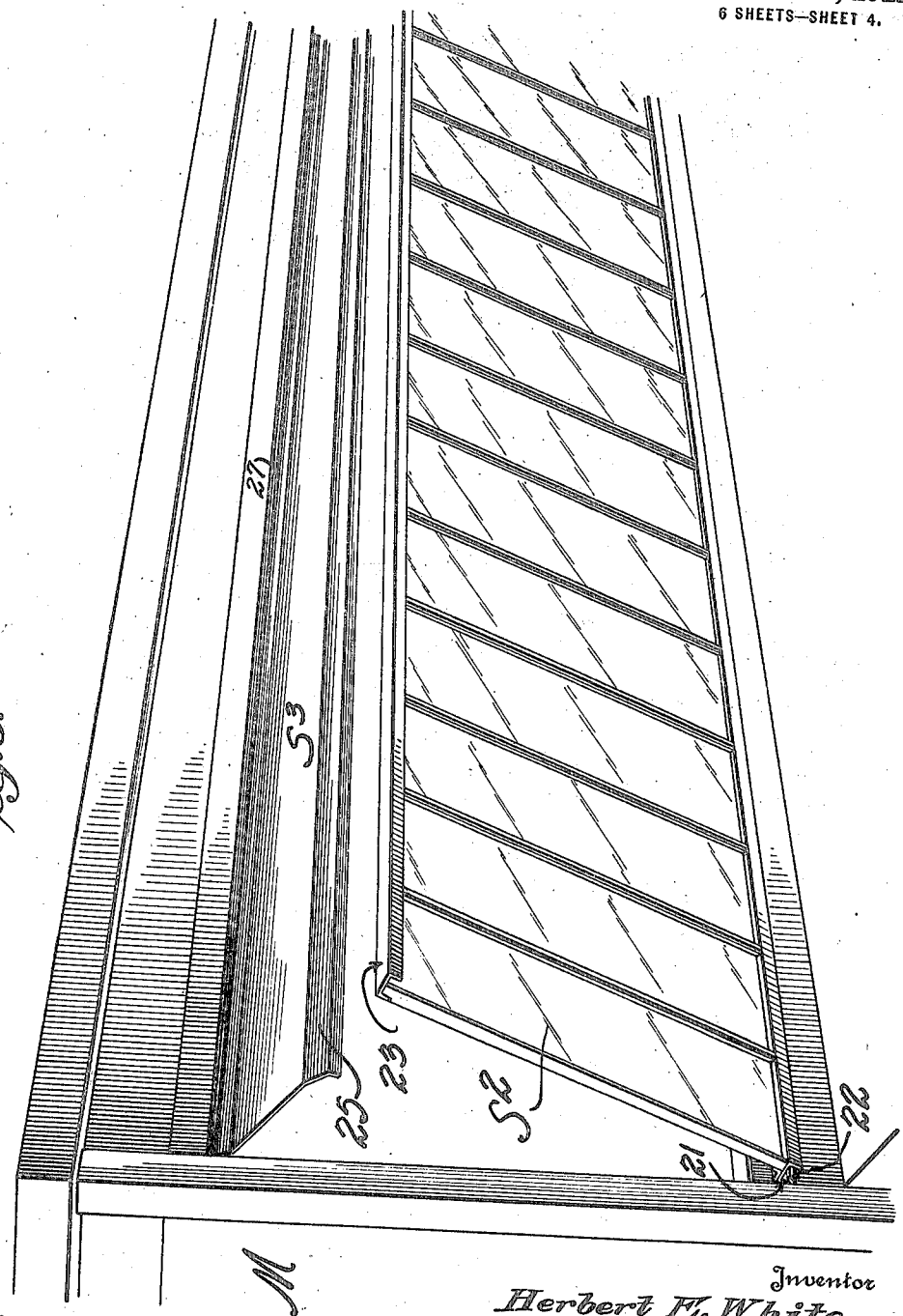


Fig. 6.

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6 SHEETS—SHEET 5.

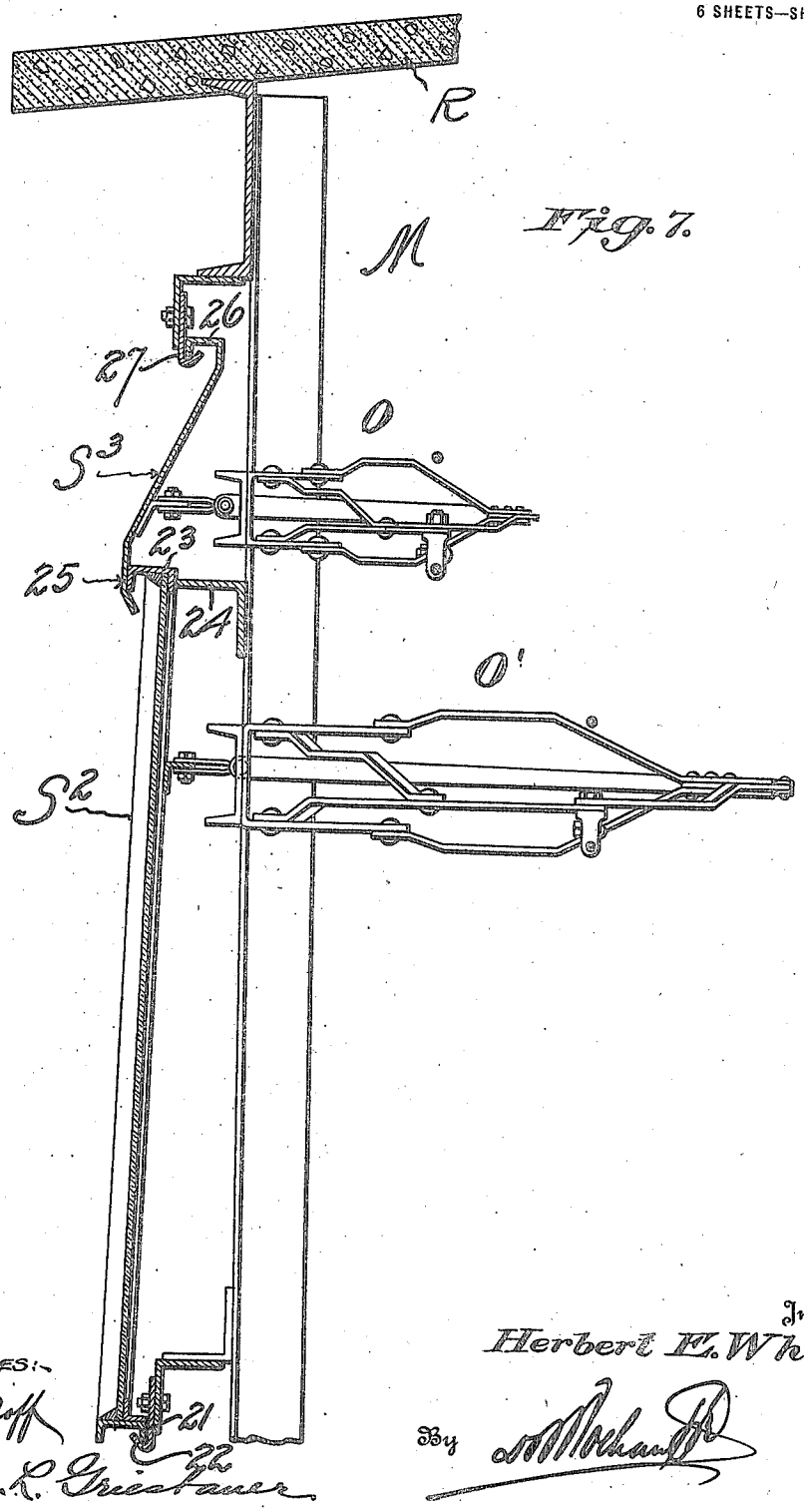


Fig. 7.

Witnesses:-

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BOTTOM HUNG SASH CONSTRUCTION.

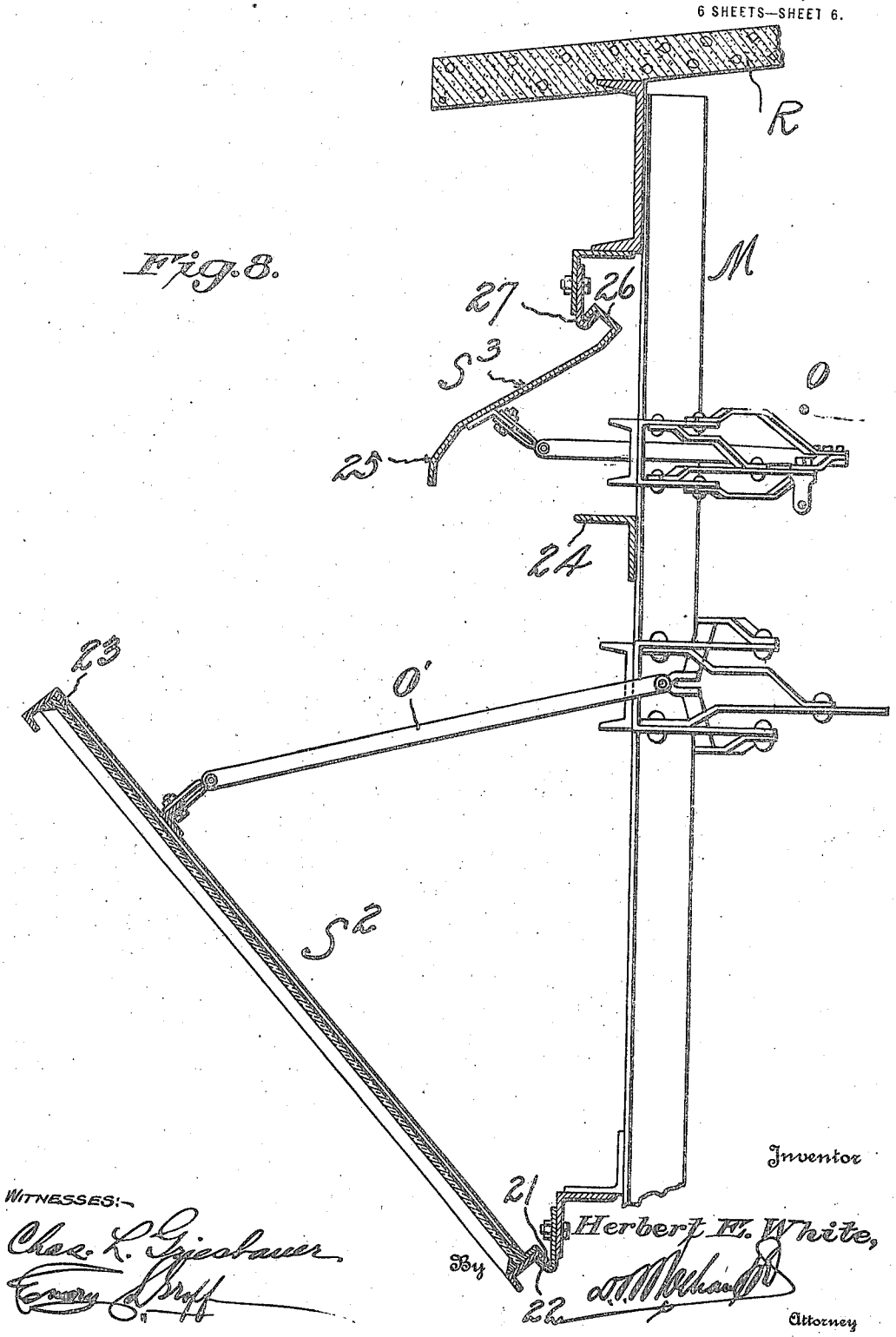
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Patented Oct. 24, 1922.

6 SHEETS—SHEET 6.

Fig. 8.



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Patented Oct. 24, 1922. 1,433,441

UNITED STATES PATENT OFFICE.

HERBERT E. WHITE, OF YOUNGSTOWN, OHIO, ASSIGNOR TO THE TRUCSON STEEL COMPANY, OF YOUNGSTOWN, OHIO, A CORPORATION OF OHIO.

BOTTOM-HUNG-SASH CONSTRUCTION.

Application filed February 10, 1921. Serial No. 443,950.

To all whom it may concern:

Be it known that I, HERBERT E. WHITE, citizen of the United States, residing at Youngstown, in the county of Mahoning and State of Ohio, have invented certain new and useful Improvements in Bottom-Hung-Sash Constructions, of which the following is a specification.

This invention relates to an improvement in ventilating sash construction of the type used in industrial buildings, particularly plants requiring extensive ventilation, such as foundries, glass works, forge shops and the like.

It has been the practice heretofore in meeting the ventilating requirements of plants of the character described, to use a continuous sash construction which is hung or suspended from the top by a weather-tight hinge so that its bottom edge may be swung away from the window opening to provide ventilating clearance at the bottom of the sash only. While this system has been used with satisfaction in some instances, it is open to the objection of not providing maximum efficiency in ventilation where large volumes of air must be discharged quickly, because, the outlet vertically, the most effective outlet, is greatly if not wholly obstructed. That is to say, with the top hung continuous sash construction, there is practically no vertical outlet, but rather a limited horizontal passage because the sash itself assumes an oblique position from the top, downward and outward, when swung away from the window opening. Owing to the limitation of the arc of movement of the sash, due to the type of top hinge suspension and also to the mechanical operating connections, the width only of this horizontal passage may be varied within a narrow range, thereby keeping most of the gases trapped in the roof of the building and above the line of the horizontal passage referred to. It has also heretofore been proposed to provide a center pivoted sash construction, but as that type requires expensive and heavy structural mountings, it is objectionable from a practical and economical standpoint.

The present invention, therefore, has primarily in view the provision of means for obtaining a maximum ventilating outlet, substantially in the line of natural draft, while at the same time preserving the feature of weather-tight joints and simplicity of mounting incident to the top hung sash construction. To that end, it is proposed to provide a continuous sash construction hung or pivotally mounted at its bottom edge whereby its upper edge may swing or rock outwardly, and at the same time providing a weather-tight joint at the top of the sash which has heretofore been difficult in view of the size and character of the sash which are made in long continuous sections.

A further object of the invention is to provide a novel combination of top and bottom hung sash units which will afford maximum ventilation by reason of their relatively wide latitude of adjustment, and which also, by reason of this feature, make possible the practical use of the bottom hung sash for all conditions of weather.

With the above and other objects in view which will more readily appear as the nature of the invention is better understood, the same consists in the novel construction, combination and arrangement of parts hereinafter more fully described, illustrated and claimed.

A preferred and practical embodiment of the invention is shown in the accompanying drawings, in which:—

Figure 1 is a vertical sectional view of the side of a monitor of a building showing one arrangement of sash construction proposed by the present invention.

Figure 2 is a view similar to Figure 1 with the top and bottom sash units open.

Figure 3 is a detail perspective view of the construction at the hinged edge of the top sash.

Figure 4 is a detail perspective view of the overlapping weather-tight joint formed by the top and bottom sash units at the middle continuous frame angle of the monitor.

Figure 5 is a detail perspective view of the construction providing for hinge-support of the bottom hung sash unit.

Figure 6 is a detail perspective view of a bottom hung sash unit, in combination with a different type of weather-proof top unit.

Figure 7 is a vertical sectional view of the construction shown in Figure 6, with the bottom hung sash unit in its closed position.

Figure 8 is a view similar to Figure 7 showing the bottom hung sash in its open position.

Similar reference numerals designate

corresponding parts throughout the several figures of the drawing.

In carrying forward the primary object of the invention various structural arrangements may be resorted to, in combination with a novel bottom-hung sash construction to provide a weather-tight joint at the top thereof when the sash is closed, and which on the other hand will afford a maximum vertical draft outlet or passage when the said bottom hung sash is open. To that end, the bottom hung sash construction, proposed herein, may be used in combination with any suitable top weathering unit adapted to overlap the top edge of said bottom hung sash in such manner that it will not interfere with the rocking outward of the sash on its bottom hinge. For example, the said top weathering unit and joint-forming element, may either be the lower frame plate of an upper top-hung sash unit as shown in Figures 1, 2 and 4, or a separate top-hung apron or strip as shown in Figures 6, 7 and 8.

Therefore, fundamentally, the present invention proposes to provide a bottom-hung sash unit associated with a suitable weather-joint for its upper swinging edge to provide a weather-tight connection at that point.

Referring to the embodiment shown in Figures 1 and 2 of the drawings, it will be observed that the monitor portion M of a building is partly shown having the roof R supported by the usual structural framework, and provided at its vertical ventilating side with the bottom-hung sash unit S and the weather tight joint element carried by a top hung sash unit S′. These units may be manipulated by hand or mechanically by operating connections O and O′ attached to their swinging ends as will be observed from the drawings.

Referring first to the mounting of the bottom-hung sash unit, it will be understood that this may be effected by any suitable hinge construction, but the preferable embodiment is shown in the drawings and will now be referred to. This may clearly be seen from the detail Figures 1, 2 and 5, and referring thereto it is to be noted that that sash unit S is hingedly supported at its bottom edge while its upper edge may swing outwardly, and the said unit preferably includes a channeled bottom frame member 1 whose inner flange 2 has a hinging engagement in the bearing seat *a* or upturned flange 3 of a supporting hinge member 4 carried by the continuous sill angle 5 of the building framework. By reason of this arrangement, the entire lower sash is pivotally hung or hinged at its bottom edge upon the said flange 3 in such a manner as to provide a thoroughly practical continuous hinge joint which is thoroughly weather-tight because the inner flange of the channel bears uniformly throughout the groove of the hinge member, and the outer flange 6 thereof overhangs and protects the hinge by forming what is in effect an eaves flange to shed or drain the drip away from the joint.

The top edge of the bottom hung sash unit S is also formed by a top channel member 7 with the groove of the channel arranged to receive the upper ends of the vertical muntins and also adequately housing the panels or panes 8 of glass carried thereby. The inner flange 9 of the said top channel member 7 preferably abuts against a sill angle 10 when the sash is in its closed position. When resting in that position, the outer flange 11 of the channel 7 is overlapped from above by the depending covering flange portion 12 of the weather joint forming element W, which in this form of the invention may be the depending flange of the bottom frame member 13 of the upper top-hung sash unit S′. Therefore, this arrangement particularly adapts the invention for use in combination with sash of the top-hung type to give increased light as well as providing a wide range of adjustment for the draft outlet, and also permitting the use of the bottom-hung sash in stormy weather by affording more or less protection from the elements to the contents of the building when the bottom hung sash is open during a storm.

The mountings for the top-hung sash unit S′ are shown in Figures 3 and 4. They include the frame member 13 having the seat portion 14 for receiving the vertical muntins 15 and panes of glass 16, while the top edge portion of said unit S′ is formed by an inverted channel member 17 whose outer flange 18 rests in the inwardly projecting supporting flange 19 of a hinge member 20 carried by one of the continuous angles of the building. The upper sash unit S′ is therefore mounted to swing outwardly at its bottom edge to permit the apron portion 12 of the sill 13 to clear the upper channel member 7 of the bottom hung sash.

In using the present construction, the lower edge of the top hung sash S′ must of course be first moved by its operating connection O outwardly a sufficient distance to permit the top channel member 7 of the bottom hung sash to clear the sealing flange 12 of the sill member thereof, and then the bottom hung sash S may be moved to any desired position to obtain the required outlet or passage to permit of the free escape of the air or gases collected within the hood of the monitor. In other words, it is necessary to partially open the top unit before the lower or bottom hung sash can be opened, and after the bottom hung sash is free of the

apron or joint, the top unit may be adjusted or reclosed partially to obtain practically any desired degree of ventilation. In fair weather, the maximum ventilating position just referred to may be used, but in stormy weather the top sash unit S′ may be opened wide and the lower sash drawn in just enough to come within the overlapping edge of the upper sash, and since ordinarily sash of this sort is provided on both sides of a building or monitor, one side is usually available in most any kind of storm.

As further illustrating the range of application of the invention, reference may be made to Figures 6, 7 and 8 of the drawings which show a bottom hung sash S^2 having a hinged mounting at its bottom edge 21 upon the continuous supporting hinge member 22 and adapted to be manipulated through suitable operating means whereby the channel member 23 of its swinging end may be brought from open position into engagement with the sill member 24 to permit the weather-proof joint element S^3 to be brought down into overlapping engagement therewith as shown in Figure 7. The said weather-proof joint element in this form is preferably a windowless metal strip or plate having at its lower edge the covering apron 25 while its upper edge is formed into a channel with the suspending bearing flange 26 engaging with the hinge member 27 carried by the framework of the monitor. With this type of construction, it will be apparent that the maximum ventilating clearance may be easily and quickly obtained, and as a matter of fact this construction is particularly adaptable to installations where a quick scavenging of the foul air in a building is of special importance and where the adjustment or throttling of the vertical draft opening is not so material as in the case of the complemental top and bottom hung sash units of the same construction as shown in Figures 1 and 2 of the drawings.

From the foregoing, it will be observed that although the invention is susceptible of embodiment in various forms, it nevertheless involves special features and characteristics chief among which are the mounting of the lower sash in such a manner that it hinges or rocks on its lower frame member in a thoroughly practical manner to provide a weather-proof joint at this point, while at the same time the upper edge thereof may be protected by the overlapping of a top hung member having a weather-tight hinge suspension. By the provision of the outwardly opening bottom hung construction the scavenging or change of air trapped within the monitor or within the upper part of a building may be easily and quickly discharged by reason of the augmented avenue of escape afforded through the provision of the relatively extended character of the opening afforded by the manipulation of the lower sash with respect to its complemental upper member, and which forms a weather-tight protection for the top edge thereof only in closed position.

I claim:—

1. A sash construction including a closure member hinged at the bottom edge of the window opening, another closure member hinged to the top of the window opening and constituting means for forming a weather tight joint between said members when in closed position, means for causing the upper closure member to overlap the said closure member hinged at the bottom of the window opening.

2. A sash construction for buildings including a sash unit having a hinge-support at its bottom edge, movable means at the top edge thereof for forming a weather-tight joint, and mechanically operated means for controlling said movable means.

3. A sash construction for buildings including a sash unit having a hinge-support at its bottom edge, means pivotally suspended above the top edge of said sash unit and having a covering portion overlapping the upper edge of said latter sash unit, and mechanically operated means for controlling said pivotally suspended means.

4. A sash construction for buildings including a sash unit having a hinge-support at its bottom edge, a weathering member adapted to be swung into and out of overlapping engagement with the upper edge of said sash unit, and mechanically operated means for causing the weathering member to overlap said sash unit.

5. A sash construction for buildings including a continuous supporting hinge, a sash unit having at its bottom edge a channel member one flange of which has a bearing on said continuous supporting hinge member, movable means at the top edge of said sash for forming a weather-tight joint, and mechanically operated means for shifting said movable means.

6. A sash construction for buildings including a continuous supporting hinge member, a sash unit having at its bottom edge an inverted channel member constituting the lower frame part thereof and one flange of said channel having a bearing on said continuous supporting hinge member, removable means at the top edge of the sash for forming a weather-tight joint, and mechanically operated means for shifting said movable means.

7. A sash construction for buildings including a supporting hinge member, an upturned supporting flange, a sash unit having a flanged bottom frame member, a flange of which bears in the groove of said supporting hinge member, an upper frame part for the sash, and means for overlapping the said

upper frame part to provide a weather-tight joint at the top of the sash.

8. A sash construction for buildings including a supporting hinge member, a sash unit having a flanged bottom frame part formed by an inverted channel bar one flange of which bears in the groove of said supporting hinge member, and the outer flange of which constitutes an overhanging eaves flange, an upper frame part for the sash, and means for overlapping the said upper frame part to provide a weather-tight joint at the top edge of the sash.

9. A sash construction for buildings including a pair of closure members for the window opening respectively hinged at the top and bottom edges of the window opening, said upper closure member providing means for overlapping the joint between said members when in a closed position to provide a weather-tight connection therebetween.

10. A sash construction for buildings including a pair of continuous closure members adapted to be swung on horizontal axes located respectively at the top and bottom edges of the window opening, said closure members adapted to have their swinging ends brought into overlapping relation, and means for operating the said closure members independently of each other.

11. A sash construction for buildings including means for forming a weather-tight hinge joint at the bottom edge of the sash for supporting the same whereby its upper edge may swing outwardly from the top of the window opening, movable means arranged at the upper edge of the window opening for providing a weather-tight joint with the upper edge of the sash when the same is in closed position, and mechanically operated means for operating said movable means.

12. A sash construction for buildings including two sash units one of which is hinged at the bottom and the other of which is hinged at the top, the top hung unit being arranged to overlap the bottom hung unit, and means for causing the upper sash unit to move into and out of overlapping relation with the bottom unit.

In testimony whereof I hereunto affix my signature in the presence of two witnesses.

HERBERT E. WHITE.

Witnesses:
CHARLES L. MAXWELL,
RUSSELL T. TODD.