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METAL WINDOW CONSTRUCTION.

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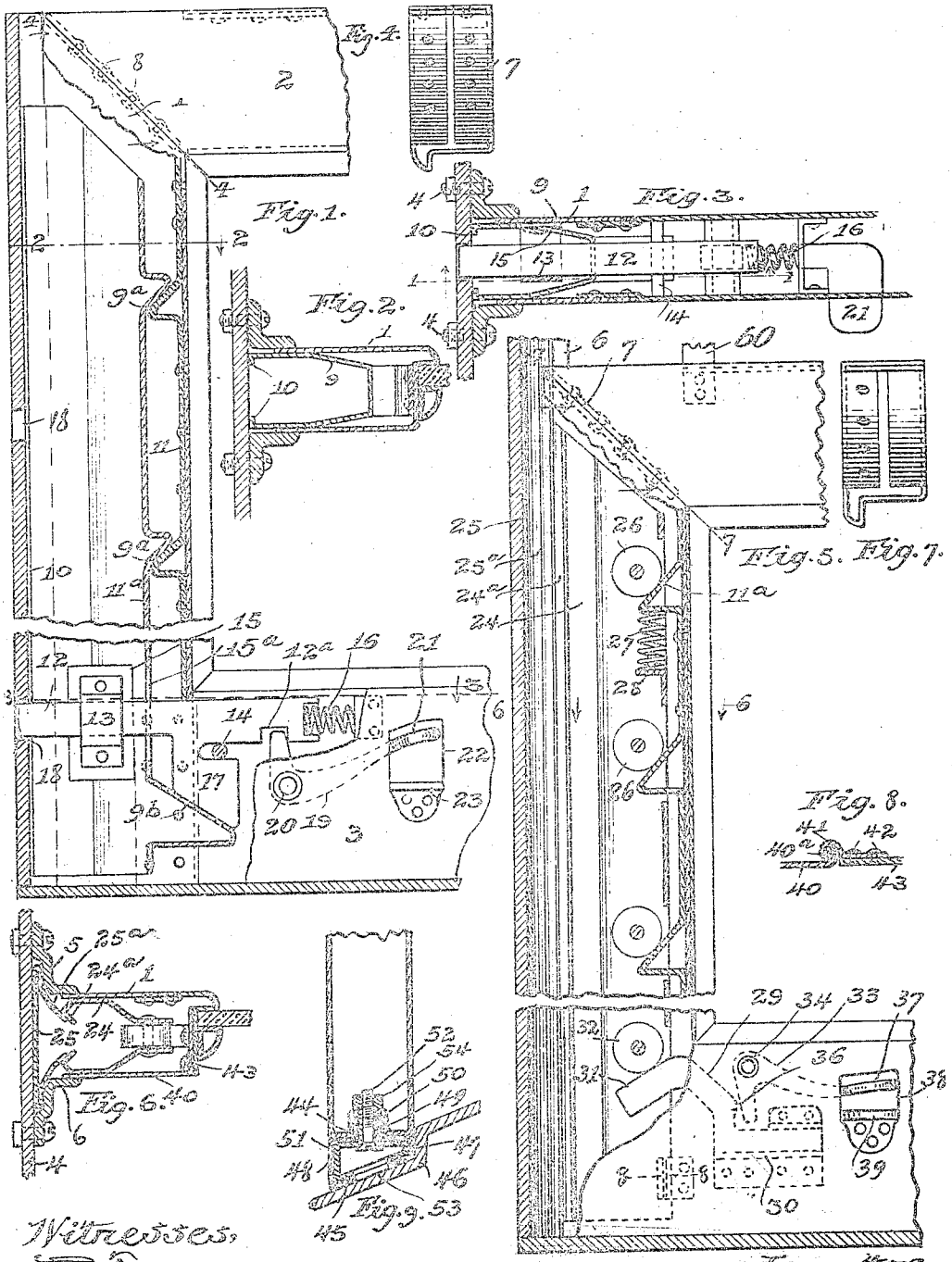

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UNITED STATES PATENT OFFICE.

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METAL WINDOW CONSTRUCTION.

1,032,057. Specification of Letters Patent. **Patented July 9, 1912.**

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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 Metal Window Constructions, of which the following is a specification.

The objects of the invention are to provide an improved sash having close engagement with its guide to prevent the entrance of dust, moisture, cold air, and the like, but at the same time having freedom of movement relatively to the guide to permit ready adjustment thereover; to provide means, preferably automatic in operation, for adjusting a preferably suspended or balanced sash to the guide; to provide a construction wherein the sash or its guide is provided with an element capable of pivotal or angular movement relatively to the member engaged thereby; to provide a construction wherein the sash or its guide or both is provided with one or more elements, preferably elastic, adapted to increase the closeness of contact between the sash and the guide, as well as to preferably form an adjustment of said parts relatively to each other; to provide means, preferably anti-friction in character, and preferably automatic, for adjusting a balanced or suspended sash to the guide, to provide a novel joint at the corners of the sash for the meeting ends of the stiles and bars of the latter permitting transverse yielding relatively to the guide; and to provide an adjusting strip adapted to accommodate the cross member or other members of the sash to varying forms of finish of the car, the same also preferably acting as a cushioning and dirt-excluding element.

My invention will be readily understood when considered in connection with the accompanying drawings showing practical embodiments of the several features in which the invention may be said to reside; and referring to said drawings,—

Figure 1 is a side elevational view of a portion of a metal window sash and its guide, broken out through the stile, illustrating my improved means for automatically adjusting the sash in its own plane whereby to secure a snug fit at any position of the sash; Fig. 2 is a cross-sectional view on the line 2—2 of Fig. 1; Fig. 3 is a cross-sectional view on the line 3—3 of Fig. 1; Fig. 4 is a cross-sectional view through an improved miter joint of the sash on the line 4—4 of Fig. 1; Fig. 5 is a view similar to Fig. 1, illustrating a spring-actuated anti-friction means for adjusting the sash in its own plane relatively to its guide; and also illustrating a hinged side wall of the sash stile; Fig. 6 is a cross-sectional view on the line 6—6 of Fig. 5; Fig. 7 is a cross-sectional view through a modified form of miter joint employed in the construction of Figs. 5 and 6; Fig. 8 is a cross-sectional detail on the line 8—8 of Fig. 5, illustrating the manner of hinging one side wall of the sash stile; Fig. 9 is a fragmentary vertical section through the lower sash bar and sill, illustrating my improved adjusting and cushioning strip between the lower margin of the sash and the sill.

Referring to the drawings, 1 may designate as an entirety the stile, and 2 and 3 the upper and lower cross-bars, respectively, of a hollow sheet metal sash, and 4 may indicate the side post of the window opening, to which are suitably secured strips 5 and 6 forming between them, with the face of the wall 4, the usual guide-groove of the sash. The sash herein shown is of the hollow sheet-metal variety; and in order to preserve the transverse elasticity of the side walls throughout their entire length, I have devised a novel form of miter joint more particularly illustrated in Figs. 1 and 4, wherein the meeting ends of the stile and bar are bent inwardly on a line coincident with the miter joint of the corner, and are suitably cut and trimmed to form meeting flanges 7 which are secured together as by rivets 8. Slidably mounted within the channel-shaped stile 1 is a correspondingly channel-shaped member 9, the open side of which projects slightly beyond the open side of the member 1 and directly engages the bottom wall of the groove, preferably by inturned lips 10, as shown in Fig. 2. Secured to or

formed integral with the transverse member of the channel-strip 9 are a series of suitably spaced cam inclines 9^a that are adapted for coöperation with a corresponding series of similarly inclined cam members 11^a formed in or on a strip 11 secured to the inner transverse member of the stile 1.

It will be observed that the coöperating inclines 9^a and 11^a are so disposed that a downward movement of the strip 9 relatively to the sash, or an upward movement of the sash relatively to the strip 9 forces the latter outwardly into snug engagement with the bottom wall of the groove, and thus adjusts the sash to a snug fit in the window opening. The inclination of the members 9^a and 11^a is of such a degree as will secure a sufficient lifting effect upon the channel strip 9 when the sash is raised to overcome the friction of the lips 10 of the channel strip upon the bottom of the guide-groove, while at the same time permitting a sufficient wedging action between the channel strip and the sash to effect the described snug engagement of the adjusting channel-strip with the bottom wall of the groove. Various means, including gravity alone, may be employed within the purview of my invention to effect this relative movement of the adjusting strip and sash; the means shown in Figs. 1 and 3 consisting of the following. A plunger 12 is slidably mounted in a keeper 13 and on a pin 14 in one or both of the lower corners of the sash, said keeper being secured to the inner side of one of the side walls of the sash 1 and projecting inwardly through an opening 15 in the adjacent side wall of the adjusting strip 9, said opening being of sufficient size to permit the necessary relative movement between the adjusting strip and the sash stile to effect the described adjustment of the sash in its guide-groove. The inner transverse wall of the adjusting strip 9 is also vertically slotted, as shown at 15^a to permit longitudinal play of said adjusting strip over the plunger 12. A spring 16 acts against the inner end of the plunger and normally tends to force the latter outwardly. The plunger has a depending lug 17 having an inclined lower edge that engages a correspondingly inclined projection 9^b of the strip 9, so that the outer thrust of the plunger operates thereby to force the strip 9 downwardly relatively to the sash; and this action takes place at any adjusted position of the sash. The plunger 12 may also be made to serve as a supporting means and positive lock for the sash by forming in the bottom wall of the guide-groove a series of suitably spaced holes 18 into which the end of the plunger may project. The plunger may be retracted in order to release the wedging engagement of the sash and adjusting strip by means of an angle lever 19 pivoted at 20 to one wall of the sash-bar, one arm of said lever engaging a notch 12^a in the plunger, and the other arm having a pinch-handle 21 projecting through an opening 22 in the sash-bar and coöperating with a stationary pinch-handle 23.

Figs. 5, 6, 7 and 8 illustrate some modifications of the device above described as well as some additional features of improvement that may be employed. In these views 24 designates the inner adjusting strip carried by the sash-stile, which strip is shown as having its outer edges bent or lipped inwardly, as at 24^a (Fig. 6), and these inturned lips engage coöperating inwardly projecting inclined lips or flanges 25^a formed on a strip 25 that is retained in the guide-groove. The members 24 and 25 are preferably both of elastic sheet-metal, so that the engaging members 24^a and 25^a are both resilient and coöperate, under outward thrust of the adjusting strip, to not only make a tight fit between the parts 24^a and 25^a, but also to force the sides of the sash-stile laterally into snug engagement with the guide-strips 5 and 6 of the guide-groove. In this modification I have also shown, in place of the cam inclines 9^a of Fig. 1, rollers 26 riding on the inclines 11^a carried by the sash; this construction making a more sensitive device by reason of the anti-friction character of the engaging parts which tend to force the adjusting strip outwardly into the guide-groove. In this construction I have also shown a simple compression spring 27 located between the bottom of the cam member 11^a and an inwardly turned portion 28 of the adjusting strip for the purpose of forcing the latter downwardly relatively to the sash. The release of the adjusting strip may be effected by any suitable or convenient lifting means applied thereto, the means herein shown consisting of a slide 29 mounted in a slide-way 30 in the lower sash-bar, said slide having an inclined nose 31 underlying a roller 32 carried by the adjusting strip, said inclined nose being forced outwardly beneath said roller so as to raise said strip by an elbow lever pivoted at 34 to the sash-bar and having one arm thereof engaging a shoulder 36 on the slide, the other arm being provided with a pinch-handle 37 projecting through an opening 38 in the sash-bar and coöperating with a stationary pinch-handle 39. The sash is supported by any suitable or desired form of sash balance, the lower end of the tape or cord of which is indicated at 60 as secured to the upper transverse bar of the sash. In these views, I have shown a construction of sash wherein one side wall 40 of the stile is hinged along its inner edge to the sash so as to be capable of transverse yielding under the lateral thrust of the adjustment strip 24 or any other device that may be employed

for the same purpose. A convenient manner and means of hinging said side wall at an end thereof is illustrated more particularly in the sectional detail view, Fig. 8, wherein it will be seen that the inner edge of the wall is provided with an inturned hinge member 40ª that interfits with a correspondingly formed hinge member 41 secured as by rivets 42 to the wall 43 of the bar 2 or 3. One or more similar intermediate hinges may be employed connecting the wall 40 to the vertical transverse member of the stile. In this construction, the riveted miter joint at the corner of the sash will be applied only at the side opposite that formed by the hinged wall 40, in order to permit the freedom of movement of the latter.

The hinged member last described may be other than a side wall of a stile or bar and may be a hinged attachment to the sash guide applied wherever a yieldable member of or coöperating with the sash is desired for the general purposes described.

In Fig. 9 I have illustrated a device in the nature of an adjusting and cushioning strip for the sash, which may be said to have two particular functions. In the first place, by being made of different angular forms in cross-section, it is designed to adapt a sash having a square or transversely horizontal lower edge to a sill of any angle of inclination; and in fact, it may compensate for any angular variance between the lower edge of the sash and the sill. In the second place, by being made in various heights, it may compensate for slight differences in the proper height of the sash relatively to the opening closed thereby. As shown, it comprises the same angular relation to a vertical or horizontal plane as that occupied by the lower edge of the sash, and having a lower surface occupying the same angular relation to a vertical or horizontal plane as the sill on which it rests. In the simple form herein shown, the member is made of a metal strip suitably bent to form the upper surface 44 conforming to the lower edge of the sash, the lower inclined surface 45 conforming to the inclination of the sill 46; and connecting walls 47 and 48. The strip also preferably employs one or more projections 49 on its upper surface engaging recesses or sockets 50 in the lower edge of the sash to prevent lateral displacement of the strip; and where a cushioning effect is desired the entire strip is surrounded by an envelop of yielding material, such as rubber, felt, leather, or the like, indicated at 51. The strip may be conveniently secured in place by screws 52 that may be entered through openings 53 in the lower side of the strip and its envelop and passed through registering apertures in the projection and socket and secured by nuts 54. It will be evident that by making this strip of varying heights, as well as of varying degrees of inclination of its upper and lower surfaces, it will not only compensate for variations in the vertical dimension of the sash, but will also compensate for any angular variations between the lower edge of the sash and the sill. Such an adjusting strip might be applied to any part of the sash where it could be usefully employed.

While I have shown the improvements of my invention as applied to one side only of a sash, it will be evident that they may be applied to both sides, if desired.

It will be evident to those skilled in the art that the various features hereinabove described are capable of modification and variation in respect to details without any substantial change in character or function, and hence it should be understood that the invention is not limited to the particular constructions disclosed except to the extent indicated in specific claims.

I claim:

1. The combination with a sash and a sash-guide, of an adjusting strip therebetween, said sash and adjusting strip being provided with coöperating cam devices, and a spring operating between said sash and adjusting strip.

2. The combination with a sash and a sash-guide, of an adjusting strip therebetween, said sash and adjusting strip being provided with coöperating cam devices, and a spring acting to force said sash and adjusting strip in opposite directions.

3. The combination with a sash and a sash-guide, of an adjusting strip therebetween, said sash and adjusting strip being provided with coöperating cam devices, and a spring operating to move said cam devices over each other.

4. The combination with a sash and a sash-guide, of an adjusting strip therebetween, said sash and adjusting strip being provided with coöperating cam devices, and a compression spring exerting a thrust at one end against said sash and at its other end against said adjusting strip.

5. The combination with a sash and sash guide, of a downwardly acting adjusting strip therebetween, and a cam carried by the sash, said cam adapted to coöperate with the adjusting strip to effect an adjustment of the sash relatively to its guide, substantially as described.

6. The combination with a sash and a sash guide, of a downwardly acting spring actuated adjusting strip therebetween, and a cam carried by the sash and coöperating with the adjusting strip to effect an adjustment of the sash relatively to its guide, substantially as described.

7. The combination with a sash and a sash-guide, of means for supporting the sash, and means for adjusting the sash in

its own plane relatively to its guide, said last-named means comprising relatively movable parts having inclined anti-friction engagement with each other, substantially as described.

8. The combination with a sash and sash guide, of cooperating elastic members carried by the sash and guide, respectively, and inclined relatively to the plane of the sash, said members operating to effect a close engagement of the sash with the lateral walls of the guide, substantially as described.

9. The combination with a hollow sash and a guide-groove therefor, of cooperating elastic strips carried by the sash and guide, respectively, and inclined relatively to the plane of the sash, said strips operating to spread the sides of the sash into snug engagement with the walls of the groove, substantially as described.

10. The combination with a sash and a sash guide, of a member hinged to one of said parts and adapted to engage the other, substantially as described.

11. A sash having a member thereof hinged along one longitudinal margin of the sash, substantially as described.

12. A sash having a side wall of a member thereof hinged to the sash along its inner edge, substantially as described.

13. The combination with a sash-guide, of a sash having a hinged side wall, and means serving to force said hinged wall into engagement with a wall of the guide, substantially as described.

14. A hollow sash having the meeting ends of angularly disposed members bent inwardly on a miter joint and secured together, substantially as described.

15. A hollow metal sash having the meeting ends of one or both side walls of a stile and cross-bar bent inwardly on a miter joint and secured together, substantially as described.

16. The combination with a sash, of a sash guide, an adjusting strip applied to the sill engaging edge of the sash, the upper and lower faces of said adjusting strip being angularly disposed relatively to each other whereby to accommodate the sash with a sill having a different inclination from the edge of the sash, and spring actuated adjusting means between the sash and the sash guide, substantially as described.

17. In a window, the combination substantially as set forth of a frame provided with a guide-way, a sash the fixed portions of which are adapted to move in said guide-way, and a U-shaped holding device one leg of which is engageable with a portion of the sash to hold such portion in frictional contact with the guide-way.

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