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C. E. MARX ET AL

2,253,281

DRAFT CHECK

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Fig. 1.

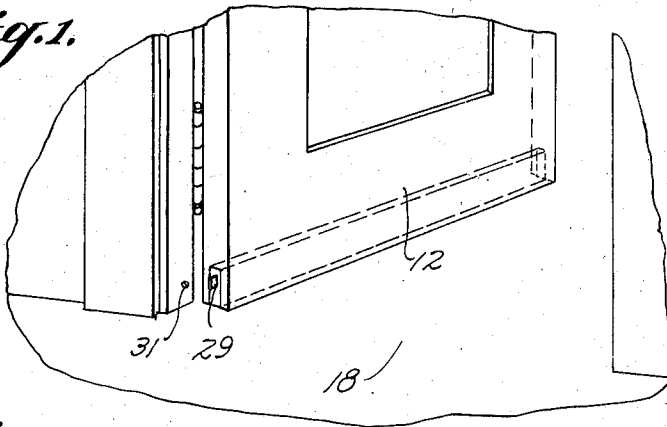


Fig. 2.

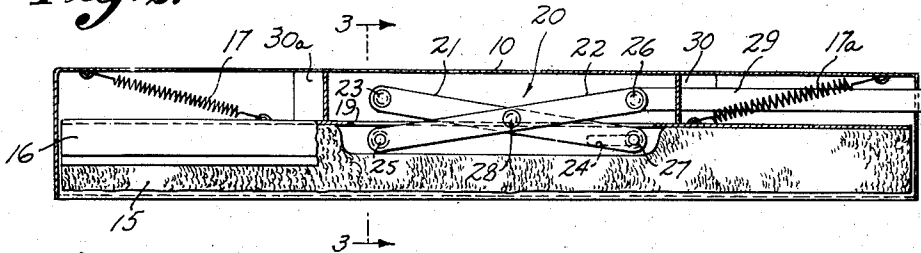


Fig. 3.

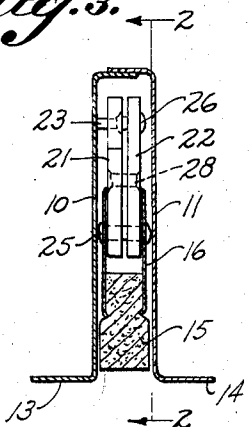


Fig. 4.

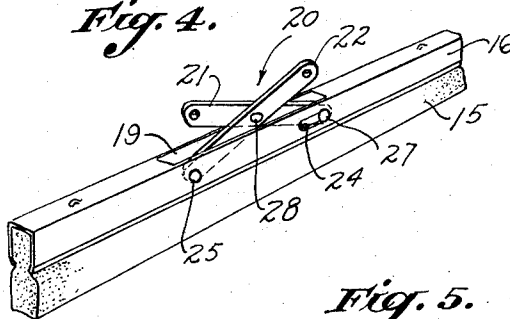
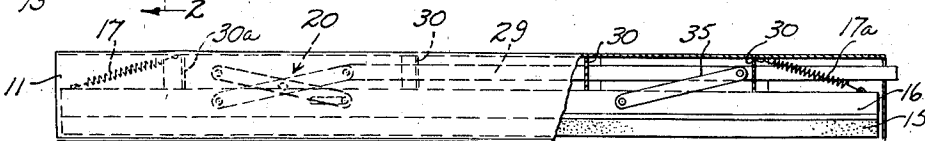


Fig. 5.



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DRAFT CHECK

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3 Claims. (Cl. 20—68)

Our invention relates generally to draft checks for doors, and more particularly to such draft checks that are designed to be operated automatically upon the closing of the door.

While draft checks have been known and used before, these prior forms have not been satisfactory for a number of reasons. To properly seal the space between the bottom of a door and the sill, it is necessary that the sealing member be in contact with the sill when the door is closed; but to prevent needless wear of the sealing member and prevent it from catching rugs, etc., it is necessary to raise it when the door is open. Draft checks have been developed which raise the sealing member when the door is opened, and allow it to drop when the door is closed; but this does not provide sufficient force to effectively seal the opening, especially if the sill is irregular or worn. Other forms have been developed which provide a positive downward force; but in so doing, it has been necessary to give the sealing member a lateral as well as a vertical motion. Since it is not feasible to have the sealing member extend beyond the sides of the door at any time, this has meant that there remains an unsealed area at one edge of the door through which air, water, etc., may flow.

It is, therefore, a major object of our invention to provide an automatic draft check in which the sealing member is raised above the floor when the door is open, and bears against the floor with sufficient force to compensate for irregularities thereof when the door is closed.

It is a further object of our invention to provide such a draft check in which the sealing member has a true vertical motion and may thus seal the entire width of the door.

It is also an object of our invention to provide such a device which may be used in doors of any width with equally good results.

It is still a further object of our invention to provide such a draft check which is thin enough to fit in doors without weakening or disfiguring them.

These and other objects of our invention will become apparent from the following description of a preferred and modified form thereof, and from the drawing illustrating those forms, in which:

Fig. 1 is a utility view of our device as it appears installed in a door,

Fig. 2 is a longitudinal sectional view taken at 2—2 in Fig. 3,

Fig. 3 is a cross-sectional view taken at 3—3

in Fig. 2 with the guide No. 30 omitted for the sake of clarity,

Fig. 4 is a perspective view of the sealing member, clip member, and straight-line mechanism, and

Fig. 5 is a view similar to Fig. 2 and showing an optional form especially suited for wide doors.

Referring now to the drawing, and particularly to Fig. 2 thereof, the numeral 10 indicates a housing member preferably formed of sheet metal and adapted to be placed in a vertically-disposed recess in the lower edge or style of a door 12. For convenience in assembling, the housing member 10 forms only one half of the housing, and hence a similar member 11 attached to the member 10 completes the housing, forming a housing closed at both ends and open at the bottom, with outwardly-extending flanges 13 and 14 for attaching it to the door. While the use of a separate housing is normally preferred, it is possible to assemble and support all of the necessary elements within the recess in the style of the door, and hence in this specification and its appended claims, the word "housing" is to be understood as including the use of either a separate housing or the recess as a housing. Within the housing and extending its entire length is a pad 15 of felt, rubber, or other suitable material which is adapted to be forced downwardly against the sill or threshold 18 of the door 12 when the latter is closed. The upper edge of the pad 15 is held by a clip 16 preferably formed of sheet metal which holds and stiffens the pad; and attached to the upper portion of the clip are springs 17 and 17a which urge the clip and its pad upwardly into the housing.

To force the pad 15 and its clip 16 downwardly, it is highly desirable to utilize a mechanism which will produce a straight-line motion, so that the path of the pad will be parallel to the sides of the door in order that the pad may extend from one edge of the door to the other and thus form a continuous and complete draft check. To provide such a motion, we have developed the mechanism shown in Fig. 2 which, by means of a simple linkage system, provides the desired type of motion with a minimum of parts.

This straight-line mechanism, designated generally by the numeral 20, consists of a pair of links 21 and 22 of equal length, pivotally connected together at their centers in a manner similar to the well-known lazy tongs. The ends of the links may be considered as being the corners of a rectangle; and since the links are con-

nected together at their centers, when one link is rotated with respect to the other, the rectangles will always have the same axes. Thus, if the upper end of the link 21, which we term the drag link, is pivotally held as by a rivet 23 to the housing member 10, and the upper end of the link 22, in horizontal alignment with the upper end of link 21, is moved horizontally toward the latter, the lower ends of the links will be moved downwardly. Since the upper ends of the links are horizontally aligned, and since the lower ends will always retain a parallel alignment, a member connected to the lower ends of the links will always be horizontal. In addition, since the ends of the links always form a rectangle, and since one end, 23, of the link 21 is attached to the housing member 10, the lower end of the link 22 will always be vertically aligned with the end 23.

In making use of this, we attach the end 23 to the housing member 10 as previously mentioned, and attach the lower end of the link 22 to the clip 16 by means such as a rivet 25. The lower end of the link 21 is held in a horizontally-disposed slot 24 in the clip 16, for as the lower end of the link 21 moves downwardly, it moves toward the lower end of link 22, and hence the slot is needed to allow for this horizontal motion while at the same time restraining vertical motion with respect to the clip 16. In attaching the lower ends of the links 21 and 22 to the clip 16, we prefer to provide a slot 19 in the upper surface of the clip through which the ends of the links may extend to be fastened to the sides of the clip. A rivet 23, or similar means, connects the centers of the links and completes the straight-line mechanism.

To provide the horizontal movement of the pivot point 26 necessary for the functioning of the apparatus, we provide within the housing, a horizontal bumper bar 29 which is pivotally attached to the leverage link 22 at the pivot point 26 and extends to a point slightly beyond the end of the housing adjacent the hinged side of the door. Because of the action of the springs 17 and 17a, the clip 16 will normally be in raised position and hence the bumper bar 29 will be in its most outwardly-extending position. However, when the bumper bar 29 is moved inwardly, the clip 16 and its associated sealing pad 15 are moved downwardly against the urging of the springs 17 and 17a by reason of the straight-line mechanism 20 previously described. To guide and support the bumper bar 29, we provide a guide member 30 which is preferably attached to the housing member 10, and which supports the bumper bar and insures its horizontal movement. We prefer to form the guide member 30 of a sheet metal angle member with one leg in a vertical plane perpendicular to the longitudinal axis of the bumper bar. By using such a guide, it may be extended downwardly and act as a stop for the clip 16 to prevent the latter's being lifted too high by the springs 17 and 17a. A similar stop 30a is placed near the other end of the housing, thus insuring that the clip 16 and pad 15 will remain horizontal at all times.

To provide the necessary horizontal movement of the bumper bar 29, the outer end of the bar is adapted to bear against the jamb of the door when the latter is closed, thus forcing the bar inwardly into the door and operating the straight-line mechanism 20. While it is possible for the end of the bar 29 to bear directly against the jamb of the door, this will gradually wear away

the relatively soft wood of the jamb, and hence after a time, the bumper bar will not be forced inwardly so far as it should be to insure proper sealing of the space beneath the door. To overcome this difficulty, we prefer to provide a screw 31 in the jamb of the door against which the end of the bumper bar 29 may bear, and thus gouging of the jamb is eliminated. In addition, the use of a screw permits of an adjustment of the length of throw of the bumper bar, and hence the distance the pad 15 moves downwardly may be adjusted for the individual door. It will be apparent that other means of preventing wear of the jamb may be used, such as a metal plate affixed to the jamb, but this has the disadvantage of not being as adjustable as the screw 31 previously mentioned.

When doors of average width are provided with one of our automatic draft checks, the use of a single straight-line mechanism 20 in the center of the door gives satisfactory results. However, in the case of very wide doors, the rigidity of the clip 16 may not be sufficient to force the pad 15 against the sill 18 with equal pressure at the ends and middle of the pad. In such circumstances, we prefer to use a slightly modified arrangement similar to that shown in Fig. 5, where the bumper bar 29 extends substantially the entire length of the housing to the straight-line mechanism 20 at the outer edge of the door. Near the inner edge of the door, an additional link 35, parallel to the leverage link 22, is pivotally attached to the bumper bar 29 and the clip 16, and thus as the bumper bar is forced inwardly, that end of the clip 16 and of the pad 15 will be forced downwardly, since the straight-line mechanism 20 at the opposite end of the clip 16 prevents the latter from moving sideways.

We have chosen this method of applying additional downward force to the pad 15 in preference to using an additional straight-line mechanism, since its use at any point where the bumper bar 29 extends on beyond in both directions would require additional thickness of the housing. This will at once become apparent when it is remembered that provision would have to be made for a leverage link 22, a bumper bar 29 and a drag link 21 to be placed so that all three might work side-by-side without interfering with one another. This would require additional thickness of the housing and while in some instances this might readily be provided, in the majority of cases it is necessary to keep the housing relatively thin in order to prevent splitting or weakening of the door. By way of example only, it may be stated that in our preferred form the overall thickness of the housing is approximately $\frac{7}{8}$ of an inch, and thus only a half-inch recess need be cut in the bottom of the door.

It will thus be apparent that we have provided an improved automatic draft check for doors which seals the entire space between the door and the sill with a sealing member positively forced against the sill, while at the same time, we have provided a device in which the sealing member will be positively raised from the sill as soon as the door is opened and thus will not drag as the door is opened wider. It may also be seen that because of the positive pressure arrangement, sealing will still be effected in the case of worn or irregularly shaped sills.

While we have shown and described a preferred and optional form of our invention, we do not wish to be limited to the particular forms or ar-

rangements of parts herein described and shown, or particularly covered by our claims.

We claim as our invention:

1. A draft check of the character described which includes: a housing adapted to be installed in the style of a door; a clip member within said housing and extending the entire length thereof; a straight-line mechanism within said housing adapted to move said clip member out of said housing and consisting of a pair of crossed links pivotally connected together in the center, the upper end of one link being pivotally connected to said housing and the lower end of said link being pivotally and slidably attached to said clip member, the lower end of said second link being pivotally attached to said clip member; means for operating said straight-line mechanism, consisting of a bar pivotally attached to the upper end of said second link and adapted to bear against the jamb of the door when said door is closed; guide means for restricting the movement of said bar and supporting it; spring means urging said clip within said housing; and sealing means held by said clip means and adapted to completely close the space between said door and the adjacent floor.

2. A draft check of the character described which includes: a housing adapted to be installed in the style of a door; a clip member within said housing; a pair of crossed links pivotally connected together in the center, the upper end of one link being pivotally connected to said housing and the lower end of said link being pivotally

and slidably attached to said clip member, the lower end of said second link being pivotally attached to said clip member; means operative upon the closing of said door to move the upper end of said second link horizontally toward the upper end of said first link; spring means urging said clip within said housing; and sealing means held by said clip means and adapted to completely close the space between said door and the adjacent floor.

3. A draft check of the character described which includes: a housing adapted to be installed in the style of a door; a clip member within said housing; an operating bar extending lengthwise of said housing and adapted to bear against the jamb of the door and be moved axially thereby when said door is closed; guide means for restricting the movement of said bar and supporting it; a first link having its upper end pivotally attached to the end of said bar and its lower end pivotally attached to said clip; a second link located in the same plane as said bar and having its upper end pivotally attached to said housing and its lower end pivotally and slidably attached to said clip, said first and second links being pivotally connected together at their centers; spring means urging said clip within said housing; and sealing means held by said clip means and adapted to close the space between said door and the adjacent floor.

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