May 19, 1964 P. FOREMAN 3,133,324

MAGNETIC WEATHER SEAL AND WINDOW CONTROL

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Fig. 1

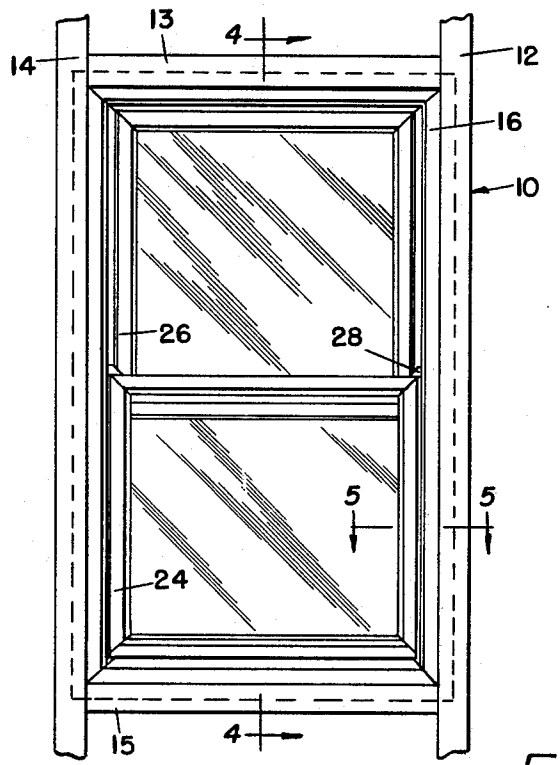


Fig. 2

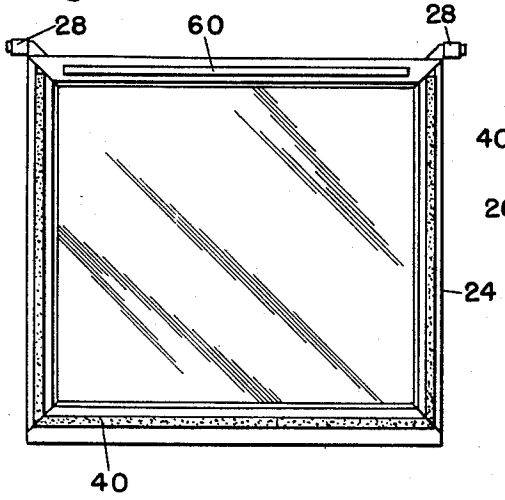
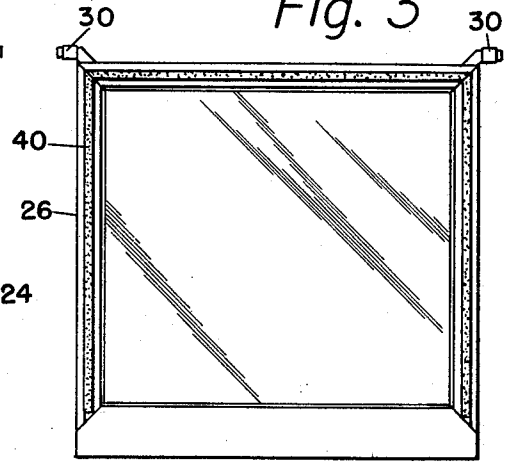


Fig. 3



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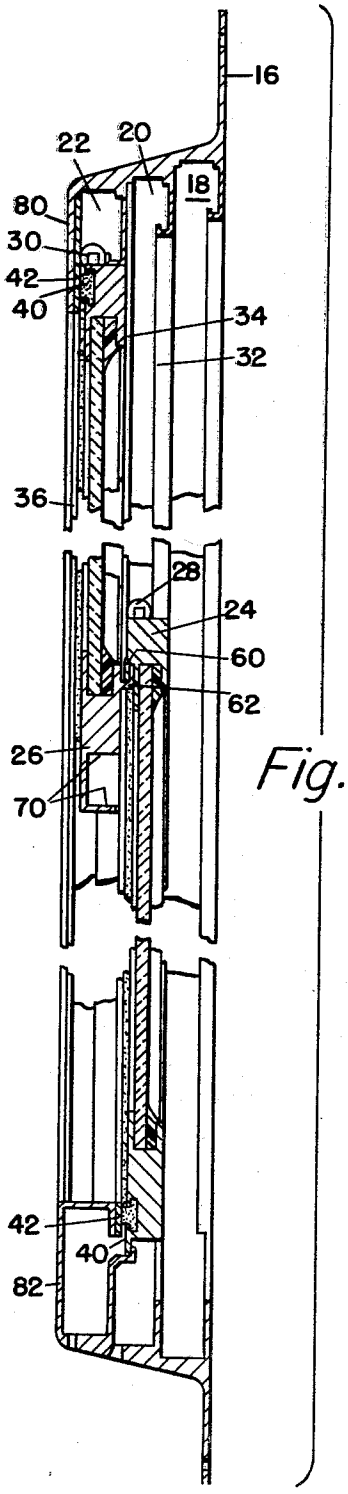


Fig. 4

Fig. 5

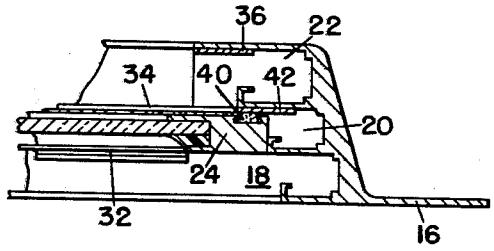
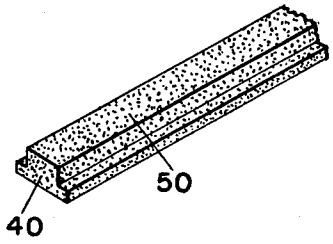


Fig. 6



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United States Patent Office 3,133,324 Patented May 19, 1964

3,133,324

MAGNETIC WEATHER SEAL AND WINDOW CONTROL

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Filed June 13, 1961, Ser. No. 116,749
6 Claims. (Cl. 20—52)

This invention relates primarily to double-hung windows, particularly storm windows, although it is also applicable to horizontal-slide and prime windows, including casement windows. It has particular reference to means for sealing the space between the windows and the frame defining an opening in a wall therefor, and for retaining the windows in selected moved positions with respect to the frame.

Broadly stated, the object of the invention is to provide a magnetized window sash which will form a weather seal with the window frame when in the closed position, and which will permit position control of the upper and lower windows without the need of slide-bolts, spring-loaded pins, and other such devices.

Another object is to provide means for eliminating rattling caused by movement of the windows toward and away from the frame and from each other.

These and other obvious objects of the invention are accomplished by means of a continuous, pliable, magnetic strip which is secured to and extends perimetrally along the flat faces of the window sash stiles, and a corresponding armature or continuous magnetizable strip in opposed relation to the magnetic strip secured to and extending along the flat faces of the rails forming the tracks within which the windows ride up and down. By this arragnement there is eliminated the need for and supplementary weather-stripping and anti-rattling devices, and any levers, weights or other means for maintaining the window sash at a desired height with respect to the window frame, as well as making entirely optional the need for any latches for locking the closed windows so that they cannot readily be opened by someone on the outside.

The construction and operation of the present operation, as well as the nature of its improvement over the prior art, will readily be understood by reference to the drawings, wherein:

FIG. 1 is a front elevational view of each of the windows and sash in a double-hung, triple-track storm window construction, as mounted in a building wall, and as seen from the inside;

FIG. 2 is a rear elevational view of the front sash which has been removed from the FIG. 1 position and turned around;

FIG. 3 is a rear elevational view of the rear sash which has been removed from the FIG. 1 position and turned around;

FIG. 4 is a vertical section taken along line 4—4 of FIG. 1 to show details of the triple track construction as well as the inventive improvements hereof with the two storm sash in place but with the screen insert removed;

FIG. 5 is a horizontal sectional view taken from line 5—5 of FIG. 1 to show further constructional details; and

FIG. 6 is a showing in longitudinal perspective of one form of a magnetized strip which is employed to carry out the improvements of the present invention.

Referring now to the drawings, wherein like numbers refer to like parts, it will be seen that the invention is particularly adaptable to the modern triple-track, readily removable aluminum screen and storm sash customarily installed in homes having conventional double-hung windows. Thus, in a window frame 10 defined by vertical jamb members 12 and 14, and horizontal jamb members 13 and 15, there is installed a triple-track frame assembly 16. The innermost track 18 accommodates a screen

(not shown), the middle track 20 accommodates the inner or front sash 24; and the outermost track 22 accommodates the outer or rear sash 26. Front sash 24 has a pair of generally cylindrical projections 28 which ride in track 20, and rear sash 26 has a similar pair of projections 30 which ride in track 22.

Track 20 will be seen to consist of a rail 32 (as its inner or front guide) and a rail 34 (as its outer or rear guide). The outer or rear face of sash 24 (that seen in FIG. 2) rests against and is confined against rearward movement by rail 34, but the inner or frontal face of the sash is not confined so that the sash is free to be tilted forwardly with projections 28 as the pivot points. Sufficient leeway is provided so that by cooking the sash with respect to track 20 sash 24 can be removed from the track assembly 16.

In a similar manner, track 22 will be seen to consist of rail 34 (as its inner or front guide) and a rail 36 (as its outer or rear guide). The outer or rear face of sash 26 (that seen in FIG. 3) rests against rail 36 which confines the sash against rearward movement but does not prevent tilting it forwardly with projections 30 as the pivot points, providing that sash 24 either is moved out of the way or is tilted forwardly also. Sufficient leeway also is provided so that upon cocking the sash with respect to track 20 the entire sash 26 can be removed from the track assembly 16.

In window constructions of the type described it has been customary to provide either holes or ledges (not shown) at spaced positions along the lengths of tracks 20 and 22, and a slide or spring mounted bolt or other means on both ends and near the bottoms of sash 24 and 26 for engaging said holes or ledges. By such means (not shown) the heights of the sash can be controlled so that they are fully divergent from each other as shown in FIG. 1, in which the window opening is fully closed, or they can be partly superimposed or even entirely superimposed in the uppermost, lowermost or an intermediate position. When in the FIG. 1 relationship these prior art window positioning controls also serve as locking means to prevent the windows from being opened from the outside without first having to break the glass panes so as to gain access to and release the lock.

Although the described triple-track storm window construction, together with the described window control means, have been generally useful for the purpose in mind, their utility has been limited because of their inability to provide a satisfactory weather seal. Thus, when the windows are in the fully closed position shown in FIG. 1, if a very strong wind exerts pressure against the windows they have a tendency to flex enough to provide a gap around their sides which will permit the outside air to get inside and thereby defeat the purpose of the storm windows. The reason for this is the fact that each sash is made of a relatively thin gauge metal frame and contains a thin glass pane, both susceptible to flexure unless rigidly held against the window frame along the entire perimeter of the sash. But the only means for supporting the sash in desired position is to be found in the projections 28 or 30 at the top of sash 24 or 26, respectively, and the locking type of slide bolt or other such projections (not shown) at the bottom of each sash. Such support is insufficient to prevent the described less than air-tight condition.

In storm window constructions prior to the tilting window arrangement described and shown in the drawings, when windows were supported both front and back by the rails of the tracks in which they rode up and down, there was less of a problem than is now caused by the design which permits inwardly tilting of the windows for easy cleaning and removing of the windows. Even so, those constructions were not air-tight, nor were they free

from rattling as air pressure rocked the windows forward and backward within the limits of the confining rails. As for this rattling, of course, the modern triple-track design illustrated in the drawings is even more susceptible than its predecessors because it lacks the support by the rails against the forward or inner faces of the sash frames.

The present invention overcomes these defects in the prior art construction and provides a weather-stripping means around the entire perimeter of the sash, while simultaneously providing anti-rattling window support and position control at all levels of window elevation. At the same time the need for relatively expensive spring-mounted or other such window control means is eliminated. These improvements are accomplished by means of a continuous pliable magnetic strip **40** which is mounted along the entire lengths of three sides of sash **24** and sash **26** as shown in FIGS. 2 and 3. Thus, when both sash are in the completely closed-window position shown in FIG. 1, the magnetic stripping of both sash are in a continuous line forming a complete rectangle by paralleling all four slides of the window opening defined by vertical jambs **12—14** and horizontal jambs **13—15** in FIG. 1. Cooperating with magnetic strip **40** is an armature or magnetizable steel strip **42** which is aligned in opposed relationship thereto.

Magnetic strip **40** may be secured in the position generally shown in FIGS. 2–3 by any convenient means, as by use of adhesives or by press-fit in a groove or slot shaped to accommodate the magnetic strip. In the drawings, the magnetic strip is shown to have the optional shape of the FIG. 6 illustration, the strip filling accommodating slots therefor in the stiles of the sash as shown in FIG. 4. Of course, other shapes of the strips, or other means for holding the strip in place, can be employed. The magnetic strip can be exposed or it can be covered by a piece of steel (this construction not illustrated) through which the magnetic force may operate in attracting the armature. In another option, for particular application to aluminum windows, the magnetic strip can be housed in a U-shaped steel channel which, in turn, is fitted into the non-ferrous sash frame. This steel support for the magnetic strip serves to enhance the effective magnetic force of the strip.

The magnetic strip **40** may conveniently be formed from a well known, commercially available material. It is relatively flexible and may, for example, be formed by extrusion of a polyvinyl stock containing an Indox material and then causing the strip to be magnetized permanently in any convenient manner well known to the art. Preferably, the strip is magnetized so that the outer surface **50** (see FIG. 6) contains both north and south poles, about evenly divided area-wise. The magnetic force is controlled, by the nature of the strip and the manner in which it is magnetized, so that it will be sufficient to hold the windows securely to the rails in which they slide in any desired up or down position but not so great as to make it difficult for the average young adult to raise or lower the window. The size and weight of the window will, among others, be factors in the selection of the appropriate type of magnet.

The armature or magnetizable steel strip **42** may suitably be about equal in length, width and arrangement as the magnetic strips **40** shown in FIGS. 2 and 3. However, the steel strips **42** are not mounted on the sash; they are part of, or attached to the rails **34** and **36**. Thus, rear sash **26** has opposing it in contiguous realtionship therewith a magnetizable steel strip **42** in the shape of an inverted U. Likewise, sash **24** has opposing it and in contiguous relationship a magnetizable steel strip **42** in the shape of an upright U. The steel strips can be fused, press-fitted into accommodating channels or otherwise secured to rails **34** and **36** so as to be flush with the surface of the rails or slightly raised therefrom. The steel and magnetic strips preferably are in contact with each other, although it is possible to have a very slight clearance between them. However, if separated, the magnetic force must be great enough to tend to hold the windows to the rails in a given position until someone operating the window applies the additional force necessary to overcome the static forces of the magnetic strip and raise or lower the sash to other positions.

When the windows are in the "fully closed" position of FIG. 1, an interlocking of two projecting members takes place to further hold the windows together back to back. One of these members is shown at **60** in FIG. 2; it is curved, projects outwardly and extends across the full width of the rear top frame of sash **24**. A similarly shaped member **62**, which mates with member **60**, extends across the full width of the front bottom frame of sash **26**. The interlocking of the two is shown in FIG. 4.

For convenience in gripping the sash to raise or lower them a recessed ledge may optionally be provided in the lower horizontal frame portion of each sash as shown at **70** for rear sash **26** in FIG. 4. (No such ledge is shown for the front sash **24**, but it may, of course, be provided.) Such devices, or other means for accomplishing the same purpose, are not part of the present inventive improvement, and so need not be described in detail.

Other modifications or embodiments will suggest themselves to persons skilled in the art, all within the purview, scope and spirit of the disclosure. For example, the placement of magnetic strip **40** and magnetizable steel strip **42** can be reversed (not shown) so that the former is located on rails **34** and **36**, and the latter is located on sash **24**. When applied to horizontal sliding type windows the present invention may not be required to maintain windows in a given position, as in the case of double-hung windows, but it does prevent rattling and makes a perfect weather-seal. The same applies when the invention is used in connection with casement windows.

Still other options, which may not necessarily be a part of the present inventive concept, may be employed. For example, locking bolts or other locking means (not shown) may be employed as additional security for holding the windows in the closed position of FIG. 1 against the possibility of persons unlawfully prying open windows from the outside. Actually, such prying is made quite difficult by virtue of the fact that the top of the rear window is concealed behind a portion **80** of track assembly **16**, and the bottom of the front window is concealed behind a portion **82** of the track assembly. With the top and bottom thus concealed so that a pry-bar cannot readily be inserted to force the windows to move up and down, it is a difficult proposition for one to otherwise force the windows apart from the outside by trying to overcome the magnetic pull that is set up between the magnetized strips **40** and the magnetizable strips **42**.

For the reasons made clear above, it is not intended to be limited by the specific illustrative embodiments, descriptions or explanations given in this specification, but only by the metes and bounds of the following claims.

I claim:

1. A window structure comprising a rectangular frame having a pair of oppositely disposed vertical jamb members and a pair of oppositely disposed horizontal jamb members, a forwardly and a rearwardly disposed rail each having a front and a rear face and secured to each of said jamb members so as to be parallel to each other and jointly to form oppositely disposed tracks, a rectangular window sash movably supported within said tracks, the sash having its perimeter defined by paired vertical and horizontal end surfaces each of which is opposed to a corresponding jamb member, the sash further having a front face which is opposed to the rear face of the adjacent forwardly disposed rail and a rear face which is opposed to the front face of the adjacent rearwardly disposed rail, means for retaining the sash in face-to-face abutment with one of the pair of adjacent rails when the sash is in position to completely fill said window frame

so as to hold the sash and rail together in substantially air-tight relationship, said means consisting of a magnetic strip and a magnetizable strip, one of which strips is mounted on one face of the sash and the other of which strips is mounted on the opposing face of the adjacent rail, at least a part of the magnetic and magnetizable strips being in opposed and contiguous relationship at all times when the sash does not completely fill the frame, but the entire magnetic and magnetizable strips being in full contact with each other along their entire lengths when the window sash is closed with respect to the window frame.

2. The structure of claim 1 in which at least a portion of the magnetic strips is covered by a ferrous metal strip.

3. A window structure comprising a rectangular frame having a pair of oppositely disposed vertical jamb members and a pair of oppositely disposed horizontal jamb members, at least two sets of rails each having a rearwardly and a forwardly disposed rail member and each said rail member having a front and a rear face, the rail sets being secured to each of said jamb members so as to be parallel to each other and jointly to form oppositely disposed tracks, a forward rectangular window sash movably supported within the track formed by a forward one of said rail sets, a rearward rectangular window sash movably supported within the track formed by a rearward one of said rail sets, both sashes having their respective perimeters defined by paired vertical and horizontal end surfaces each of which is opposed to a corresponding jamb member, and each sash further having a front face which is opposed to the rear face of its adjacent forwardly disposed rail member and a rear face which is opposed to the front face of its adjacent rearwardly disposed rail member, means for retaining each sash in face-to-face abutment with one of the pair of adjacent rails forming the track within which the sash is carried, said means consisting of a magnetic strip and a magnetizable strip, one of which strips is mounted on one face of said sash and the other of which strips is mounted on the opposing face of the rail adjacent thereto, at least a part of the corresponding adjacent magnetic and magnetizable strips being in opposed and contiguous relationship at all times when the sashes do not close the open area defined by the window frame and, when the forward and rearward sashes are disposed diverged from each other so as collectively to close the open area defined by the window frame, the entire correspondingly opposed and adjacent magnetic and magnetizable strips are each in full contact with the other along their entire lengths in substantially air-tight relationship.

4. A storm window unit including at least two pairs of parallel and adjacent tracks, each track consisting of a pair of flat rails having a front face and a rear face, a rear window sash pivotably mounted by two oppositely extending projections from opposite ends of said sash which together with the sash ride up and down the rearmost of said tracks, a forward window sash pivotably

mounted by two oppositely extending projections from opposite ends of said sash which together with the sash ride up and down the forwardmost of said tracks, both said window sash being pivotable forwardly of the unit but each being prevented from pivoting rearwardly of the unit by the corresponding rearmost rail of each track which defines a rectangular opening that is smaller than the sash which fits in the track, means for retaining the window sash in face-to-face abutment with an adjacent rail in selected raised positions and for sealing the sash and frame so as substantially top revent the passage of air between them when the sash is in the closed window position, comprising, a magnetic strip and a magnetizable strip, one of which strips extends along at least one face of the frame of each of said sash and the other of which strips extends along at least one face of each of the rails forming the tracks, at least a part of the magnetic and magnetizable strips being in opposed and contiguous relationship at all times so that a relatively air-tight seal exists between them, and the entire correspondingly opposed magnetic and magnetizable strips being in full contact with each other when the window is closed with respect to the window frame, whereby to form a substantially air-tight seal between the frame and the sash.

5. The storm window unit of claim 4 in which there is additionally provided an interlock for holding the rear and forward sash together so as to prevent their being diverged in a forward-rearward motion when the unit is in closed position, said sashes having vertical stiles and horizontal rails, one part of the interlock being located on the bottom rail of one window sash and the other part being located on the top rail of the other window sash.

6. In a window structure including a rectangular frame, a pair of vertical rails, one affixed to the left and the other to the right side of the frame, both extending inwardly therefrom in a single plane in opposed relationship to each other, said rails further being flat and having a front and a rear face, a sash movable with respect to said rails so that one face of the sash always abuts one face of the rail, a magnetic strip and a magnetizable strip, one of which strips is secured to the abutting face of the rail and the other of which strips is secured to the opposing abutting face of the adjacent sash, the two strips being magnetically held together in opposed and contiguous relationship at all times so as to make a relatively air-tight seal between them, thereby to seal against the passage of air between the sash and the rail.

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