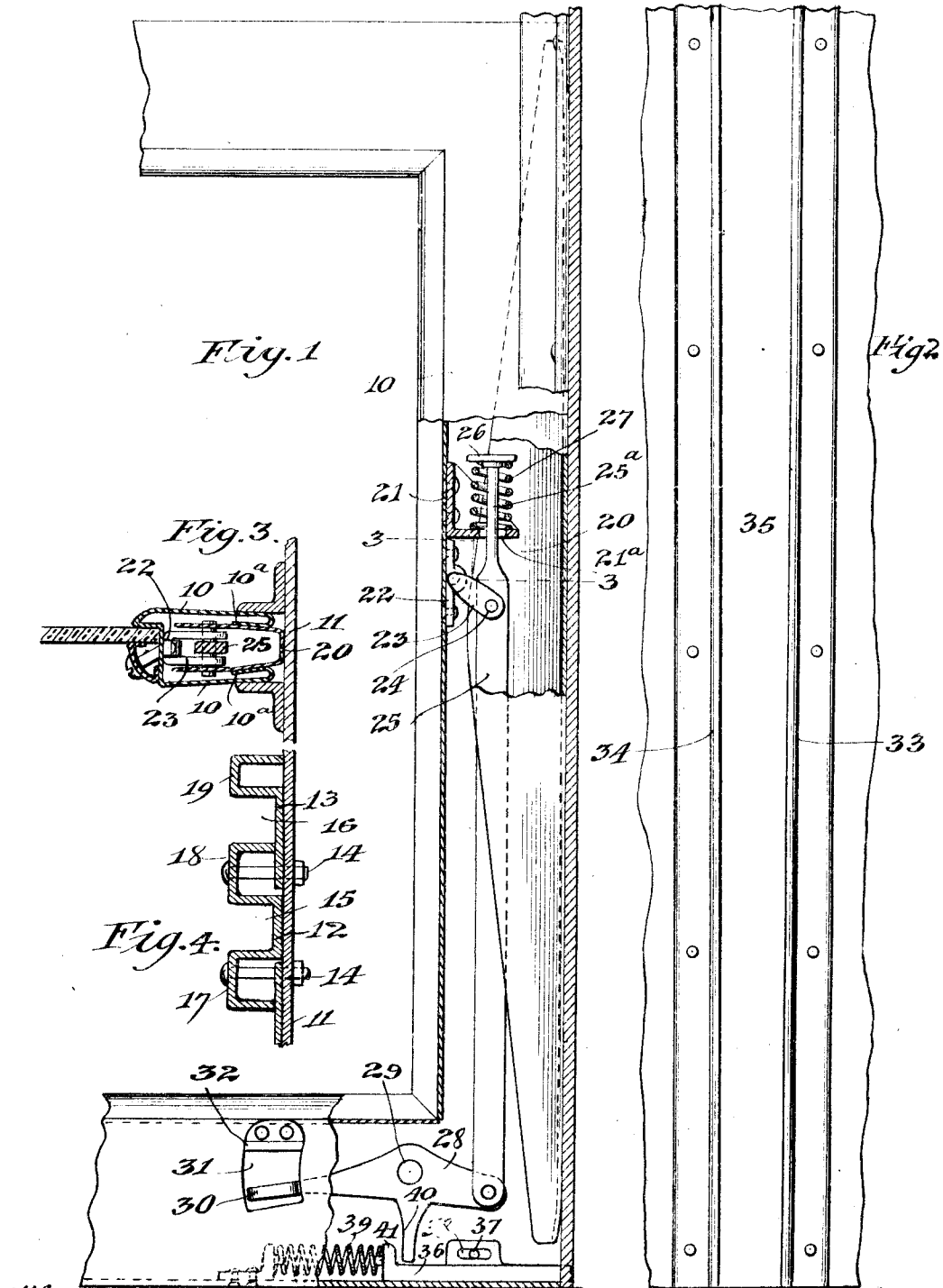


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SASH CONSTRUCTION.  
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# UNITED STATES PATENT OFFICE.

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## SASH CONSTRUCTION.

1,063,345.

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*To all whom it may concern:*

Be it known that I, GEORGE H. FORSYTH, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Sash Constructions, of which the following is a specification.

This invention relates to improvements in sash constructions, and has reference more particularly to improved means for adjusting and guiding the sash under a substantially tight fit in the guides.

The invention is more particularly, and as herein illustrated, designed for application in connection with hollow metal sash constructions, although capable of application and use in connection with sash constructions generally.

In its principal and essential features, the invention comprehends the combination with the sash and its guide, of means therebetween for normally maintaining a practically air and dust proof fit of the sash in the guide, as well as for automatically adjusting the sash to variations in width of the window opening, irrespective of imperfections and inaccuracies in the sash guides such, for instance, as where the sash-engaging wall of the guide is other than perfectly straight, or where the two sash guides on opposite sides of the sash are not in strict parallelism.

Other objects and advantages attained by the invention are the reduction of friction of the sash and guides after the sash has been moved from closed to more or less open position, which is secured independently of the manually operable means which I provide for releasing the frictional hold of the sash in its guides preliminary to opening the sash; and to provide an improved form of double guide construction.

To these ends the invention consists as to its leading feature of the combination with the sash and its guide of an adjusting strip therebetween capable of automatic angular movement so as to accommodate itself to a fit on the guide whether or not the latter be perfectly straight. In the form illustrated herein, said adjusting strip also has a bodily movement toward and from the guide, and is also preferably given a wedge form in cross-section whereby it is adapted to engage the sides of the stile or other guide-engaging member in a manner to

normally press the latter into snug engagement with the guide, for which latter purpose the said side walls preferably have inwardly turned elastic or resilient lips engaged by said adjusting strip. The variations in the frictional hold of the sash upon its guides, which are independent of the adjusting strip, are effected by making the side walls of the guide or the opposite sides of the stile, or both, of slightly varying width at their upper and lower ends, respectively, so that when the sash is closed it has at either its upper or lower end a tighter fit in or upon the guides than when the sash is opened.

The invention will be readily understood when considered in connection with the accompanying drawings, in which,--

Figure 1 is an elevational view, partly in vertical section, broken out to disclose interior parts, of a fragment of a hollow sheet metal sash and its guide embodying my invention. Fig. 2 is an elevational view of one of the sash guides, more particularly illustrating the slightly tapered form thereof; and Fig. 3 is a cross-sectional view on the line 3--3 of Fig. 1. Fig. 4 is a cross-section showing my improved construction of double guide.

Referring to the drawings, 10 may designate a hollow sheet metal sash stile, the outer edge whereof is formed with inwardly and rearwardly bent resilient lips 10<sup>a</sup> on the opposite faces of the stile.

11 indicates the base of the casing guide, and 12 and 13 indicate a pair of suitably bent metal strips that are secured to the base 11 as by bolts 14 and that together form the main and supplemental guide-grooves 15 and 16. As herein shown the strip 12 is formed on either side of the groove 15 with projecting portions 17 and 18, through which the bolts 14 are passed, the inner sides of said projecting portions constituting the side wall of the groove 15, while the outer side of the projection 18 constitutes one side wall of the groove 16. The strip 13 has a single projection 19 which affords the outer side wall of the groove 16, while the base member of the strip 13 extends beneath the outer wall of the projection 18, as shown, and is apertured for the passage of the fastening bolt 14. In this manner the integral strip 12 may be used to form the groove 15 and one wall of the groove 16, while at the 11.

same time the construction permits separate removal of either strip independently of the other. Mounted in the hollow stile 10 longitudinally of the latter and preferably extending substantially its entire length, is an adjusting strip 20 having somewhat the character of an elongated shoe and adapted for adjustable engagement with the bottom wall of the groove 15 or 16, as the case may be. This adjusting strip is, as herein shown, a hollow or channel-shaped member having its closed side outermost, and preferably tapering in width from the center toward each end. The strip is secured to the stile with capacity for both angular and bodily movement by the following means: 21 and 22 indicate a pair of brackets that are suitably secured to the inner transverse member of the stile, one above the other. In the bracket 22 is pivoted a U-shaped link 23, the outer or free ends of which are pivotally connected to the sides of the adjusting strip 20 by a pivot-pin 24. Said pivot-pin also passes through an intermediate strip-actuating link 25, the upper portion 25<sup>a</sup> of which is reduced in size and passes freely through an aperture 21<sup>a</sup> of the bracket 21, and terminates in a head or cap 26 that forms a stop for the upper end of a coiled compression spring 27 that rests upon the horizontal projecting member of the bracket 21. To the lower end of the link 25 is pivoted the outer end of a lever 28, said lever being pivotally mounted at 29 in and between the sides of the lower sash bar, and its inner arm being provided with a pinch-handle 30 projecting through an arc-shaped slot 31 in the outer face of the sash bar and cooperating with a fixed pinch-handle 32 secured to said sash bar above the slot 31.

It will be observed by reference to Fig. 3 that the adjusting strip or shoe 20 is of a tapering or wedge form in cross-section, its opposite sides slidably engaging the elastic lips 10<sup>a</sup> of the sides of the stile, the result of which is that any outward movement of the adjusting strip relatively to the stile, acting through said spring lips, tends to compress the faces of the stile into snug engagement with the side walls of the guide-groove. Furthermore, the transversely yielding character of the adjusting strip and of the lips engaged thereby permits an automatic outward adjustment of the adjusting strip to accommodate sash openings of more or less varying width.

In operation, the spring 27, by exerting a lifting effect on the link 25 through the head 26, transmits this lifting effect to the adjusting strip through the pivot-pin 24; and by virtue of the fact that the link 23 is downwardly inclined from its fixed pivotal point on the stile, this rising effect necessarily tends to thrust the adjusting strip outwardly through and between the yielding

lips 10<sup>a</sup> into contact with the bottom wall of the guide-groove; and, furthermore, by virtue of the fact that the adjusting strip is pivoted at a single point at or near its longitudinal center, said adjusting strip is also capable of automatic angular adjustment to snugly fit the bottom wall of the groove, thus accommodating itself to any irregularity or inaccuracy of the latter.

It is desirable, especially in the case of car windows, that the sash shall have a snug and close fit in its guides when in closed position for the exclusion of dust, cinders, cold and moisture, while at the same time it is equally desirable to render the raising and lowering movements of the sash as easy as possible. To secure this result, I propose to make the opposite side walls of the guide or of the sash, or of both through the length of the sash, of slightly varying width in a direction transverse to the plane of the sash or sash opening, so that the narrowest parts may be in closer engagement when the sash is in closed position. One form in which this principle may be embodied is illustrated in Fig. 2 of the drawing, wherein I have shown simply a pair of guide-strips 33 and 34 so applied as to be slightly convergent from a position opposite the upper end of the sash to a position opposite the lower end of the latter, thus forming a slightly tapering and downwardly contracted guide-groove 35 in which the transversely elastic side walls of the stile 10, which may also be similarly inclined, slide. From the foregoing it will be seen that when the sash is in its lowered or closed position the maximum compressive effect upon the sides of the stile is exerted, while as the sash is raised the stile enters the upper and wider part of the guide-groove and hence moves more freely therein, it being understood that the walls of the guide-groove above the top of the sash, when closed, are preferably parallel and of a width substantially that of the maximum width of the part of the guide-groove engaged by the sash when in closed position.

In Fig. 1 I have also illustrated a simple lock which can be released by the same mechanism by which the adjusting strip is released so as to relieve the lateral tension of the sides of the stile upon the side walls of the groove; said lock consisting of a sliding bolt or plunger 36 guided by a pin 37 playing in a slot 38 of the plunger, and normally pressed into locking position by a compression spring 39. The lever 28 has a depending finger 40 adapted to engage an upwardly projecting lug 41 on the inner end of the plunger 36. When the pinch-handles 30 and 32 are compressed to thereby draw down the link 25 against the spring 27 and thereby retract the adjusting strip 20, the finger 40 at the same time, through engage-

ment with the lug 41, retracts the plunger 36, thereby unlocking the sash and permitting it to be raised.

Although I have shown the tapering feature for securing a maximum snug fit of the sash as applied to the sash guide, and cooperating with a transversely elastic stile, yet it is evident that the tapering feature might be applied to the sides of the stile, as well whether the stile and guides, either or both are transversely elastic or rigid.

It is evident that, instead of relatively tapering the side walls of the guide, the bottom wall of the guide might be inclined with or without a corresponding inclination of the edges of the stile. Also, with reference to the adjusting strip, while I have shown this as angularly movable in the plane of the sash, yet it will be evident that the same effect might be produced by so mounting said strip as that it shall have an angular adjustment in a plane transverse to the sash.

I claim:

1. The combination with a hollow sash and a guide therefor, of an angularly movable adjusting strip mounted in said hollow sash and adapted to engage said guide, said adjusting strip being of wedge form in cross-section whereby, under outward movement, it operates to force the sides of said sash into engagement with the side walls of the guide, substantially as described.

2. The combination with a hollow sash and a guide therefor, of a hollow adjusting strip mounted in said hollow sash and adapted to engage said guide, said adjusting strip being transversely elastic and of wedge form in cross-section whereby, under outward movement, it operates to yieldingly press the sides of said sash into engagement with the side walls of the guide, substantially as described.

3. The combination with a hollow metal sash stile having inwardly turned lips on the outer margins of its sides, and a guide therefor, of an adjusting strip of wedge form in cross-section mounted in said hollow sash, said adjusting strip being adapted to engage said guide at its outer margin and slidably engaging said lips by its inclined sides, whereby outward movement of said adjusting strip operates to yieldingly press the sides of said stile into engagement with the side walls of the guide, substantially as described.

4. The combination with a hollow metal sash stile having inwardly turned lips on the outer margins of its sides, and a guide therefor, of a hollow adjusting strip mounted in said hollow sash, said adjusting strip being transversely elastic and of wedge form in cross-section and engaging said lips and guide on its inclined sides and outer edge, respectively, whereby outward movement

of said adjusting strip operates to yieldingly press the sides of said stile into engagement with the side walls of the guide, substantially as described.

5. The combination with a hollow metal sash stile and a guide-groove therefor, of an adjusting strip in said stile, a link pivotally connecting said adjusting strip at or near its longitudinal center to said stile, manually operable means for swinging said link inwardly whereby to retract said adjusting strip, and spring means tending to swing said link outwardly whereby to project said adjusting strip into engagement with the guide, substantially as described.

6. In a window construction, a double sash guide comprising a pair of sheet metal strips, one of which is bent longitudinally to form a central guide-groove and lateral hollow projections on either side of said guide-groove forming the side walls of the latter, and the other of which is bent to form a lateral hollow projection forming one side wall of an adjacent guide-groove, and a bottom wall projected beneath the adjacent limb of the adjacent hollow projection of the other of said strips, whereby either of said strips may be removed independently, substantially as described.

7. In a window construction, a sash guide comprising a pair of sheet metal strips bent longitudinally to form a pair of laterally adjacent sides of a sash guide-groove, one of said strips having a lateral extension forming the bottom wall of the groove and projecting beneath the other strip and common means for fastening said strips to a base board, thereby preventing relative displacement of said strips, substantially as described.

8. The combination with a sash and a guide therefor, of an adjusting strip between said sash and guide, said strip laterally and angularly movable in the plane of said sash, and spring means for forcing said adjusting strip into contact with said guide, thereby causing engagement of said adjusting strip with said guide, substantially as described.

9. In a window construction, the combination of a sash and guide therefor, an adjusting strip between said sash and guide, a strip-actuating link pivotally connected to said adjusting strip, a second link connecting said adjusting strip with said sash, spring means for causing engagement of said groove by said adjusting strip, and manually operated means connected with said strip-actuating link for withdrawing the adjusting strip from said groove, thereby allowing the sash to be moved upwardly or downwardly, substantially as described.

10. In a window construction, the combination of a sash and a guide therefor, an adjusting strip between said sash and guide, a strip-actuating link pivotally connected to

said adjusting strip, a second link connecting said adjusting strip with said sash, spring means for causing engagement of said groove by said adjusting strip, manually operated means connected with said strip-actuating link for withdrawing the adjusting strip from said groove, thereby allowing the sash to be moved upwardly or downwardly, and locking means associated with said manually operated means for retaining the sash in its closed position, substantially as described.

11. In a sash construction, the combination of a sash frame, a sash within said frame, and a pivotally mounted adjusting strip between said sash and frame, said adjusting strip adapted to accommodate itself to differences in alinement between the sash and frame, substantially as described.

12. In a sash construction, the combination of a sash frame, a sash within said frame, a pivotally mounted adjusting strip between said sash and frame, said adjusting strip adapted to accommodate itself to differences in alinement between the sash and frame, and means for releasing the frictional

engagement of said adjusting strip, whereby to permit raising and lowering of said sash, substantially as described.

13. In a window construction, the combination with a frame provided with guide grooves having downwardly converging side walls, of a sash mounted within said guide grooves and having side faces adapted to conform to the converging walls of the groove whereby to maintain the respective coacting surfaces of the sash and groove in parallelism, substantially as described.

14. In a window construction, the combination with a frame provided with guide grooves of gradually tapering width toward the lower end, of a sash mounted within said groove and of correspondingly tapering thickness whereby to maintain the two faces of the sash in parallelism with the respective coacting walls of the groove, substantially as described.

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