June 30, 1931. F. L. MICHAELS 1,812,840

WEATHER STRIP APPARATUS

Filed Sept. 10, 1929 2 Sheets-Sheet 1

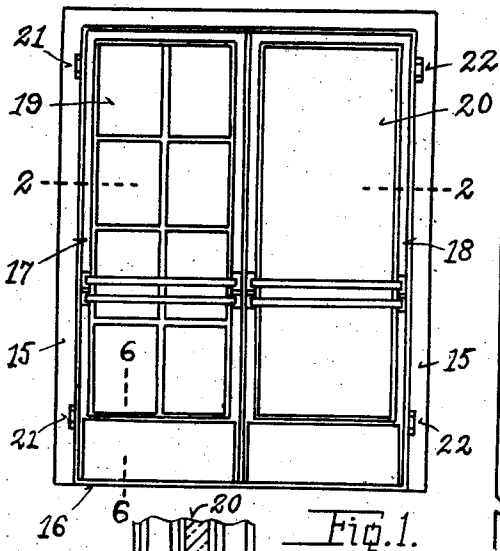


Fig. 1.

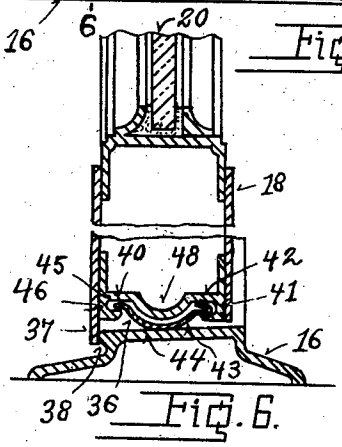


Fig. 6.

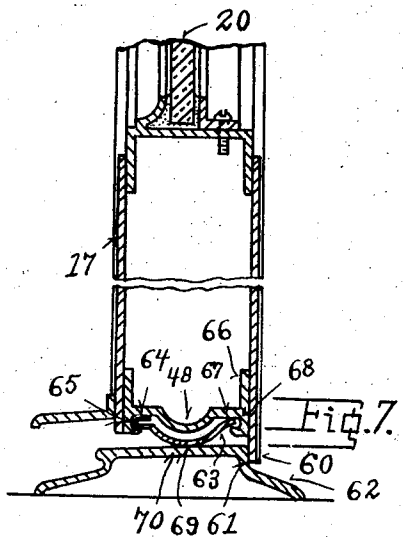


Fig. 7.

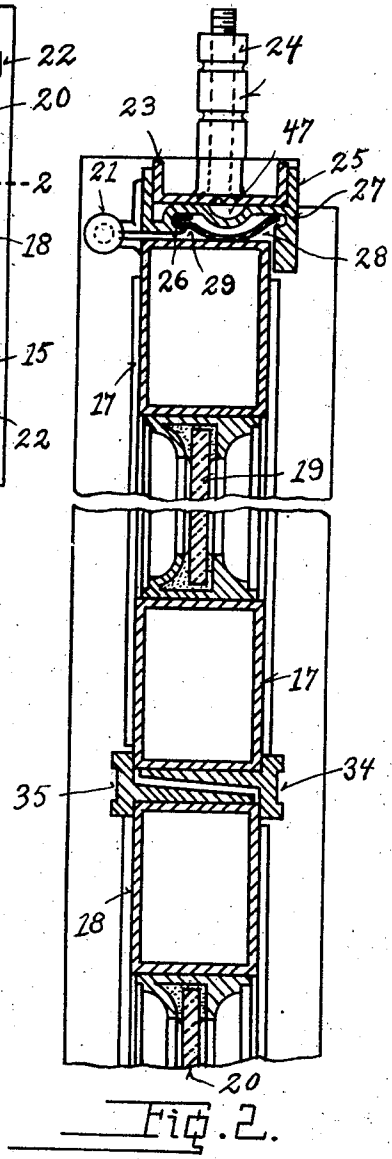


Fig. 2.

Inventor

Frank L. Michaels,

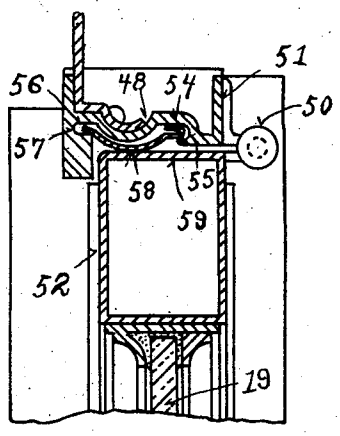
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Attorney

June 30, 1931. F. L. MICHAELS 1,812,840

WEATHER STRIP APPARATUS

Filed Sept. 10, 1929 2 Sheets-Sheet 2



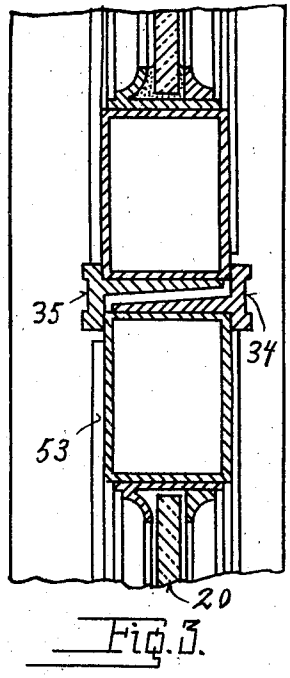


Fig. 3.

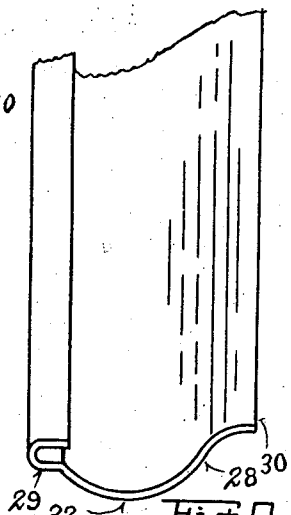


Fig. 8.

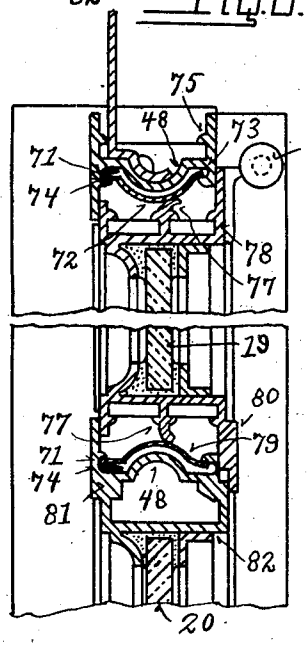


Fig. 4.

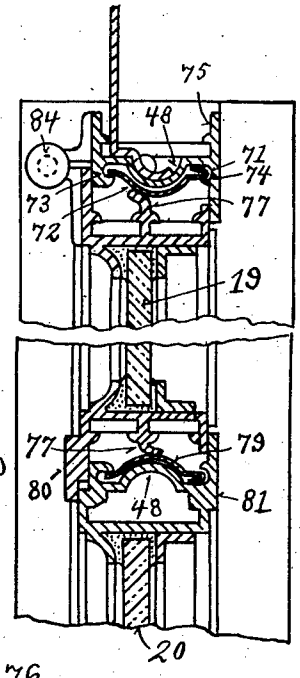


Fig. 5.

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Patented June 30, 1931

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UNITED STATES PATENT OFFICE

FRANK L. MICHAELS, OF COVINGTON, KENTUCKY

WEATHER STRIP APPARATUS

Application filed September 10, 1929. Serial No. 391,524.

My invention relates to improvements in weatherstrip for windows and doors. One of its objects is to provide an improved weatherstrip adapted for use with metal windows and doors. Another object is to provide in combination with a sash or door constructed from extruded metal forms a sheet metal weatherstrip adapted to be readily engaged with said forms and serving to exclude wind and rain. Another object is to provide an improved type of weatherstrip adapted to be readily inserted and retained in position for use, and adapted to reliably exclude wind and rain. My invention also comprises certain details of form and arrangement and combination of components, all of which will be fully set forth in the description of the accompanying drawings, in which:

Fig. 1 is a plan of one type of metal door or window frame and door or sash with my improved weatherstrip applied thereto.

Fig. 2 is an enlarged section through the same taken on line 2—2 of Fig. 1.

Fig. 3 is a view similar to Fig. 2 illustrating a modification thereof.

Fig. 4 is a view similar to Fig. 2 illustrating another modification.

Fig. 5 is a view similar to Fig. 2 illustrating another modification thereof.

Fig. 6 is an enlarged sectional detail taken on line 6—6 of Fig. 1.

Fig. 7 is a view similar to Fig. 6 illustrating a modification thereof.

Fig. 8 is a perspective view of a portion of the weatherstrip detached.

My improved weatherstrip is particularly adapted for use in connection with doors and casement windows, which are more difficult to render weatherproof than sliding doors or windows, although it is also adapted for use with sliding windows or doors. It is also particularly adapted for use in connection with metal doors and windows as it can be readily inserted into position or removed without the use of nails, screws, bolts or similar fastening members, and when in use serves effectively and reliably to exclude the weather.

The accompanying drawings illustrate embodiments of my invention. In Fig. 1 I have illustrated in plan a metal door or window frame 15 having a sill 16, and a pair of doors or windows 17 and 18 of the casement type adapted to open or swing outwardly. One of the doors 17 is shown glazed with several small glass panels 19 while the opposite door is shown glazed with a single large panel 20. As illustrated in Figs. 1 and 2 the door 17 is hinged on the outside to the frame at 21, while the door 18 is hinged on the outside to the frame in a similar manner at 22. As shown in Fig. 2 the side bars of the frame comprise structural iron channel members 23, which are anchored to the wall by means of expansion bolts 24. The finished bronze or other side bars 25 of the frame are later assembled and attached to the members 23 so as to encase and form a finish for the members 23. The side bars 25 are each provided with a vertical channel 26 near one edge and a vertical channel 27 near its opposite edge, or spaced apart one from the other. A vertically disposed weatherstrip 28, having the metal at one edge bent upon itself to form a resilient rib or bead 29 along one edge thereof, and having its middle portion 32 crowned outwardly from the rib 29 and with its opposite free edge 30 in substantially the same plane as the rib 29, and in position to loosely engage within and be confined within the channel 27.

By introducing the edge 30 into the channel 27, the portion 32 may be sprung or flexed sufficiently so that the bead 29 may be introduced into the channel 26 where it is engaged and resiliently held in place due to the bead 29 being of such dimensions as to fit snugly into the channel 26 and to be held securely in place in the channel 26 due to the resiliency of the two arms of the bead 29. This allows the crown 32 and edge 30 to move freely and under resilient tension with the bead 29 as a fixed support therefor, while the edge 30 is confined within the channel 27 and free to move within the limits of the channel 27. The crown 32 is in position to be engaged by the edge 33 of the door 17 and pressed toward the side bar 25 thereby when the door 17 is closed turning upon the axis of its hinges 21.

The weatherstrip in the side bar 25 of the door frame is thus pressed out of its normal cross sectional pattern toward the bar 25 to form a resilient and weatherproof joint between the crown 32 of the weatherstrip and the edge 33 of the door 17. The edge 30 of the weatherstrip is thereby projected further into the channel 27, and is also pressed resiliently against one face of the channel 27 to thereby form another resilient and weather proof joint between the edge 30 and the side bar 25. The bead 29 where it is forced into the channel 26 also forms a weatherproof joint with the side bar 25. The free vertical edge of the door 17 is provided with a metal parting strip 34 which is engaged by a counterpart parting strip 35 carried by the vertical free edge of the door 18. The hinged edge of the door 18 is made weatherproof by a structure and weatherstrip which is a counterpart of that shown at the top of Fig. 2.

In Fig. 6 I have shown a weatherstrip 36 mounted with reference to the sill 16 of the door frame upon either one of the doors 17 and 18. As illustrated in Fig. 6 the movement of the door upon its hinges is limited by a ledge 37 at the bottom of the door contacting with an edge 38 of the sill 16. The bottom edge of the door is formed by a cross-strip 40 which is provided with a horizontal channel 41 corresponding to the channel 26 of Fig. 2, into which a weatherstrip bead 42 corresponding to the bead 29 of Fig. 2 is firmly and resiliently mounted. A crown 43 corresponding to the crown 32 of Fig. 2 resiliently engages the inclined face 44 of the sill, while the free edge 45 of the weatherstrip corresponding to the free edge 30 of Fig. 2 enters and is limited in its movements by a channel 46, corresponding to the channel 27 of Fig. 2. The operation of the weatherstrip in Fig. 6 is substantially the same as in Fig. 2. In Fig. 2 I preferably employ a curved rib 47 forming part of the side rail 25, which approaches the rear edge of the crown 32 of the weatherstrip and would serve to prevent the weatherstrip being forced out of its normal position or crowned in the reverse direction. In Fig. 6 a similar curved rib 48 forming part of the cross-strip 40 to prevent the weatherstrip 36 being forced too far out of its normal position.

In the modification shown in Figs. 3 and 7, the doors or windows 52 and 53 are shown hinged at 50 upon the inside of the door frame 51, and adapted to open inwardly instead of outwardly. In Fig. 3 the bead 54, corresponding to the bead 29 of Fig. 2 is engaged firmly in a channel 55 corresponding to the channel 26 of Fig. 2, while the free edge 56, corresponding to the free edge 30 of Fig. 2 engages within a channel 57, corresponding to the channel 27 of Fig. 2. The crown 58 corresponding to the crown 32 of Fig. 2 is pressed out of its normal position by the edge 59 of the door 52 when the door is closed, thereby attaining a weatherproof joint along the sides of the door frame, substantially as heretofore described for Fig. 2.

As shown in Fig. 7 either door 52 or 53 when closed upon its hinges 50 is brought to a stop by the ledge 60 of the door engaging an edge 61 upon the inside of the sill 62. The weatherstrip 63 has a bead 64 corresponding to the bead 29 of Fig. 2, which resiliently engages a channel 65 in a cross-strip 66, while the free edge 67 of the strip 63 engages a channel 68 corresponding to the channel 27 of Fig. 2. When the door is closed the crown 69, corresponding to the crown 32 of Fig. 2 is forced resiliently into engagement with the upper face 70 of the sill 62 to form a weatherproof joint between the door and sill.

Fig. 4 illustrates a modification of Fig. 3 in which the weatherstrip is provided with a bead 71, a crown 72, and a free edge 73, with the bead 71 engaging a channel 74 in the side rail 75 of the door frame and the door 78 hinged at 76 to the door frame to open inwardly. A rib or projection 77 extending outwardly from the edge of the door 78 engages the crown 72 of the strip to cause the weatherstrip to form a weatherproof joint between the door and door frame substantially as heretofore described for Fig. 2. Also in Fig. 4 I have shown a weatherstrip 79 interposed between the parting strips 80 and 81 of the doors 78 and 82, and a projection 83 to engage the crown of the strip 79 to form a weatherproof joint between the meeting edges of the doors 78 and 82. A weatherproof joint at the bottoms of the doors 78 and 82 is secured substantially as shown and described for Fig. 7.

Fig. 5 illustrates a structure substantially the same as shown in Fig. 4, except that the doors open outwardly relative to the door frame upon hinges 84. The weatherstrip of the various figures extends the full length or width of the door or door frame to which they are attached and are practically concealed and out of the way to an extent not liable to be injured. In the event of injury to the weatherstrips they may be readily detached and replaced with new ones.

The apparatus herein shown and described is capable of considerable modification within the scope of the claims without departing from the spirit of my invention.

What I claim is:

1. In combination with a door and door frame relatively movable, and one of which is provided with two spaced and substantially parallel channels, a weatherstrip of crowned resilient sheet material having one edge folded upon itself and resiliently engaged with one of said channels and its opposite free edge floating in the opposite channel, the intermediate crowned portion of said weatherstrip being in position to be engaged

with the opposite member of said door and door frame when the door is closed to form a resilient weatherproof joint between said door and door frame.

2. In combination with a door and door frame relatively movable and one of which is provided with two spaced and substantially parallel channels, a weatherstrip of crowned resilient sheet material having one of its edges held in fixed position in one of said channels and its opposite free edge floating in the opposite channel, the intermediate crowned portion of said weatherstrip being in position to be engaged with the opposite member of said door and door frame when the door is closed to form a resilient weatherproof joint between said door and door frame.

3. In combination with a door and door frame relatively movable and one of which is provided with two spaced and substantially parallel channels, a weatherstrip of resilient sheet metal having one of its edges detachably held in fixed position in one of said channels and its opposite edge entering and normally floating freely within the confines of the opposite of said channels, the intermediate section of said weatherstrip being crowned and in position to be engaged by the opposite member of said door and door frame when the door is closed to form a resilient weatherproof joint between said door and door frame.

4. In combination with a door and door frame relatively movable and one of which is provided with a crowned section and a channel substantially parallel thereto, a weatherstrip of resilient sheet material having one edge folded upon itself to form a resilient means of detachably attaching said weatherstrip to the channeled member of the door and door frame, and having its intermediate section crowned over and normally out of contact with the crowned section of the door or door frame member when the free edge of said weatherstrip is embraced within said channel and in position to be engaged by the opposite member of said door and door frame when said door is closed to form a resilient weatherproof joint between said door and door frame.

In testimony whereof I have affixed my signature.

FRANK L. MICHAELS.