

(19)



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(11)

**EP 0 915 226 A2**

(12)

**EUROPEAN PATENT APPLICATION**(43) Date of publication:  
12.05.1999 Bulletin 1999/19(51) Int. Cl.<sup>6</sup>: **E06B 7/215**(21) Application number: **98120835.8**(22) Date of filing: **03.11.1998**

(84) Designated Contracting States:  
**AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU  
MC NL PT SE**  
Designated Extension States:  
**AL LT LV MK RO SI**

(30) Priority: **05.11.1997 IT VI970185**

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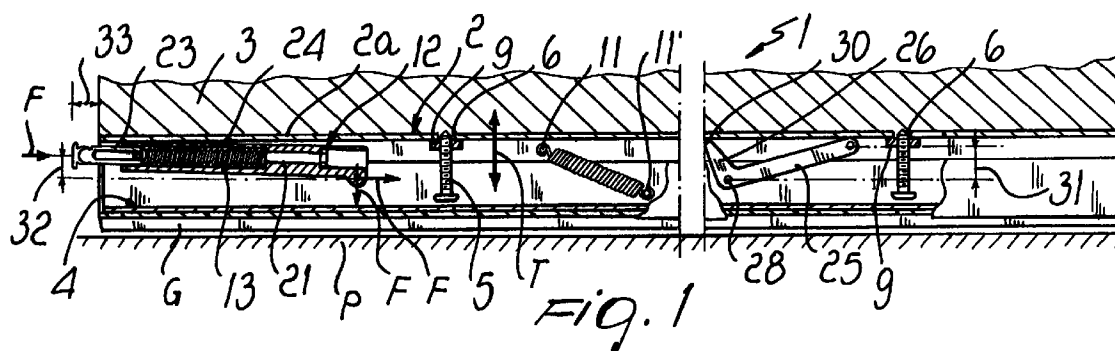
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**(54) Self-adjusting draft stopper for door and window frames or the like**

(57) The draft stopper includes a fixed profiled member (2), which can be detachably anchored to the lower edge of a door (3) and faces the floor; a movable profiled member (4), which is inserted in the fixed profiled member (2) so that it can slide transversely with respect to it; a means (10, 11) for rigidly coupling the movable profiled member (4) to the fixed one (2); a pusher (12) which interacts with an abutment member which is rigidly coupled to the door frame (3) in order to promote the automatic spacing and, respectively, approach of the movable profiled member (4) with

respect to the fixed one (2) and with respect to the floor during door opening or closure. The pusher (12) has a length which can vary elastically in a longitudinal direction in order to automatically adapt to discontinuities of the floor. The pusher (12) includes a substantially tubular body (13) with a longitudinal end (14) which is pivoted to the movable profiled member (4) and a rod (21) which is accommodated in the axial hole of the tubular body (14).

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## Description

[0001] The present invention relates to a draft stopper for door and window frames and the like.

[0002] It is known that draft stoppers are applied to the lower edge of doors so as to reduce the gap between the lower edge and the floor in order to limit air passage and heat loss.

[0003] A conventional type of draft stopper is essentially constituted by a supporting profiled member, which generally has a U-shaped transverse cross-section and which is associated with the lower edge of the door proximate to the floor, and by a movable profiled member which is inserted in the supporting profiled member so that it can slide transversely with respect to it.

[0004] The two profiled members are mutually coupled by virtue of suitable coupling members, constituted for example by at least one linkage and by at least one spring which tends to keep the profiled members mutually close. An actuation means is also provided for moving the movable profiled member with respect to the supporting profiled member closer or further away from the floor when the door is closed or opened, respectively.

[0005] The actuation means can be constituted by a pusher, generally a lever, which is connected to the movable profiled member and can be actuated at an end pushbutton which protrudes from the lateral edge of the door.

[0006] When the door is closed, the protruding pushbutton interacts with the door frame, causing the movement of the movable profiled member toward the floor and the simultaneous elongation of the elastic coupling member. When the door is opened, the elastic return of the spring lifts the movable profiled member from the floor so as to avoid any interference.

[0007] One drawback of these conventional devices is the need to adjust the position of the pusher when installing the door so as to correctly interfere with the door frame during closure. In practice, the operator must vary the position of the pushbutton of the pusher by screwing it more or less tightly by virtue of a screwdriver, a wrench or another similar tool.

[0008] A further drawback is also constituted by the fact that after assembly it is necessary to rather frequently perform successive adjustments of the pushbutton in order to ensure correct operation of the draft stopper over time.

[0009] The aim of the present invention is to eliminate the above drawbacks, providing a draft stopper which requires no adjustment when the door is installed.

[0010] An object of the invention is to avoid any readjustment of the device after installation.

[0011] This aim, this object and others which will become apparent hereinafter are achieved by a self-adjusting draft stopper for door and window frames or the like comprising a fixed profiled member, which can

be anchored to the lower edge of a door; a movable profiled member, which is inserted in the fixed profiled member so that it can slide transversely with respect to it; a means for rigidly coupling the movable profiled member to said fixed profiled member; at least one pusher which interacts with an abutment member which is rigidly coupled to the door frame in order to promote the automatic spacing and, respectively, approach of the movable profiled member with respect to the fixed one and with respect to the floor during door opening or closure; characterized in that said pusher is a single self-adjusting pusher whose length can be varied elastically in a longitudinal direction in order to automatically adapt to discontinuities of the floor.

[0012] In a preferred embodiment, the pusher is constituted by a tubular member which is pivoted to the movable profiled member and internally accommodates a rod which can slide in contrast with an elastic contrast means.

[0013] When the door is closed, the longitudinal elastic yielding of the pusher forces the movable profiled member toward the floor. A sealing member coupled to the lower edge of the movable profiled member provides a seal against the floor, so as to limit air passage and heat loss.

[0014] When the door is opened, the lifting of the movable profiled member away from the floor is entrusted to the elastic takeup of a return spring which is interposed between the two profiled members.

[0015] For the installer, the draft stopper according to the invention has the advantage of easier and quicker fitting, because the elastically yielding pusher requires no adjustment.

[0016] For the user, the draft stopper according to the invention is more reliable than known types of draft stopper because it does not require subsequent readjustments.

[0017] Further characteristics and advantages of the invention will become apparent from the detailed description of a preferred but not exclusive embodiment of a draft stopper, described by way of nonlimitative example with the aid of the accompanying drawings, wherein:

Fig. 1 is a partially sectional side view of a draft stopper according to the invention;

Fig. 2 is a sectional view of the draft stopper, taken along the plane II-II of Fig. 1;

Fig. 3 is a transverse sectional view of the draft stopper according to the invention, taken along the plane III-III of Fig. 1;

Fig. 4 is a partially sectional axonometric view of one end of the draft stopper shown in the preceding figures;

Fig. 5 is an enlarged-scale sectional side view of a detail of the draft stopper of Fig. 4, taken along an axial longitudinal plane;

Figs. 6 to 8 are partially sectional side views of details of Fig. 5.

**[0018]** The draft stopper according to the invention is described with reference to the above figures and is generally designated by the reference numeral 1; the draft stopper includes a fixed supporting profiled member 2, which has a substantially U-shaped transverse cross section, and a movable profiled member 4, which also has a substantially U-shaped transverse cross-section. The movable profiled member 4 is inserted between the wings of the fixed profiled member 2 so that it can slide with respect to the fixed profiled member 2 in a transverse direction shown by the arrow T.

**[0019]** The fixed profiled member 2 can be connected to the door 3 by virtue of preinstalled self-tapping screws 5 which are inserted in a corresponding number of holes 6 formed in the upper band 2a of the fixed profiled member 2. Each screw 5 can be accessed through a hole 7 which is formed in the lower side 4a of the movable profiled member 4 and through which a screwdriver 8 is inserted, and is immediately visible as soon as the sealing member G which provides a seal against the floor is removed.

**[0020]** In order to facilitate installation and reduce assembly times, each screw can be kept in position by virtue of a washer 9 which is associated with the internal part of the upper wing 2a of the fixed profiled member 2 at the through hole 6 through which it protrudes. The washer 9 is preferably made of a plastic material such as nylon or PVC which is in any case suitable to apply a high friction coefficient to the screw.

**[0021]** The movable profiled member 4 is connected to the fixed profiled member 2 by a coupling means constituted by at least one rigid linkage 10, whose ends are pivoted to the respective profiled members 2 and 4, and by a traction spring 11 which is coupled to points 11' and 11".

**[0022]** Conveniently, the movable profiled member 4 can be affected by an automatic movement means constituted by a single self-adjusting pusher, generally designated by the reference numeral 12, which moves it with respect to the fixed profiled member 2 and to the floor P.

**[0023]** According to the invention, the single pusher 12 has an elastically variable length so as to adapt to the discontinuities or inclination of the floor and to the deformations of the door, considerably simplifying the structure of the automatic draft stopper and preserving the oscillating behavior of the profiled member with the corresponding removable sealing member G.

**[0024]** For this purpose, the pusher 12 includes a substantially tubular body 13 with an end which is pivoted at 14 to the movable profiled member 4. The tubular body

14 has an axial hole 15 provided with a central cylindrical portion 16 and two end portions 17, 18 which are wider so as to form respective steps or shoulders 19, 20.

**[0025]** A smooth rod 21 is accommodated in the hole 15 and is formed for example by a bolt whose diameter is slightly smaller than the diameter of the cylindrical portion 16 of the hole 15 so as to be able to slide freely in that portion.

**[0026]** The rod 21 has, at one of its ends, an expansion 22 which is for example shaped like a hexagonal head and is suitable to abut, at the end of the stroke, against the shoulder 19 of the wider hole 17.

**[0027]** A tip or stud 23, constituting a push button, is screwed to the opposite end of the rod 21 and is meant to interact with a fixed abutment which is mounted on the door frame and is not shown in the drawings.

**[0028]** A compression spring 24 is interposed between the internal end of the pushbutton 23 and the shoulder 20 in order to keep the rod in a normally-extracted position.

**[0029]** By virtue of the variability of the length of the pusher 12, the draft stopper can be installed on the door 3 without any adjustment of the pusher neither initially nor during use.

**[0030]** It is noted that the rigid linkage 10 is L-shaped, with a long longitudinal portion 25 and a short transverse portion 26. The long portion 25 is pivoted with one end to the fixed profiled member 2 at 27 and with the opposite end to the movable profiled member 4 at 28. The short transverse portion 26 has an end 30 which faces the internal wall of the part 2a of the fixed profiled member 2. In this manner, the end 30 acts as a stroke limiter and determines the minimum distance 31 between the fixed profiled member 2 and the movable profiled member 4 when the draft stopper is in the inactive position.

**[0031]** During operation, when the door is closed, a force F is applied to the pushbutton 23 which is directed along the axis of the rod 21; the rod retracts into the tubular body 13, compressing the spring 24 and transmitting its reaction to the shoulder 20 against the contrasting action of the coupling spring 11. In turn, the tubular body 13 transmits this reaction force to the movable profiled member 4 with a vertical component F' produced by the resolution of the force F which acts with a lever arm 32 with respect to the pivot 14. The movable profiled member 4 is accordingly pushed downward and the sealing member G is forced against the floor P by the force F', whose intensity depends on the value of the lever arm 32, on the extent of the protrusion 33 of the pushbutton 23 and on the elastic constant of the spring 24.

**[0032]** When the door is reopened, the elastic take-up of the spring 24 causes the pushbutton 23 to protrude and return to the initial position. Simultaneously, the spring 11 draws up the movable profiled member 4 inside the fixed profiled member 2 until the end 30 of the

rigid linkage 10 abuts against the fixed profiled member 2.

[0033] From the above it is evident that the draft stopper according to the invention achieves the intended aim and all the objects; in particular, the lack of adjustment of the draft stopper during its initial installation is stressed.

[0034] The object of achieving subsequent adjustments of the draft stopper is also achieved.

[0035] The draft stopper according to the invention is susceptible of numerous modifications and variations, within the scope of the inventive concept expressed in the accompanying claims. For example, the draft stopper can be produced by using an elastic means different from the one shown, in order to obtain the mutual movement of the profiled members and the variability of the length of the single pusher having an elastically variable length.

[0036] Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly, such reference signs do not have any limiting effect on the scope of each element identified by way of example by such reference signs.

## Claims

1. A self-adjusting draft stopper for door and window frames or the like, comprising:
  - a fixed profiled member (2), which can be anchored to the lower edge of a door (3);
  - a movable profiled member (4), which is inserted in said fixed profiled member (2) so that it can slide transversely with respect to it;
  - a means (10, 11) for rigidly coupling the movable profiled member (4) to said fixed profiled member (2);
  - at least one pusher (12) which interacts with an abutment member which is rigidly coupled to the door frame (3) in order to promote the automatic spacing and, respectively, approach of the movable profiled member (4) with respect to the fixed one (2) and with respect to the floor during door opening or closure;
  - characterized in that said pusher is a single selfadjusting pusher (12) whose length can be varied elastically in a longitudinal direction in order to automatically adapt to discontinuities of the floor.
2. A draft stopper according to claim 1, characterized in that said single pusher (12) comprises a substantially tubular body (13) with a longitudinal end (14) which is hinged to said movable profiled member (4).
3. A draft stopper according to claim 2, characterized in that said tubular body (13) has an axial hole (15) with a central cylindrical portion (16) and two wider end portions (17, 18).
4. A draft stopper according to claim 3, characterized in that said pusher (12) comprises a rod (21) which is accommodated in said axial hole (15) so that it is guided slidingly by its central cylindrical portion (16) in contrast with the action of an elastic contrast means (24).
5. A draft stopper according to claim 4, characterized in that said rod (21) has an enlarged end (22) for forming a stroke limit with respect to the shoulder (19) formed by one of the wider end portions (17) of the axial hole (15).
6. A draft stopper according to claim 5, characterized in that said rod (21) has a screwable pushbutton (23) at the end that lies opposite to said enlarged portion (22).
7. A draft stopper according to claim 1, characterized in that it has a compression spring (24) which is accommodated in the axial hole (15) of said tubular body (13) between said screwable pushbutton (23) and the shoulder (20) formed by the other wider end portion (18).
8. A draft stopper according to claim 1, characterized in that said connection means comprises at least one substantially rigid linkage (10) with ends (27, 30) which are pivoted to said fixed profiled member (2) and to said movable profiled member (4) respectively.
9. A draft stopper according to claim 8, characterized in that said connecting linkage (10) is substantially L-shaped, with a long longitudinal portion (25) and a short transverse portion (26), the end of said short transverse portion (26) being suitable to abut against a longitudinal wall (2a) of said fixed profiled member (2).
10. A draft stopper according to claim 9, characterized in that said coupling means further comprises a return spring (11) whose ends (11', 11'') are pivoted to said fixed profiled member (2) and to said movable profiled member (4).
11. A draft stopper according to claim 1, characterized in that said movable profiled member (4) has, in its lower side (4a) which is directed toward the floor (P), multiple through holes (7) which are suitable to access said fixing means (5).
12. A draft stopper according to claim 11, characterized

in that said fixing means comprises multiple pre-installed screws (5) which are inserted in respective through holes (6) formed in the upper side (2a) of said supporting profiled member (2) and rigidly coupled to the latter by virtue of a positioning washer (9) which is anchored to the upper face (2a) of said fixed profiled member (2).

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