

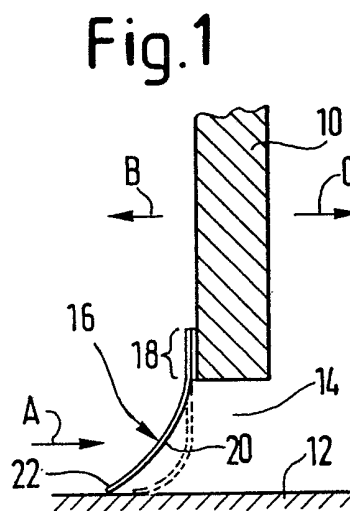
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(54) **Draught seal**

(57) To seal the gap (14) between a door (10) and the floor (12), a sealing strip (16) consisting of a flexible tape e.g. of plastics material is attached to the bottom edge of the door, the

portion (20) which projects being broader than the height of the gap (14) so that the free end presses substantially flatly against the floor. The surface of the strip facing the floor may be roughened or raised to create a velvety character.



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Fig.1

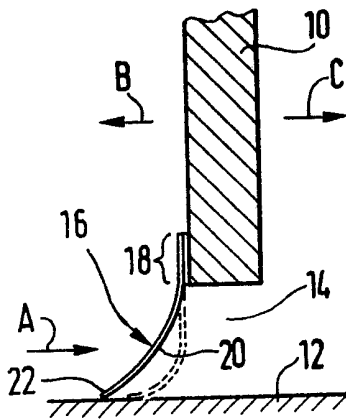


Fig. 2

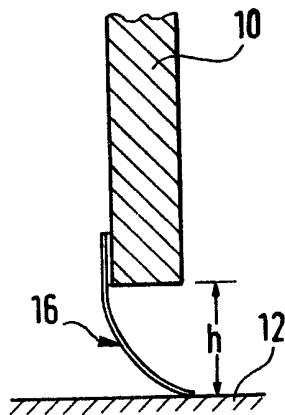


Fig. 3

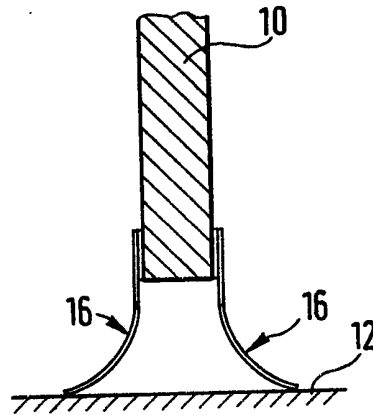


Fig. 4

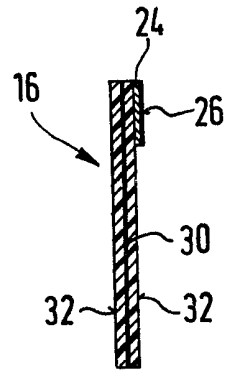
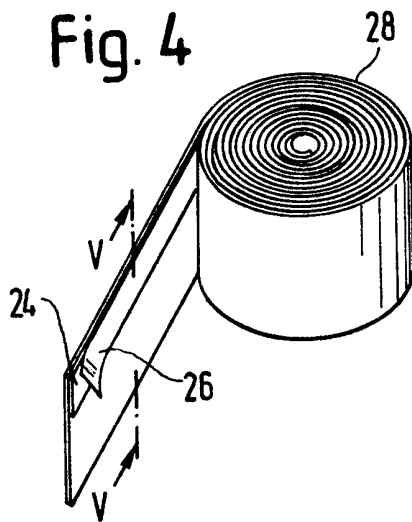
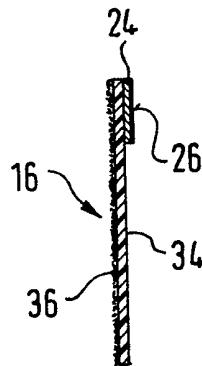


Fig. 5

Fig. 6



SPECIFICATION

A sealing arrangement for sealing a gap between two relatively movable members

The invention relates to a sealing arrangement for sealing a gap between two relatively movable members such as a door and floor by means of a sealing strip which is arranged on the edge of one member and which overlaps the gap.

- In order to seal the relatively wide gap between the lower edge of a door and the floor to prevent air penetrating, it is known to provide a sealing strip which bridges the gap in such a manner that it rests with its free edge on the floor. This solution has the disadvantage that, when a pressure difference occurs across the door, the generally flexible strip is deflected so that the gap below the door widens further and a draught can pass under the door.

- Furthermore, it is known to attach a kind of brush to the bottom edge of the door in order to seal the gap below the door. Firstly, this brush does not create a perfect seal and, secondly, dust and fluff are caught in the bristles. A brush of this type is moreover relatively expensive. Finally, a brush of this type is also unsuitable for use on carpeted floors since it offers resistance to the opening and closing of the door and rubs on the carpet.

- The object underlying the invention is to provide a sealing arrangement which, by using extremely simple means, can be used to ensure effective sealing of the gap between the door and floor without thereby hindering the opening and closing of the door or wearing the floor covering.

- According to the invention there is provided a sealing arrangement for sealing a gap between two relatively movable members by means of a sealing strip which is arranged on an edge of one member and which overlaps the gap, wherein the sealing strip consists of a flexible tape, and the width of that part of the tape which projects downwards over said one member is greater than the width of the gap in such a manner that the strip rests with its free longitudinal edge area at least approximately flatly on the second member.

- Because the sealing strip is broader than the gap between the two members, the sealing strip is forcibly bent forming a curved groove or channel so that the free end of the strip passes into the second member. If the wind now exerts a pressure on the concave side of the sealing strip, then the said strip lies with its free longitudinal edge area flatly on the second member, the gap being completely sealed. In order to achieve an effective sealing of the gap in both directions, it is therefore appropriate to attach a sealing strip of the type according to a preferred embodiment of the invention to both sides of the first member so that in all cases the concave side of the sealing strip is subjected to a draught.

Preferably, the sealing strip is adapted to the gap between a door and a floor. The arrangement according to the invention can be used both with polished or smooth floors and with carpeted

- 65 floors. In the case of polished floors the sealing strip maintains an unchanged position during opening and closing of the door. In the case of carpeted floors the sealing strip is, as a result of the friction between the sealing strip and carpeted floor, bent over when there is a change in the direction of door movement so that the sealing strip is always pulled over the floor with its longitudinal edge section resting on the floor. For the sealing effect it is immaterial in this

- 70 connection whether the free longitudinal edge area of the sealing strip points away from the door into the room when the door is closed, or is driven under the edge of the door.

- A considerable disadvantage of the known solutions described above is that they cause a dragging or sliding noise during opening and closing of the door. This disadvantage of the known solutions is eliminated in accordance with a preferred feature of the invention in that the strip

- 85 is provided with a velvety or at least slightly roughened or raised soft surface on at least one side. All smooth materials produce a dragging or scraping noise when sliding over a floor, whereas such a noise does not occur with a velvety surface.

- In the case of smooth or polished floors where the shape of the sealing strip remains unchanged during opening and closing of the door, it is sufficient merely to provide the side facing the floor with a velvety surface of this kind. However, in order that the strip may also be used at the same time on carpeted floors, it is useful to provide a velvety surface of this kind on both sides of the strip so that the strip always rests with this soft surface on the floor.

- In order that the strip may be attached simply to any already existing door, the strip is provided advantageously along one of its longitudinal edges with an adhesive tape which is firstly provided advantageously with a covering film. After the covering film is removed, the strip can then be simply bonded to the bottom edge on the door.

- The sealing strip is made preferably of a plastics material. Since the sealing strip is exposed to a high mechanical stress particularly when used in rooms having carpeted floors, it is useful to design the sealing strip with a backing fabric which is coated on one side or both sides with the plastics material. When the backing fabric is coated with the plastics material on one side, the fabric itself can form the fibrous or soft furry surface which is not smooth and with which the sealing strip rests on the floor.

- In a preferred embodiment the sealing strip consists of an imitation leather-like material. In this connection a strip of fabric, which is made of up to approximately 70% cotton, is embedded in a highly microcellular polyurethane foam. During manufacture the polyurethane foam is slightly compressed to form a strip approximately 1 mm thick. Both sides of the strip are subsequently smoothed and polished so that the strip has a velour leather or suede-like surface on both sides. This material retains its flexible property even at low temperatures, is resistant to the mechanical

stresses described above and does not cause dragging or scraping noises when sliding over polished floor coverings or over carpeted floors.

In a particularly preferred embodiment the strip
5 consists of a plastic film which is provided with a synthetic fibre flock coating on at least one side in order to produce the velvety surface. A sealing strip of this type can be manufactured considerably more cheaply than the previously
10 described sealing strip by using a backing fabric. In this case the plastics film, which is for example only 0.2 mm thick, is highly resistant so that the noiseless sealing properties of the sealing strip are maintained for a long time. The plastics film is
15 made preferably of polyvinyl chloride or polyurethane, the plastics material which is used in each case containing the maximum possible percentage of plasticizer for such a material. The short synthetic fibres used for flock coating are
20 made preferably of polyamide.

In order to prevent extension or stretching of the soft plastics film when attaching the sealing strip, the adhesive tape consists preferably of a traction-resistant adhesive backing which is
25 coated with adhesive on both sides and which can be formed by, for example, a strip of rigid PVC. However, an adequate resistance to extension is also obtained by using an adhesive backing which consists of a strip of fabric.

When the plastics film is provided with flock coating on one side the adhesive tape is attached preferably to the unflocked side of the film since adhesion of the adhesive backing to flock coating is deficient. In a case where the plastics film is
35 provided with flock coating on both sides, an edge of the plastics film corresponding to the width of the adhesive tape should be kept free of flock coating.

Embodiments of the invention will now be described by way of example with reference to the accompanying drawings in which:—

Figure 1 shows a diagrammatic vertical end section perpendicular to the plane of a door, with a sealing strip, the free longitudinal edge of which
45 points away from the door,

Figure 2, shows a view corresponding to Figure 1 and in which the sealing strip is driven inwards under the door,

Figure 3 shows a view corresponding to Figure 1, having a sealing strip on both sides of the door,

Figure 4 shows a strip or tape which is wound up to form a roll and which can be used to manufacture the sealing strip,

Figure 5 shows a cross-section, on an enlarged scale, through the strip along the line V—V in Figure 4, and

Figure 6 shows a section, corresponding to Figure 5, through a further embodiment of the invention.

The bottom end of a door 10 and a section of the floor 12 can be seen in Figure 1. There is a gap 14 between the door 10 and the floor 12. This gap
65 14 is overlapped by a sealing strip 16 which is attached, preferably bonded, to a side of the door

along the bottom edge of the door by a strip section 18. The width of that section 20 of the sealing strip 16 which extends downwards from the door 10 is greater than the height h of the gap 14 so that the section 20 of the sealing strip 16 rests with its free longitudinal edge at least approximately flatly, or obliquely on the floor 12, forming an outwardly directed curve. If wind pressure now acts in the direction of arrow A on the sealing strip, this strip moves for example into the position indicated by broken lines, the free longitudinal edge area of the strip section 20 being pressed closely to the floor 12 and thereby causing the gap 14 under the door to be sealed even when subjected to wind pressure.

When the door 10 swings in the direction of arrows B and C in Figure 1, the sealing strip 16 retains its shape as shown in Figure 1 if the floor 12 is a smooth or polished floor, the example a
85 parquet floor or tiled floor. If, on the other hand, the floor is covered with carpeting, the sealing strip 16 is, when the door 10 moves in the direction of arrow B, bent over under the door into the gap 14, as shown in Figure 2.

On the other hand, when the door 10 moves in the direction of arrow C, the sealing strip 16 again assumes the shape as shown in Figure 1.

Obviously, the sealing strip 16 could always be bent under the door even on smooth floors, as shown in Figure 2. It is very advantageous when using a single sealing strip, that the strip always extends away from the door in the direction from which the draught is expected so that the sealing strip is pressed closely against the floor by the
100 wind pressure.

Figure 3 shows an embodiment in which a sealing strip is attached to both sides of the door so that sealing of the gap 14 under the door is achieved irrespective of the direction of the draught acting on the door.

The sealing strip can be attached to the doors during or even subsequent to manufacture of the doors. For this purpose the sealing strip is provided, for example on one side along its upper edge, with an adhesive tape 24 which is covered with a pull-off film 26. The sealing strip can be sold by the metre. To seal the gap under the door, a length of material corresponding to the width of the door is cut off the roll 28 shown in Figure 4, the pull-off film 26 is removed and the sealing strip is attached to the bottom edge of the door with the aid of the adhesive surface of the adhesive tape 24 so that the sealing strip 16 rests with its free longitudinal edge on the floor, forming the curve shown in Figures 1 to 3.

In a particularly preferred embodiment the sealing strip consists of a highly microcellular polyurethane foam into which is embedded a woven strip 30 which is made of up to
125 approximately 70% cotton (Figure 5). The thickness of the entire strip 16 is approximately 1 mm. The surface 32 of the strip are smoothed and polished so that they have a velour leather or suede-like character. Along one edge of the strip the adhesive tape 24 with the pull-off film 26 is
130

applied to a surface 32. A material similar to the previously described material is in fact commercially available as an imitation leather. In this case, however, one surface is always

- 5 impregnated and embossed in order to simulate a leather-like surface. A material having such a surface has in fact the necessary mechanical strength, but always produces a dragging or scraping noise with its embossed, impregnated
10 surface. This is avoided by using the previously described new material.

Figure 6 shows a section corresponding to Figure 5 through a further embodiment of the invention, like parts being provided with like
15 reference numerals.

- In the embodiment shown in Figure 6 the strip
16 consists of a plastic film 34 which is approximately 0.2 mm thick and which is made, for example, of polyvinyl chloride or polyurethane,
20 this plastic material containing the maximum possible percentage of plasticizer for such a material. The plastic film 34 is provided with a flock coating 36 on one of its sides. This coating consists of, for example, very short polyamide
25 fibres which give the flocked surface a velvety character, the said surface nevertheless being very resistant to abrasion.

- Since the plastic film 34 is relatively highly extended in the event of pull as a result of its
30 flexible properties, the adhesive tape 24 consists of a traction-resistant adhesive backing which is coated with adhesive on both sides and which is made of, for example, a plastic material, particularly a strip of rigid PVC, and prevents
35 extension or stretching of the sealing strip in the event of tensile strain. This traction-resistant adhesive backing thus replaces the fabric insert 30 used in the above described embodiment according to Figure 5.

- 40 It goes without saying that the sealing strip can be coloured to match the colours of the doors or colours of the floor coverings in such a manner that the strip is very inconspicuous even when subsequently attached to a door.

45 CLAIMS

1. A sealing arrangement for sealing a gap between two relatively movable members by means of a sealing strip which is arranged on an edge of one member and which overlaps the gap,
50 wherein the sealing strip consists of a flexible tape, and the width of that part of the tape which projects downwards over said one member is greater than the width of the gap in such a manner that the strip rests with its free longitudinal edge
55 area at least approximately flatly on the second member.

2. An arrangement according to Claim 1, wherein the strip has a velvety or piled surface at least on the side facing said second member.

- 60 3. An arrangement according to Claim 1 or 2,

the strip is provided with a self-sticking or pressure-sensitive adhesive tape along a longitudinal edge on one side.

4. An arrangement according to any one of claims 1 to 3 wherein said one member is a door and said second member a floor.

5. An arrangement according to claim 4, wherein the strip is attached to one side of the door.

- 70 6. An arrangement according to claim 4, wherein a strip is attached to each side of the door.

7. An arrangement according to any one of claims 1 to 6 wherein the strip is made of a plastics material.

8. An arrangement according to any one of claims 1 to 7 wherein the strip is provided with a backing fabric.

9. An arrangement according to claim 8 wherein the backing fabric is formed substantially of cotton and is embedded in microcellular polyurethane foam which is slightly compressed to form the sealing strip and is polished on both of its surfaces.

- 85 10. An arrangement according to claim 7, wherein the strip consists of a plastics film which is provided with a synthetic fibre flock coating on at least one side.

11. An arrangement according to claim 10, wherein the material which forms the plastics film contains the maximum possible percentage of plasticizer for such a material.

12. An arrangement according to claim 10 or 11 wherein the plastics film is made of polyvinyl chloride.

13. An arrangement according to claim 10 or 11, wherein the plastics film is made of polyurethane.

14. An arrangement according to any one of claims 10 to 13, wherein the synthetic fibre which is used for the flock coating consists of polyamide.

15. An arrangement according to any one of claims 3 to 14, wherein the adhesive tape comprises a traction-resistant adhesive backing which is provided with a coating on both sides.

16. An arrangement according to claim 15, wherein the adhesive backing is formed by a strip of rigid polyvinyl chloride.

17. An arrangement according to claim 15 wherein the adhesive backing is formed by a strip of fabric.

18. An arrangement according to any one of claims 10 to 17, wherein when the plastics film is provided with a flock coating on one side, the adhesive tape is affixed to the unflocked side of the film.

19. A sealing arrangement for sealing the gap between a door and a floor substantially as described herein with reference to, and as
120 illustrated in, any one or more of the Figures of the accompanying drawings.