

No. 771,133.

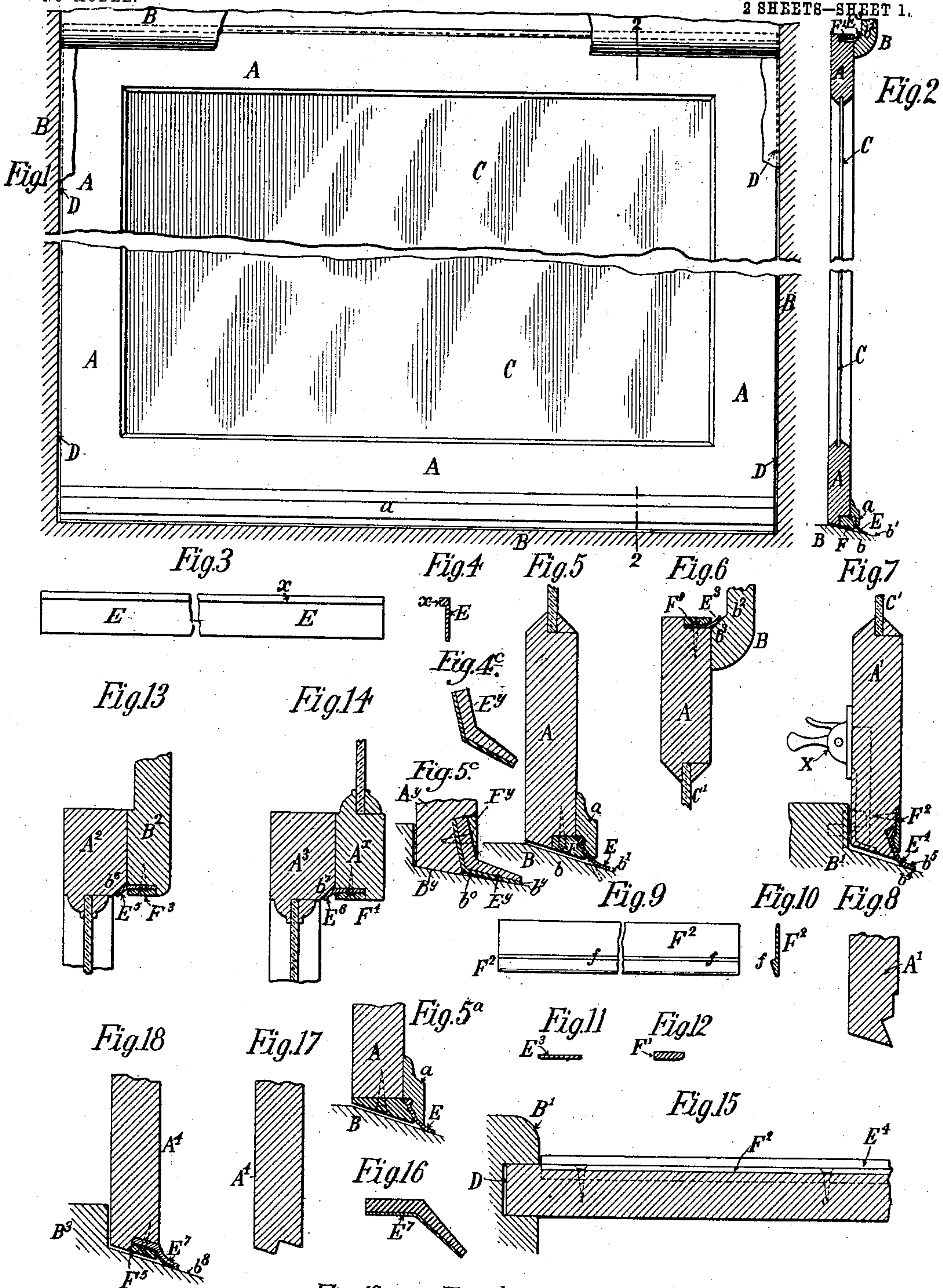
PATENTED SEPT. 27, 1904.

O. M. EDWARDS.
WINDOW.

APPLICATION FILED MAY 13, 1902.

NO MODEL.

2 SHEETS—SHEET 1.



Witnesses:

Raphael Peter
Florence E. Newbury

Oliver M. Edwards, Inventor

by *George L. Newbury* Att'y

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2 SHEETS—SHEET 2.

Fig.19

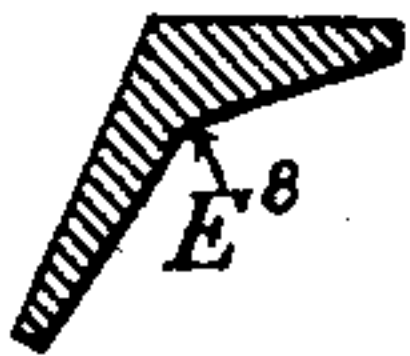


Fig.20

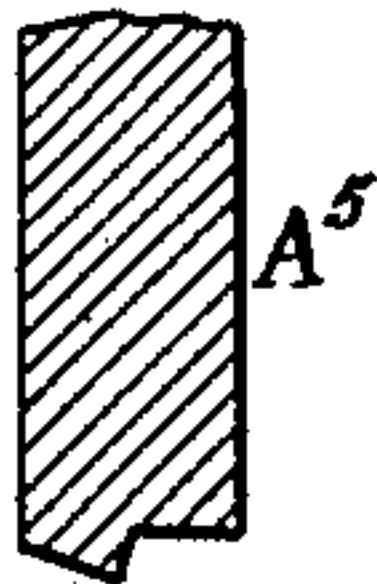


Fig.21

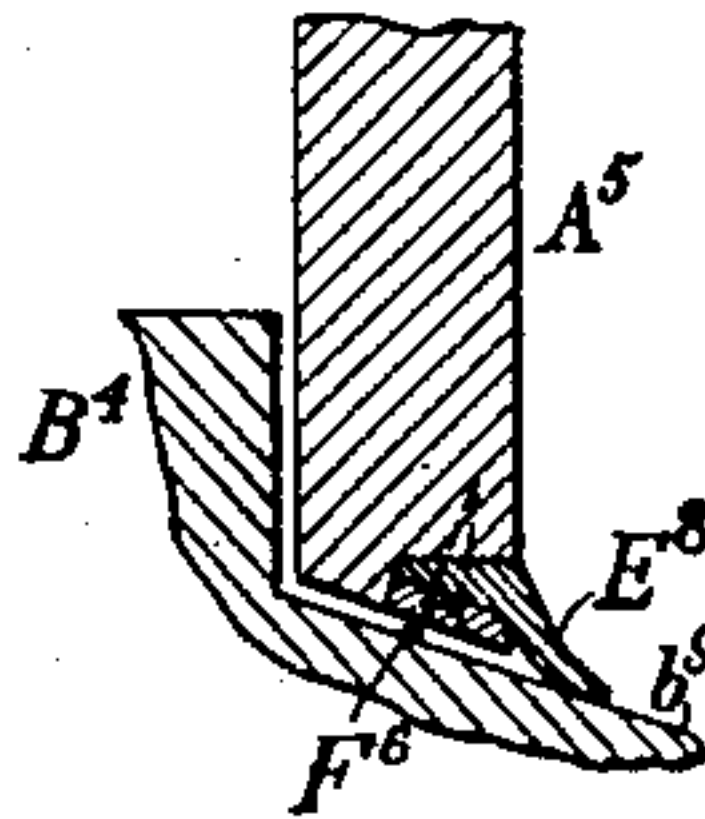


Fig.22

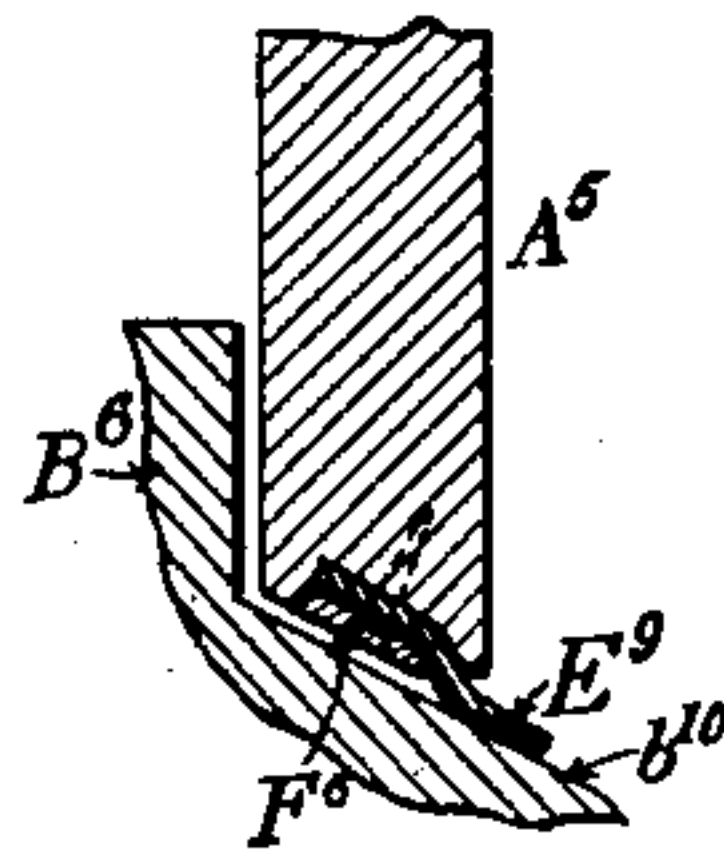


Fig.23

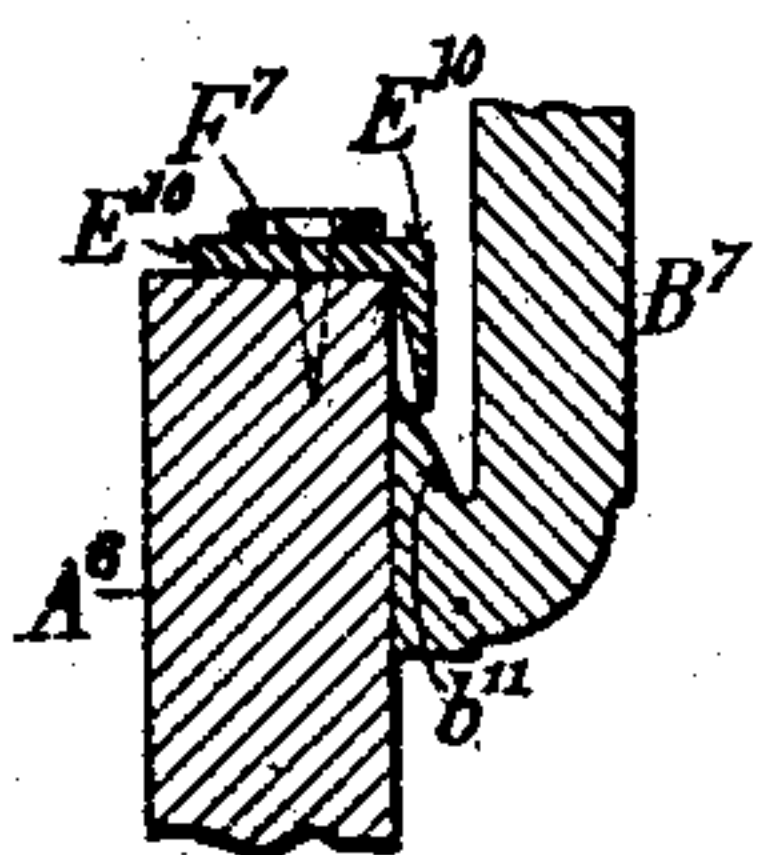


Fig.24



Fig.27

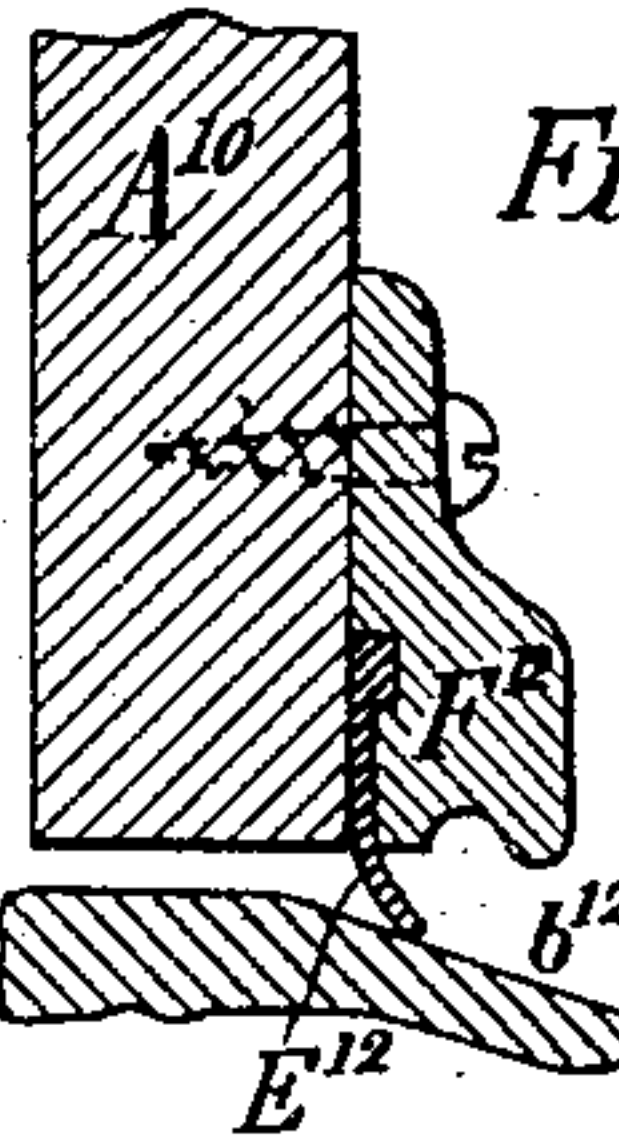


Fig.25

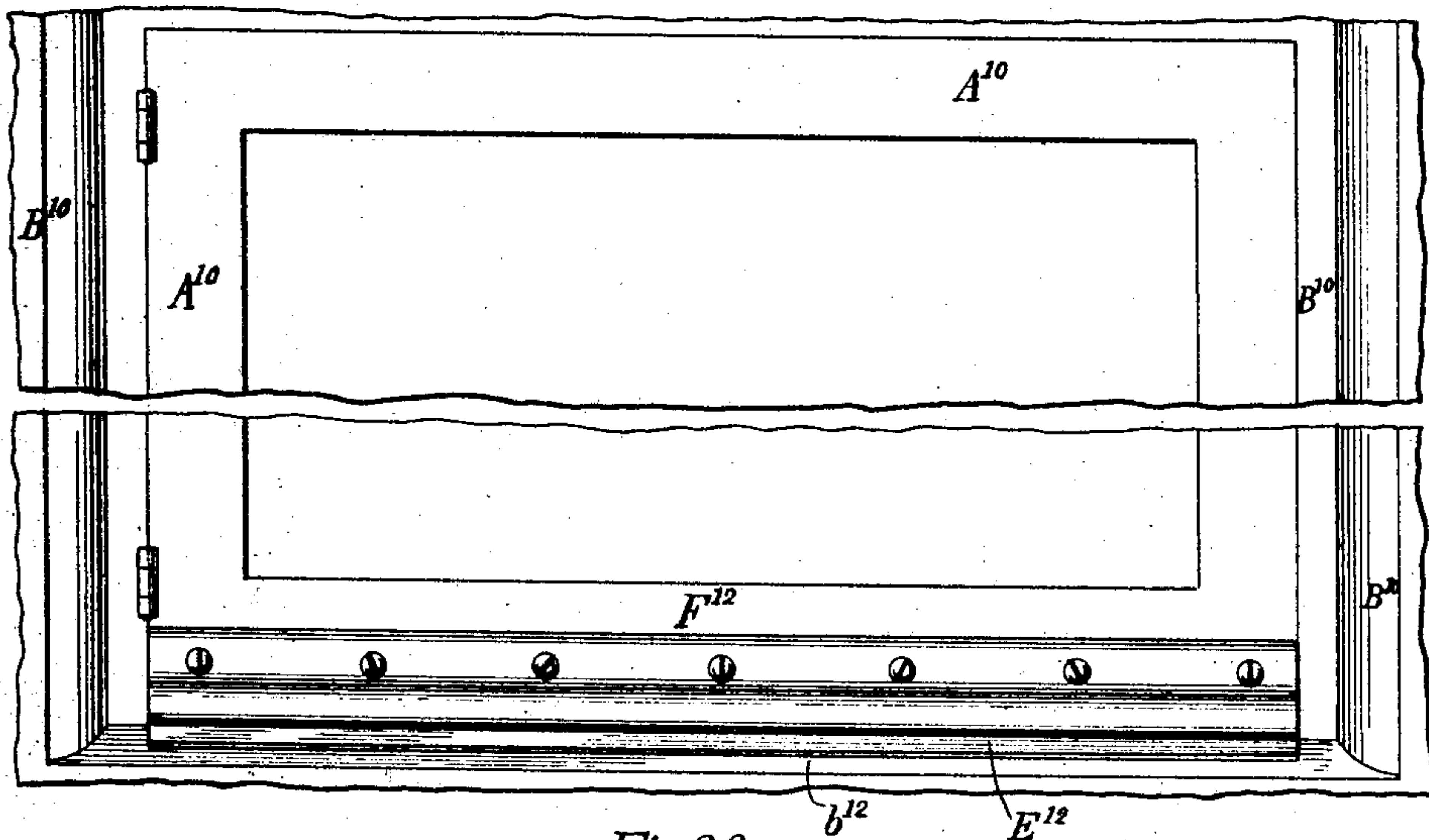
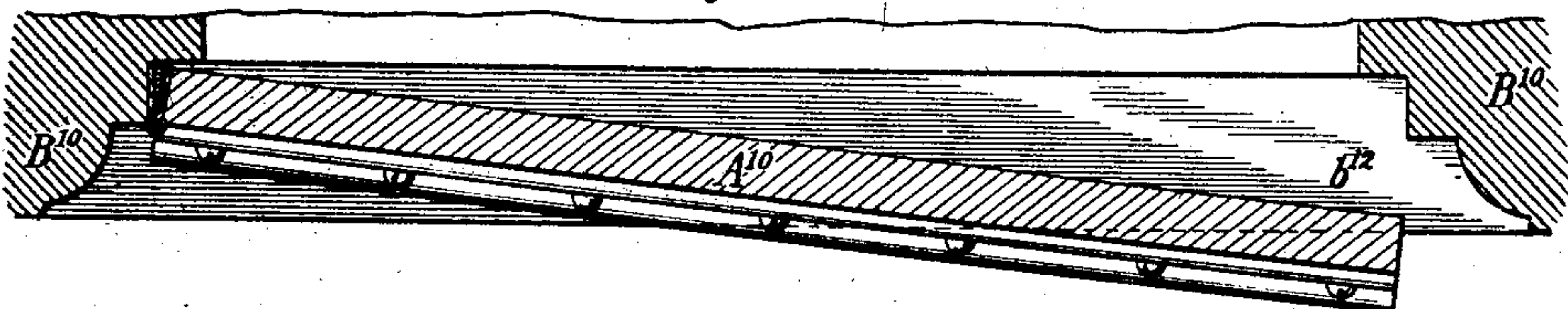


Fig.26



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UNITED STATES PATENT OFFICE.

OLIVER M. EDWARDS, OF SYRACUSE, NEW YORK.

WINDOW.

SPECIFICATION forming part of Letters Patent No. 771,133, dated September 27, 1904.

Application filed May 13, 1902. Serial No. 107,067. (No model.)

To all whom it may concern:

Be it known that I, OLIVER M. EDWARDS, a citizen of the United States, residing at Syracuse, in the county of Onondaga, State of New York, have invented certain new and useful Improvements in Windows, of which the following is a full, clear, and exact description, reference being had to the drawings accompanying and forming a part of the same.

10 This invention relates generally to improvements in windows of railway-cars and other structures, and has for its object the provision of means whereby the joints between either the top or the bottom portion of the sash or between both portions and the corresponding portions of the frame may be bridged over by a yielding strip or strips of material and thereby exclude dirt and cold at such portion or portions.

20 My invention consists, first, in combining with a cross part or portion of a frame and of a sash of a surface inclined at an angle other than a right angle to the guideway in the frame, a flexible strip of material of a length substantially that of the inclined surface and of a width to bridge over the joint between the sash and frame, and securing means adapted to secure the edge of the strip to the window in position for the other edge to engage with the inclined surface and move away from the part to which the strip is secured when the window is closed; second, in combining with two cross parts or portions of a frame and of a sash two inclined surfaces, 35 each of which is at an angle other than a right angle to the guideway in the frame, of two flexible strips of material, one for each inclined surface, each of which is of a length substantially that of its inclined surface and securing means for each of the flexible strips, each means being adapted to secure one edge of a flexible strip to the window in position for the other edge of such strip to engage with one of the inclined surfaces when the 45 window is closed and bridge over the joints between the top and bottom portions of the sash and frame; third, in providing a flexible strip of material with a thickened widthwise portion to aid in holding or securing such strip in position adjacent to a frame and a

part movably mounted therein, whether such movable part is mounted to slide or swing in such frame; and it also consists in certain other novel and useful combinations of parts, all of which will be hereinafter more fully described, 55 and particularly pointed out in the claims, which form a part of this specification.

Like letters of reference wherever they occur indicate corresponding parts in all of the figures.

60 Figure 1 is an exterior view of a window, showing the bottom and top portions of a sash and window-frame with my improvements applied thereto, the sash and frame being broken away, as shown, to illustrate the parts shown on a larger scale than otherwise. Fig. 2 is a vertical sectional view of what is shown in Fig. 1 on line 2 2 thereof. Figs. 3 and 4 are plan and cross-sectional views, respectively, of a portion of the flexible strip of material, which 65 has one edge thereof thickened by the addition of a rib lengthwise of the strip, which is arranged at one edge thereof. Figs. 4^a and 4^b show in cross-section modifications of the strip of flexible material seen in Fig. 4. Fig. 4^c 75 shows in cross-section another modification of the strip of flexible material seen in preceding figures. Fig. 5 illustrates one way of applying the strip of flexible material to the bottom portion of the sash and of the frame, illustrating that seen in Figs. 1 and 2 on an enlarged scale. Fig. 5^a shows a modified form of parts seen in Fig. 5. Fig. 5^c illustrates one way of applying the strip of flexible material to the bottom portion of the sash—as, 85 for instance, that form seen in Fig. 4^c. Fig. 5^c also illustrates the relation of the free edge of the strip to the sill of the window-frame when the sash is closed. Fig. 6 is a sectional view showing the application of a strip of flexible material to the top portion of the sash and frame, being that seen at the top of the window seen in Figs. 1 and 2, but on an enlarged scale. Fig. 7 is a sectional view showing another way of applying the flexible strip having 95 a thickened edge with a locking device added to illustrate how the sash is held against “creeping” beyond a certain amount. Fig. 8 is an edge view of the bottom portion of the sash seen in Fig. 7, illustrating the manner of 100

cutting the sash to receive the flexible strip and its securing means or holding-bar. Fig. 9 is a side view of the holding-bar seen in Fig. 7 with the rib thereon running lengthwise of such bar and with the central portion broken away. Fig. 10 is a cross-sectional view of the holding-bar seen in Figs. 7 and 9. Fig. 11 is a cross-sectional view of the strip of flexible material seen in Figs. 6, 13, and 14. Fig. 12 is a cross-sectional view of the holding-bar, also seen in Figs. 6, 13, and 14. Fig. 13 shows a modification in the arrangement of the inclined surface relatively to the sash and the frame, such surface being formed on a part of the sash itself. Fig. 14 is a view of a modification wherein the lower portion of an upper sash and the upper portion of a lower sash has the inclined surface arranged substantially as shown in Fig. 13. Fig. 15 shows a cross-sectional view of one side of the frame, its guideway and the sash illustrating one arrangement of flexible strip and holding-bar seen in Fig. 7 relatively to the sash, frame, and guideway. Figs. 16, 17, and 18 show another modification or embodiment of my improvement. Figs. 19, 20, and 21 illustrate still another embodiment or example of my improvement. Fig. 22 shows another form of applying the flexible strip to the bottom portion of the sash. Figs. 23 and 24 illustrate another modification or example of my improvement. Figs. 25, 26, and 27 illustrate the application of a flexible strip having a thickened widthwise portion to a movably-mounted swinging part as a portion of a sash or door.

In Figs. 1, 2, 5, and 6, A represents the sash, and B the frame which receives the sash, so as to slide therein in opening and closing the window. C represents the glass in the sash, and D the guideway in the frame in which the sash slides. In Fig. 1 the window is seen from the exterior of the structure—as, for instance, from the exterior of the car—this being done because it is preferred that the bottom of the sash, at least, shall have my improvement applied at or near the exterior surface thereof, so that the joint between the sash and its frame may be bridged over at or near this exterior bottom surface of the sash, as seen. If this be done at both the top and bottom portions of the sash and frame or at either one of the two places, it excludes the dirt, cinders, and cold air from the space within the guideway not actually occupied by the sash, and consequently the sash can move in its guideway with less hindrance from the dirt and cinders than would be the case if the dirt and cinders had free access to the guideway.

It has become the practice to use in railway-cars movable stop-beads or holding devices on the interior of the car to hold the sides of the sash with more or less firmness against its permanent or fixed stop-beads, which stop-beads form the guideway in the frame to receive the sash and permit it to slide

therein. Such movable stop-beads or holding devices provide means whereby the dirt and cold may be excluded from the guideway at the sides of the sash and at the exterior thereof by the holding action of the devices against the interior of the sash and forcing it outward against the fixed stop-beads of the guideway. It is customary with such holding devices to employ automatic raising means or counterbalancing means. The latter means are employed to a considerable extent where these movable stop-beads or holding devices are not used.

Wherever counterbalancing or automatic raising means are employed, the sash “creep”—that is, to move slowly and a little at a time in the opening direction—and positive locking means are employed in such cases, so that the extent of this creeping action may be limited. This requires that there be left a little space between the points where the sash strikes the window-sill and where the lock-bolt or detent engages with its keeper to insure the movement of the sash in the closing direction far enough for the lock-bolt to always snap into its locking position relatively to its keeper and insure the complete closure of the window. In practice it has been found that this requires some considerable space to insure the full and ready closure of the window and that as a consequence when the creep of the sash takes place there is this full space between the bottom of the sash and its sill for the entrance of dirt and cold air into the space within the guideway not actually occupied by the sash and even if such dirt and air be excluded from the interior of the car this dirt and cinders will so interfere with the movement of the sash in its guideway as many times to preclude the opening of the window and, if movable stops or holding devices are not used, to require a greater space in the guideway for the sash than otherwise would be required. This greater space gives greater opportunities for the passage of dirt and cinders into the guideway and from thence into the interior of the car. Consequently it is preferable to exclude the dirt, cinders, and cold air from the guideway itself and by so doing excluding the same from the interior of the car or other structure.

In Figs. 1, 2, and 5 the sash A has a projecting lip or portion *a*, formed in any well-known or convenient way, which is for the purposes of my improvements the same as if formed integrally with the sash. This projecting portion *a* extends downwardly to nearly the bottom edge or surface of the sash and when the sash is fully closed down to within a short distance of the sill of the window-frame. The bottom of the sash may be recessed, as indicated in Fig. 5, which recess extends substantially parallel with the portion *a* for substantially the width of the sash. A strip of flexible material E is formed, pref-

erably, with a thickened portion lengthwise of the strip, arranged as shown in Figs. 2, 3, 4, and 5 or as in some of the other figures of the drawings. In the form seen in Figs. 2, 3, 4, and 5 the thickened portion α is arranged along one edge of the strip, leaving its opposite edge comparatively thin. A recess is formed in the projecting portion α of the sash A to receive this rib-like portion of the strip E, as shown in Fig. 5. A holding-bar F, of any suitable material, preferably of metal, is adapted by its construction to be secured to the sash and at the same time secure the strip E firmly to the sash, and such bar and screws form securing means for one edge portion of the strip. This firm holding of the strip is necessary, and the thickened portion or rib along one edge of this strip materially aids in holding the strip E firmly to the sash. The free and comparatively thin edge of this strip E extends outwardly and downwardly from the sash A and at an angle to its exterior surface thereof and also at an angle to the sill portion b of the window-frame B. This portion of the sill b is adjacent to the guideway in which the sash slides, and it also forms an inclined surface b' , which is at an angle other than a right angle to such guideway, and this inclined surface extends from one side of the frame and guideway to the opposite side thereof. The free edge of the strip E engages with the inclined surface b' of this sill portion b of the frame B as the sash is moving in the closing direction and slides down and along such surface b' , bending from its substantially flat condition (seen in dotted lines in Fig. 5) to the curved condition. (Seen in full lines in the same figure.) When the sash is opened or creeps, the free and comparatively thin free edge of the strip E slides upwardly on this inclined surface b' ; but it remains for a short distance in contact with such surface, thus bridging over the joint between the bottom of the sash A and the inclined surface of the sill b of the frame B for a corresponding distance.

It will be observed that the nearer the strip E in its flat condition approaches the angle of the inclined surface b' of the sill b the less curvature is given to the strip E on any given extent of movement of the sash A relatively to the sill b . This curvature given to the strip E by the contact or engagement of its free edge with the inclined surface b' causes the free and comparatively thin edge to hug or remain in close contact with such inclined surface, and thus it excludes dirt and air from the guideway at the bottom of the sash to a greater extent than otherwise, and this is the case whether the sash is in contact with the sill portion b or whether it is some little distance therefrom—as, for instance, as seen in Fig. 7—and where the creeping of the sash has brought the lock-bolt in engagement with its keeper and the sash is positively locked against

further creeping. When the strip E is applied as shown in Figs. 5 and 7, the unsecured or free portions of such strip are arranged at an angle to the exterior surface of the sash, and the comparatively thin edge of such strip in contact with the inclined surface b' offers but little opportunity for the wind to force dirt and air under such contacting edge and along such inclined surface into the guideway and thence into the interior of the car. The rib or thickened portion α of such strip E aids in holding the strip to the sash even when snow and ice form over the free edge of the strip and on the sill b , which may occur under certain circumstances and in certain conditions of the weather, such as many times occur in practice. If desired, the holding-bar F may be of dimensions to extend across the bottom of the sash, as indicated in Fig. 5^a, in which case the bottom of the sash will not be recessed at all and the projecting portion α alone be provided. Also, if desired, this flexible strip may be in cross-section, as seen in Figs. 4^a, 4^b, 4^c, and 16, or otherwise, so long as the free edge be left comparatively thin, as shown. In each of the above cases the thickened portion of the strip extends lengthwise thereof and aids in securing the strip in its secured position, whether it be secured to the sash, as here shown, or to the frame or a portion thereof, as shown in some of the figures to be hereinafter described. The length of the holding-bar, whatever its shape in cross-section, will preferably be substantially that of the width of the sash or frame to which it may be applied; but the length may be such as is desired to hold the strip of flexible material in place to do its intended work. Other holding or securing means than this bar F may be employed, if desired—such, for instance, as shown in Figs. 23 and 24—it being understood that any means which will properly hold the flexible strip in place may be used, as desired. The strip of flexible material may be of different shapes in cross-section than those heretofore referred to—as, for instance, as seen in Fig. 6, where a strip E³ of substantially the same thickness throughout is shown as applied to the top edge of the sash. As here applied the free edge of such strip E³ engages with an inclined surface b^2 on the upper cross part of the frame, as shown. A holding-bar F', which is preferably of metal, is employed to secure the strip E³ to the sash A by screws, as shown, or otherwise, as desired. The strip E³ and holding-bar F' are seen in cross-section in Figs. 11 and 12, and they are to be of the length desired. The inclined surface b^3 is formed on a cross portion or part of the frame which is adjacent to the sash and to the exterior surface of the same. This inclined surface on this cross portion b^2 of the frame B serves a similar purpose to that served by the inclined surface b' of the sill portion b of

the frame B. The sash A' is recessed, as shown in Fig. 8, to receive the flat side of the strip E⁴ and the holding-bar F², all as shown in Fig. 7, or the sash may be recessed, as seen in Fig. 5^c, to receive the upper portion of strip E^y (shown in Fig. 4^c) and the holding-bar F^y. As shown in Fig. 5^c, the sash A^y receives the strip E^y (seen in Fig. 4^c) and the holding-bar F^y, screws passing through both the strip and holding-bar to secure the strip to the sash. The inclined surface b^y of the sill portion b^o of the frame B^y serves a similar purpose to that served by the surface b' of the sill portion b of the frame B. (Seen in Fig. 5.) In each case the free and comparatively thin edge of the flexible strip first engages with the inclined surface when the sash approaches the closed position and as the sash continues to close such free edge slides along such inclined surface and gives a curvature to the flexible strip widthwise of the same, which curvature tends to make the free edge press against the inclined surface with an increased force and also with an increasing extent of the surface of the strip engaging with such inclined surface. Also in each case the strip and inclined surface are so related to each other that the sash may creep to quite an extent, and yet the strip will bridge over the joint between the sash and adjacent portion of the frame.

In Fig. 7 the same kind of a flexible strip as is shown in Fig. 5 is applied to the bottom portion of the sash, but in a somewhat different manner. The general result is the same as in Fig. 5, although the angle of the strip in the flat condition relatively to the sill portion b⁴ of the frame B' is somewhat different, as will be seen. The strip of flexible material E⁴ is applied in a plane at an angle to the exterior surface of the sash A', as shown, and preferably a holding-bar F², preferably of metal, is applied to the exterior surface of the sash and preferably flush with its surface, as shown. This holding-bar F² is seen in Figs. 9 and 10 in rear side elevation and cross-section, respectively. As here shown it has a rib-like portion f, which engages with the thickened or rib portion of the strip E⁴, and thereby aids in holding such strip to the sash.

A locking device X is shown in this Fig. 7, which has a lock-bolt or detent and keeper of any well-known construction by which the sash may be positively locked against creeping beyond the desired extent and which permits the sash to creep, as indicated by the space between the bottom of the sash and the sill b⁴ in Fig. 7.

Instead of an inclined surface, with which the free and comparatively thin edge of the strip of flexible material engages, being formed on a cross portion of the frame adjacent to the sash it may be formed on the sash itself, if desired, as shown in Fig. 13. In

this case, as in Fig. 6, the inclined surface begins next to the general exterior portion or surface of the sash and extends in a direction at an angle to the guideway in which the sash slides other than a right angle and to like effect. The flexible strip E⁵ is in Fig. 13 secured to a cross part of the frame, so that its free edge engages with the inclined surface on the sash, as does the free edge of the strips E and E³ in Figs. 5 and 6 and with substantially the same result as in these figures and in Fig. 7. The simple reversal in positions of the inclined surface b⁶ and the holding-bar F³ in Fig. 13 over what is the case in Fig. 6 does not change the coacting relations of the inclined surfaces and free edges of the strips, but it permits strip E⁵ to be placed in such relation to the exterior surface of the sash that any wind pressure from the exterior of the window would tend to move the free edge of such strip into closer contact with the inclined surface in Fig. 13 instead of moving it away therefrom.

Fig. 14 illustrates a construction having the same principle of operation as the construction shown in Fig. 13, the only difference being that an upper movable sash takes the place of the cross part of the window-frame. E⁶ is the strip of flexible material, F⁴ is the holding-bar, and b⁷ is the inclined surface, which is on the sash A³ instead of on the sash A², as in Fig. 13. The flexible strip E⁶ is secured to the sash A^x by the holding-bar F⁴, as seen. The operation is the same as in the constructions hereinbefore described. The free edge of the flexible strip coacts with the inclined surface in substantially the same manner in each case. The inclined surfaces at the top and bottom of the sash in each case are adjacent to the exterior surface of the sash and are nearest each other at such exterior surface, and such surfaces separate as they extend outward and away from such exterior surface and each is at an angle to the guideway other than a right angle.

Fig. 15 illustrates the preferred way of applying the flexible strip E⁴ and holding-bar F² to the sash and relatively to the guideway in which the sash slides. (Seen in Fig. 7.) This strip E⁴ and the bar E² are preferably of a length equal to the width of the sash, and then the free edge of such strip, which extends beyond the sash when such edge is in engagement with the inclined surface, is cut away, as seen in Fig. 15. This practically closes the open space where dirt and cold air can enter underneath the sash, and there is practically no place left in which dirt and cinders can accumulate to interfere with the proper working of the sash in its guideway.

In Figs. 13 and 14 the flexible strips and holding-bars are preferably of a length equal to the width of the sash, so as to close the entire opening widthwise of such sash. These strips and holding-bars may be made as de-

sired either as to length or width, as it may be thought desirable to serve their intended purposes in each individual case, the dimensions here shown being simply examples of what such parts may be, if desired.

If desired, the flexible strip may be made of the shape and dimensions shown in Fig. 16. When thus made, the sash is preferably recessed, as seen in Fig. 17, to receive such flexible strip, which is preferably applied and held in position by a holding-bar, as shown in Fig. 18. This flexible strip E^7 , as here shown, has its projecting free edge portion arranged at an angle to the exterior surface of the sash A^4 , as is the case in Figs. 1, 2, 5, and 7, and in this respect it is the same as each of the strips in the above figures. This strip E^7 has a comparatively thin free edge which contacts with the inclined surface b^8 on the sill of the window-frame and is in this respect the same as in preceding figures. This strip E^7 also has a thickened portion, as compared with its free edge, which aids in securing the strip to the window. As here shown, such strip is applied to the sash; but it may, if desired, be applied to the frame, as hereinbefore indicated. This thickened portion of this strip E^7 in addition to aiding in securing the strip to the window also aids in holding the free edge of such strip into engagement with the inclined surface b^8 by reason of the resistance to bending caused by the thickening of the strip widthwise thereof as the exterior surface of the sash is approached and reached, the lower outer portion of the sash serving as the fulcrum, as it were, against which the thickened portion of the strip bears when force is applied against the free edge of the strip, tending to bend it widthwise—as, for instance, by contact with the inclined surface b^8 of the window-sill. By giving the strip the angular shape seen in Fig. 16 the cut in the sash may be made more nearly at right angles to the exterior surface thereof than could be done and yet have the projecting portion of such strip at the same angle to such surface if the strip were substantially flat, as in preceding figures, and this is an advantage, because the more acute the angle formed between the exterior surface of the sash and its bottom edge the greater the danger of injury to such corner or apex of such angle both in handling the sash and also from the action of the elements. In the present case, Figs. 17 and 18, the same angle is preserved that there would be if the sash were not recessed at all—that is, the angle formed by the exterior surface of the sash and the sill of the window. Again, if desired, the strip of flexible material may be made of the shape and dimensions seen in Fig. 19, wherein both edges of the strip are of about equal thickness, with the central portion, considered widthwise, thickened, as shown. This thickening of the strip also aids in securing the strip to the window and also in resisting

the bending widthwise of the strip by its free edge engaging with the inclined surface of the sill of the window. This flexible strip E^8 when applied as seen in Fig. 21 is of such dimensions in cross-section as to permit of the sash being recessed, as seen in Fig. 20, and where the angle formed between the exterior surface of the sash and the recess is a right angle, as seen. This strip E^8 is held in position by the holding-bar F^6 , as shown in Fig. 21, and so that the free and comparatively thin edge of such strip engages with the inclined surface b^9 of the sill of the frame B^4 . The operation is the same in substance as in the construction shown in Fig. 18. In each of these two figures the strip and holding-bar is preferably of the length of the width of the sash, and the projecting portion of the strip will be notched or cut away to the extent required to pass the fixed or exterior stop-beads or stops which form a portion of the guideway in which the sash slides, substantially as seen in Fig. 15. Again, if desired, a flat or substantially flat strip of flexible material may be used, as seen in Fig. 22, wherein this strip E^9 is shown as being held to the sash A^5 by the holding-bar F^6 , and the free edge of the strip E^9 engages with the inclined surface b^{10} of the sill of the frame B^5 . As here shown, there is the same general action of the free edge of the strip and inclined surface as in other figures; but the strip E^9 does not offer the resistance to the bending action, as is the case with the thickened strips E^7 and E^8 of Figs. 18 and 21. Again, if desired, a flexible strip having one side portion at an angle to the other side portion, as seen in Fig. 23, may be used and, if desired, attached to the sash, also as shown, with an inclined surface arranged at an angle to the guideway other than a right angle, which is formed on a cross portion of the frame to exclude dirt and cold at the top edge of the sash. The flexible strip E^{10} may, if desired, be secured to the sash by screws and washers, as indicated in Fig. 23, one of the washers F^7 being seen in plan view in Fig. 24, or any other desired means may be employed to secure such strip to the window in position for its free edge to engage with and bear against an inclined surface b^{11} and bend the strip widthwise as such free edge moves along such inclined surface in the act of bringing the sash into its fully-closed position. The washers F^7 bear upon the strip E^{10} and afford a means for the screws to firmly hold the strip to the sash A^6 . The sash A^6 is shown in Fig. 23 as nearly closed and in position for the free edge of the strip E^{10} to engage with the inclined surface b^{11} on the cross top portion of the frame B^7 as the sash continues its movement in the closing direction in the guideway. This free edge of the strip E^{10} as it engages with the inclined surface b^{11} moves down and along the same, bending the strip widthwise, and the thick-

ened central portion of such strip resists this bending action, as before explained.

The advantages attending the use of the thickened widthwise portion of the flexible strip of material, as heretofore explained, are largely present when the sash is mounted to swing in the frame instead of to slide, as in the preceding descriptions, for the reason that in each case this thickened widthwise portion has a similar holding effect irrespective of the direction force is applied to move the sash.

In Figs. 25, 26, and 27 there is shown a construction in which there is a frame B^{10} , having part of a sash A^{10} or similarly-movable part mounted therein by means of hinges attached to one side of such part and to the frame, so that it swings as a door swings on its hinges. The swinging sash or door part A^{10} of course closes the opening of the frame, as usual, and when such part is in the closed position it is many times desirable to exclude cold and dirt, including, of course, water, from the bottom edge thereof, or that portion which may be brought comparatively close to the frame, but not into tight contact therewith, and this is so whether such part has a sidewise swinging movement, as in Figs. 25, 26, and 27, or has a bodily-sliding movement, as in preceding figures.

In Fig. 27 a flexible strip like that shown in Figs. 3 and 4 is applied to such a swinging movably-mounted part; but any desired construction of flexible strip provided with a widthwise thickened portion may be employed that is desired so long as such thickened portion aids in securing such strip in position to the part to which it is attached. This thickened portion may serve other functions than simply aiding in holding the strip to the part to which it is secured, as hereinbefore explained.

As shown in Figs. 25 and 27, the flexible strip E^{12} is applied to the exterior surface of the movably-mounted sash or door part, and a holding-bar F^{12} is preferably used, being secured in place by any desired means to hold the strip E^{12} firmly in place on the part A^{10} , so as to move therewith when such part is moved. The frame B^{10} is preferably provided with a sill portion b^{12} , as shown in Fig. 27, against which the free and comparatively thin edge of the flexible strip may contact when such part is in the closed position, as seen in Fig. 27. It is to be understood that this free thin edge is to have any desired relation to the sill b^{12} so long as it may serve its desired function of excluding undesirable substances from passing between it and such sill portion to the desired extent, this being a matter so far as the mere holding of the flexible strip in position is concerned which is within the discretion of the constructor. The form in cross-section the thickened widthwise portion is to have may be such as desired to effect the desired result. The flexible strip may be ap-

plied to the movable part in any relation thereto that is desired so long as it has the general mode of operation herein described. These strips of flexible material may be made of any suitable material which will give the desired degree of flexibility with the desired resistance against bending widthwise, so that they may have their free edges held in engagement with the inclined surface or surfaces with which they contact in closing the window and to bridge over the joint between the sash and its corresponding portion of the frame.

I have found in practice that canvas cloth covered with a good quality of india-rubber of suitable thicknesses forms a very good flexible strip. I prefer to place the canvas or cloth at or near the surface of the strip which engages with the inclined surface, because it does not stretch as readily as the pure india-rubber does. These strips may, however, be made, as desired, of any material and in any manner to meet the individual views of the constructor. The application of these strips of flexible material by holding-bars which are removable by removing screws or other holding means therefrom permits of a damaged strip being replaced by a new one with ease and despatch, and if such strips are applied as in Figs. 1, 2, 5, 6, 13, 14, 16, and 21 this can be done without marring or injuring the looks of the structure at points where such injury to or marring of paint or other portions connected therewith would be readily seen. This application of the strips permits of their removal when the car is run into the shop for revarnishing or a general overhauling, and thus permit such revarnishing or refinishing to be done without interference from or danger of injury to such strips and also of new strips being applied without making new holes to receive the fastening means, as the same holding-bars, screws, and holes may be used over and over again. Any holding or securing means other than those shown herein may be employed so long as such means are adapted to hold the strip or strips in position for them to do their intended work. The holding-bars herein shown and described are the preferred form, because of continuous holding action on the strip and with a small number of screws passing through them.

The angle of the inclined surfaces adjacent to the general exterior surface of the sash may be such as is desired so long as it is other than a right angle to the guideway and provides means with which the free edge of the flexible strip may engage and move, as hereinbefore explained, and in certain instances such free edge is caused to move away from the part to which the strip is secured as the window is closing and bend such strip more or less widthwise and give a more or less intimate contact of such portion of the strip with the inclined surface with which it engages. The relation of this free edge portion

of the strip to the inclined surface is more or less angular and not parallel, so that as the free edge engages with the inclined surface this portion of the strip may move relatively thereto, as herein shown and described—that is, such free edge may engage and move down the inclined surface away from the sash to which the strip is secured, as shown in Figs. 5, 5^a, 7, 5^c, 18, 21, 22, 23, 27, and the lower portions of Figs. 1, 2, and 25, or may engage and move along the inclined surface, as shown in Figs. 6, 13, 14, and the upper portions of Figs. 1 and 2.

I have herein shown and described different constructions, and others will naturally be suggested to mechanics by the foregoing, and therefore I do not wish to limit myself to the several examples or embodiments of my invention herein shown and described, but desire that all examples or embodiments which have the same principles of operation as herein set forth shall be included therein as of this invention.

The terms “top” and “bottom” have been used herein because they aptly describe the portions of the sash or frame to which they are applied, and it is to be understood that each applies to the same portion whether the sash moves vertically or horizontally in the frame or in any direction between these two—that is, the term “top” refers to the part of the sash in advance when opening the window and the term “bottom” to the part in advance when closing the same.

I have herein shown the sash and frame as broken centrally thereof, and it is to be understood that either of the constructions seen in Figs. 13 and 14 may be substituted for the construction seen at the top portion of the window in Fig. 2 or that the construction shown in Fig. 7 may be substituted for that shown at the bottom portion of Fig. 2, the top portion remaining the same or not, as desired. Again, the construction shown in Fig. 23 may be substituted for the top portion in Fig. 2 and that seen in either Fig. 5^c or that seen in Fig. 18 for the bottom portion of Fig. 2, and so on, as the constructor sees fit, accordingly as his judgment may dictate.

What I claim as new is—

1. In a window the combination, substantially as set forth, of a frame, a guideway in the frame adapted to receive a sliding sash, a sash adapted to slide in the guideway, a portion adjacent to the guideway and extending from substantially one side thereof to the other and provided with an inclined surface arranged at an angle to the guideway other than a right angle, a flexible strip of material of a length substantially that of the inclined surface, and securing means adapted to secure the flexible strip to the window in position for its free edge to engage with the inclined surface and move along against such surface and away from the part to which it is

secured, whereby the joint between the sash and frame, at one edge of the sash, is bridged over by the flexible strip and dirt and cold are thereby excluded.

2. In a window the combination, substantially as set forth, of a frame, a guideway in the frame adapted to receive a sliding sash, a sash adapted to slide in the guideway, a portion adjacent to the guideway and extending from substantially one side thereof to the other and provided with an inclined surface arranged at an angle to the guideway other than a right angle, a flexible strip of material having a thickened portion centralized widthwise thereof, and of a length substantially that of the inclined surface, and securing means to secure the flexible strip to the window in position for its free edge to engage with the inclined surface and bend such strip widthwise, as the sash moves in the closing direction in the guideway, whereby the thickened central portion of the strip resists the bending of the strip widthwise and the joint between the sash and frame, at one edge of the sash, is bridged over by the flexible strip, and dirt and cold are thereby excluded.

3. In a window the combination, substantially as set forth, of a frame, a guideway in the frame adapted to receive a sliding sash, a sash adapted to slide in the guideway, a portion adjacent to the guideway and extending from substantially one side thereof to the other and provided with an inclined surface arranged at an angle to the guideway other than a right angle, a flexible strip of material having a portion of its width extending from the sash at an angle other than a right angle to the exterior surface of the sash, and extending toward the inclined surface, and securing means adapted to hold the flexible strip to the sash in position for its free edge to engage with the inclined surface and bend the edge of the angular portion of the strip widthwise away from the sash to which it is secured, as the sash moves in the closing direction in the guideway, whereby the joint between the sash and frame, at one edge of the sash, is bridged over by the flexible strip and dirt and cold are thereby excluded.

4. In a window the combination, substantially as set forth, of a frame, a guideway in the frame adapted to receive a sliding sash, a sash adapted to slide in the guideway, a portion adjacent to the guideway and extending from substantially one side thereof to the other and provided with an inclined surface arranged at an angle to the guideway other than a right angle, and a flexible strip of material having a portion of its width extending from the sash, which portion decreases in thickness as the free edge of the strip is approached and securing means adapted to secure the strip to the sash in position for its free edge to engage with the inclined surface and bend the extending portion away from

the sash as it moves in the closing direction in the guideway, whereby the free edge of the flexible strip is held in contact with the inclined surface and the joint between the sash and frame, at one edge of the sash, is bridged over by the strip and dirt and cold are excluded.

5. In a window the combination, substantially as set forth, of a frame, a guideway in the frame adapted to receive a sliding sash, a portion adjacent to the guideway and extending substantially from one side thereof to the other and provided with an inclined surface arranged at an angle to the guideway other than a right angle, a flexible strip of material provided with a rib near one edge thereof, and a holding-bar provided on one side with a rib lengthwise thereof to engage with the rib side of the flexible strip and clamp it in position for its free edge to engage with the inclined surface and bend the strip widthwise, as the sash moves in the closing direction, whereby the holding-bar clamps the flexible strip in position on the window and the rib on the bar engages with the rib on the strip and further aids in securing such strip, and the joint between the sash and frame at one edge of the sash is bridged over.

6. In a window the combination, substantially as set forth, of a frame, a guideway in the frame adapted to receive a sliding sash, a sash adapted to slide in the guideway and provided with a recess adapted to receive a widthwise portion of a flexible strip and a holding-bar, a portion adjacent to the guideway, and extending from substantially one side to the other and provided with an inclined surface arranged at an angle to the guideway other than a right angle, a flexible strip of material of a length substantially that of the inclined surface, having a widthwise portion to engage with a portion of the recess in the sash, and a holding-bar, provided with a surface to engage with and clamp that portion of the strip in the recess and of dimensions in cross-section substantially to fill the remaining portion of the recess in the sash, whereby the flexible strip is clamped to the sash in position for its free edge to engage with the inclined surface, and the holding-bar is received substantially within the recess in the sash, and the joint between the sash and frame, at one edge of the sash is bridged.

7. In a window the combination, substantially as set forth, of a frame, a sash adapted to move in the frame and to receive a widthwise portion of a strip of flexible material and securing means, a flexible strip of material having one side portion at an angle to the other side portion, and means securing the flexible strip to the sash with one side portion extending therefrom at a different angle from that portion of the frame with which it engages when the window is closed, whereby the

joint between the sash and frame is bridged over by the flexible strip, and dirt and cold are thereby excluded.

8. In a window the combination, substantially as set forth, of a frame, a guideway in the frame adapted to receive a sliding sash, a sash adapted to slide in the guideway and to receive at its bottom portion a widthwise portion of a flexible strip of material and securing means, a flexible strip of material having one side portion at an angle to the other side portion, and one side portion adapted to be secured to the bottom portion of the sash and the other side portion decreasing in thickness as the free edge of such portion is approached, and securing means adapted to secure one side portion of the flexible strip to the sash with the other side portion depending therefrom in position to engage with the sill of the window, whereby the thickened depending portion resists the bending of such portion upon its engagement with the sill, and the joint between the bottom of the sash and sill is bridged over, and dirt and cold are thereby excluded.

9. In a window the combination, substantially as set forth, of a frame, a sash adapted to move in the frame and receive a widthwise portion of a strip of flexible material and securing means, a flexible strip of material having one side portion at an angle to the other side portion, and a holding-bar clamping one side portion of the strip to the sash with the other side portion of such strip extending from the sash at a different angle from that portion of the frame with which it engages when the window is closed, whereby the joint between the sash and frame is bridged over by the flexible strip, and dirt and cold are excluded.

10. In a window the combination, substantially as set forth of a frame, a sash adapted to slide in the frame and provided near its outer bottom portion with a surface inclined upwardly and inwardly, relatively to the exterior surface of the sash, a flexible strip of material engaging with such inclined surface, and securing means securing the strip to such inclined surface, whereby the joint between the sash and frame is bridged over by the strip and cold and dirt are excluded.

11. In a window the combination, substantially as set forth, of a frame, a sash adapted to slide in the frame and provided near its outer bottom portion with a surface inclined upwardly and inwardly, relatively to the exterior surface of the sash, a flexible strip of material engaging with such inclined surface and extending from the sash at an angle to that portion of the frame with which it engages, when the window is closed, and a holding-bar clamping such strip to such inclined surface, whereby the strip is secured to such inclined surface of the sash, and the joint between the sash and frame at that part of the window is bridged over, and dirt and cold are thereby excluded.

12. In a window the combination, substantially as set forth, of a frame, a guideway in the frame adapted to receive a sliding sash, a sash adapted to slide in the guideway, and provided near its outer bottom portion with a surface inclined upwardly and inwardly relatively to the exterior surface of the sash, a flexible strip of material adapted to be received by such inclined surface and extend downwardly from the sash with the same side surface of the strip in contact with the inclined surface in position to contact with the bottom portion of the frame, when the window is closed, and means securing such strip to such inclined surface, whereby the same side of the strip contacts with both the sash and frame and the joint between them is bridged over by the strip, at one end of the sash and dirt and cold are thereby excluded.

13. In a window the combination, substantially as set forth, of a frame, a guideway in the frame adapted to receive a sliding sash, a sash adapted to slide in the guideway, two portions, each adjacent to the guideway, one near the top and the other near the bottom of the sash, and each extending from substantially one side of the guideway to the other and each provided with an inclined surface arranged at an angle to the guideway, other than a right angle, which surfaces are nearest together adjacent to the general exterior surface of the sash, two flexible strips of material, one to engage with the top inclined surface and one to engage with the bottom inclined surface, and each of a length substantially that of its inclined surface, and securing means for each strip adapted to secure such strip to the window in position for its free edge to engage with its inclined surface and bend such strip widthwise, as the sash moves in the closing direction in the guideway, whereby the joints at the top and bottom of the window are bridged over by the flexible strips and dirt and cold are thereby excluded.

14. In a window the combination, substantially as set forth, of a frame provided with an inclined sill portion, a guideway in the frame adapted to receive a sliding sash, a sash adapted to slide in the guideway and provided near its upper portion with a portion having an inclined surface, the inclined surface on the sash and that of the sill being oppositely inclined at angles other than right angles to the guideway and the two surfaces being nearest adjacent to the general exterior surface of the sash, two flexible strips of material, one to engage with the top inclined surface and one to engage with the bottom inclined surface, and of a length substantially that of its inclined surface, and securing means for each strip adapted to secure such strip to the window in position for its free edge to engage with its inclined surface and bend such strip widthwise, as the sash moves in the closing direction in the guideway, whereby the joints

at the top and bottom of the window are bridged over by the flexible strips and dirt and cold are thereby excluded.

15. The combination in a window, substantially as set forth, of a frame, a sash slidable therein, two inclined surfaces, one near the top and one near the bottom of the sash, each of which is inclined outwardly away from the exterior surface of the sash and at an angle other than a right angle thereto, two strips of flexible material, and holding-bars, one for each strip, clamping the strips in position for the free edges of such strip to engage with and move along the inclined surfaces and bend the strips widthwise as the sash nears its closed position, whereby both strips are bent widthwise at the same time and the joint between the sash and frame is thereby bridged over and cold and dirt are excluded.

16. The combination in a window, substantially as set forth, of a frame, a sash slidable therein, two inclined surfaces, one near the top and one near the bottom of the sash each of which is inclined outwardly away from the exterior surface of the sash and at an angle other than a right angle thereto, two strips of flexible material, and holding-bars, one for each strip, clamping the strips in positions for the free edge portions of the strips to stand at an acute angle to the inclined surfaces as they first engage with such surfaces and bend such strips widthwise as the sash continues its movement in the closing direction, whereby the joint between the sash and frame is thereby bridged over and cold and dirt are excluded.

17. The combination in a window, substantially as set forth, of a frame, a sash slidable therein, two inclined surfaces, one near the top and one near the bottom of the sash, each of which is inclined outwardly away from the exterior of the sash and at an angle other than a right angle thereto, two strips of flexible material, and holding-bars, one for each strip, clamping the strips to the sash with their free edge portions extending outwardly and away from the sash in positions to engage with the inclined surfaces and bend the strips widthwise as the sash moves into the closed position whereby both strips are bent widthwise at the same time and the joint between the sash and frame is thereby bridged over and cold and dirt are excluded.

18. In a window the combination, substantially as set forth, of a frame provided at its top and bottom portions with inclined surfaces, a guideway in the frame adapted to receive a sliding sash, a sash adapted to slide in the guideway and provided near its top and bottom portions with strips of flexible material secured thereto, each of which has one side portion at an angle to the other side portion, one of which side portions is secured to the sash and the other extends downwardly and outwardly from the exterior surface of

the sash, the free edge of which engages with its inclined surface on the frame, when the sash is closed and moves away therefrom when the window is opened, whereby the joints between the top and bottom of the sash and frame are bridged over by the flexible strips secured to the sash, and dirt and cold are thereby excluded.

19. In a window the combination, substantially as set forth, of a frame provided at its top and bottom portions with inclined surfaces, both of which are inclined away from the sash, a guideway in the frame adapted to receive a sliding sash, a sash adapted to slide in the guideway and provided near its top and bottom portions with strips of flexible material secured thereto, each of which has one side portion at an angle to the other side portion, one of which side portions is secured to the sash, and the other extends outwardly from the exterior surface of the sash, the free edge of which engages with its inclined surface on the frame, when the sash is closed and moves away therefrom when the window is opened, whereby the joints between the top and bottom of the sash and frame are bridged over by the flexible strips secured to the sash and dirt and cold are thereby excluded.

20. In a window the combination, substantially as set forth, of a frame provided at its top and bottom portions with oppositely-inclined surfaces, the point of least distance between such surfaces being adjacent to the sash, a guideway in the frame adapted to receive a sliding sash, a sash adapted to slide in the guideway and provided near its top and bottom portions with flexible strips of material, secured thereto, and of a length substantially that of the width of the sash, and of a width to extend beyond the sash and engage with the inclined surfaces on the frame, when the sash is closed and to move away from such surfaces when the window is opened, whereby the joints between the top and bottom of the

sash and frame are bridged over by the flexible strips secured to the sash, and dirt and cold are thereby excluded.

21. In a window the combination, substantially as set forth, of a frame provided with an inclined sill portion, a guideway in the frame adapted to receive a sliding sash, a sash adapted to slide in the guideway, a strip of flexible material having a centrally-thickened portion, and of a length substantially that of the sill portion, and a holding-bar one edge portion of which bears against the thickened portion of the strip and secures such strip to the sash in position for its free edge to engage with and move along the inclined sill portion, at an angle thereto, when the sash is closed and to move away therefrom when the window is opened, whereby the flexible strip is held to the sash and the joint between the sash and sill portion is bridged over by the strip, and dirt and cold are thereby excluded.

22. The combination substantially as set forth, of a frame, a part movably mounted therein, and adapted to receive a flexible strip, a strip of flexible material having a thickened widthwise portion arranged near one edge thereof, and a holding-bar clamping such thickened portion to such part in position for the free edge portion of the strip to engage with the frame and be moved away from such part as it moves into the closed position.

23. The combination, substantially as set forth of a frame, a part movably mounted therein, and adapted to receive a strip of flexible material having a rib arranged near one edge thereof, and a holding-bar embracing the rib on the strip and clamping it to the movable part in position for the free edge of the strip to engage with the frame and move away from such part as it moves into the closed position.

OLIVER M. EDWARDS.

Witnesses:

JAMES R. MURPHY,

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