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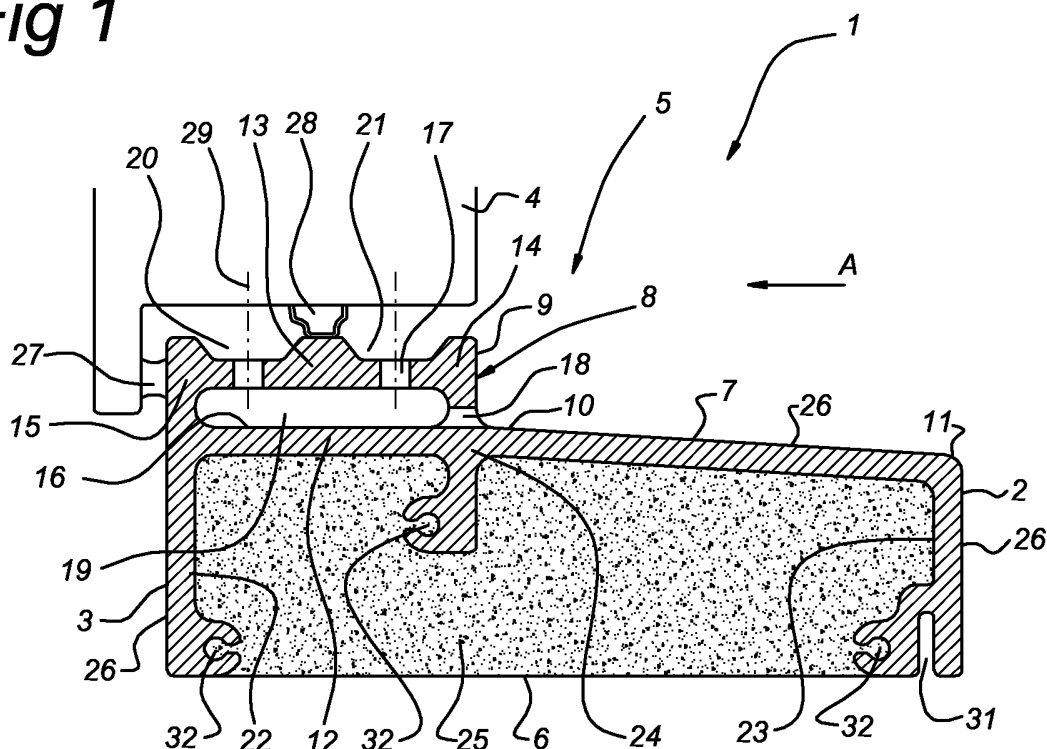
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(54) Threshold with drainage

(57) The present invention concerns a threshold, such as for an external door. The threshold comprises a first longitudinal side and an opposing second longitudinal side as well as an upper side and lower side. In use, the first longitudinal side faces outwards and the second longitudinal side faces inwards. The upper side comprises a run-off part, the top surface of which drains towards the first longitudinal side and the low edge of which ad-

joins the first longitudinal side, as well as a raised threshold part with an upright side facing the first longitudinal side, which upright side adjoins the high edge of the run-off part at the bottom. The threshold part is a hollow tubular part with a base, a top wall and two opposing side walls, the first side wall of which determines the upright side; and the top surface of the base part is situated higher than or level with the high edge of the run-off part.

Fig 1



Description

[0001] The present invention relates to a threshold, such as for an external door or some other outside wall element, comprising a first longitudinal side and an opposing second longitudinal side as well as an upper side and lower side, wherein, in use, the first longitudinal side faces outwards and the second longitudinal side faces inwards; wherein the upper side comprises:

- a run-off part, the top surface of which drains towards the first longitudinal side and the low edge of which adjoins the first longitudinal side;
- a raised threshold part with an upright side facing the first longitudinal side, which upright side adjoins the high edge of the run-off part at the bottom.

[0002] Such thresholds according to the preamble of Claim 1 are known in a general sense and are usually constructed in solid stone or solid timber. The task of the threshold part is to prevent rainwater from being blown inwards over the run-off part and thus entering the building. The threshold part prevents this through the upright side arresting the water blown inwards. Furthermore, along with a so-called draught strip and a moving window or door, the threshold part provides better draught exclusion.

[0003] Furthermore, a threshold according to the preamble of Claim 1 is known from EP 789 128. The upper side of this threshold is provided with a sloping surface 12 and a raised (threshold) part 26, 27. The threshold is in two sections and composed of a light metal, hollow extrusion section 11, 12, 22, 27 and a cover 26. This threshold is fixed to the foundation by means of screws 24 and vertical drill holes provided for this purpose in the extrusion section. Vertical fixing webs 27 are provided on both sides of the drill holes 24 to fix the cover 26. The purpose of the cover 26 is to conceal the screws and drill holes and keep them out of sight. The horizontal surface situated between the fixing webs 27 in which the drill holes 24 are provided is lower than the high side of the sloping surface 12.

[0004] The aim of the present invention is to provide a threshold of the type mentioned in the preamble with an improved (rain)water exclusion capability.

[0005] This aim is achieved according to the invention with a threshold of the type mentioned at the outset, in that the threshold part is a hollow tubular part with a base, a top wall and two opposing side walls, the first side wall of which determines the upright side; and in that the top surface of the base part is situated higher than or level with the high edge of the run-off part. By constructing the threshold part as a tubular part, this can act as a collecting member for intercepted rainwater which nevertheless has penetrated or attempted to penetrate. By having the base of the tubular part higher than or level with the high edge of the run-off part, drainage is enabled from the

tubular part to the run-off part. Furthermore, the threshold part is provided with inlet means to feed water to be collected into the tubular part as well as discharge means to discharge from the tubular part water collected therein. Water lying on the sloping run-off part which is blown by the wind against the raised part and, in the absence of the invention, over the raised part, can be collected in the tubular part by means of the inlet means so as to then be discharged via the discharge means.

[0006] It is noted that a threshold with a drainage system is known from US 4 055 917. Referring to Figure 3 in this US 4 055 917, this threshold is constructed from two mutually joined extrusion sections, a top section part and a bottom section part. The top section part forms the upper side of the threshold and has an upper side with, on one side to the right, a web 70 running up at an angle from outside/right to inside/left, and on the other side to the left a lowered section in which the bottom of the closed door fits. This lowered section adjoins the high side of the sloping surface 70. There is no question here of a threshold upper side with a raised threshold part that adjoins the high side of a sloping run-off part that is also part of the upper side of the threshold. US 4 055 917 thus refers to another type of threshold.

[0007] Although a person skilled in the art can implement discharge from the tubular part to the run-off part by various means, for example by means of small tubing, it is advantageous according to the invention if the first side wall is provided with one or more first drainage passages which connect the inside of the hollow tubular part to the high edge of the run-off part. Such first drainage passages can, for example, be holes, drill holes or slots. Such first drainage passages can already be provided at the production stage, but can also be made in situ by the contractor. These first drainage passages thus form the said so-called discharge means. However, these first drainage passages will also permit water that has been propelled inside across the run-off part by the effect of the wind to enter the tubular part and be collected there so as to be discharged again via (the same) first drainage passages when the wind abates. The first drainage passages therefore also function as the said so-called inlet means.

[0008] In order to prevent water from penetrating across the top of the threshold part, it is advantageous according to the invention if the top wall of the tubular part is provided with one or more second drainage passages which connect the outside of the top wall of the tubular part to the inside of the tubular part. Thus, water blown across the threshold part is guided by the second drainage passages to the inside of the tubular part and can be discharged again from there. Such second drainage passages may be, for example, holes, drill holes or slots. Such second drainage passages can already be provided at the production stage but may also be made in situ by the contractor.

[0009] In order effectively to collect water that tends to penetrate across the top of the threshold part, it is ad-

vantageous according to the invention if the top wall of the tubular part is provided externally with at least one groove running in the longitudinal direction of the tube, and if one or more of said second drainage passages open into said groove. The water is then collected in the groove (which is recessed into the top surface and thus will form no inconvenient obstacle on the threshold part) and guided via the groove to one or more second drainage passages so it can reach the inside of the tubular part.

[0010] A threshold according to the invention is simple to manufacture, for example, by forming from sheet material, or by extrusion or pultrusion, if the threshold is made up of one essentially U-shaped section part, the limbs of which determine the first and second longitudinal sides of the threshold and the web of which determines the upper side of the threshold. In the case of pultrusion or extrusion, the U-shaped section part and the tubular part can be a single pultruded or extruded section. With respect to a solid timber or stone threshold, such a threshold can, moreover, be very light. Indeed, the U-shaped section part and the tubular part can be manufactured in a metal, such as aluminium or an aluminium alloy, or a plastic, such as a glass fibre reinforced plastic. Glass fibre reinforced polyester can, for example, be considered for the glass fibre reinforced plastic. An important advantage of such materials is that they are easy to saw, often just using a hand-saw, and are relatively easily to screw (i.e. screws can be screwed in) and nail (i.e. nails can be driven in).

[0011] In order to give the U-shaped section part more solidity, it is advantageous according to the invention if the cavity between the limbs of the U-shaped section part is filled with a filler. With regard to the filler, many fillers conventionally used in building, such as PUR foam, concrete mortar, wood, etc. can be considered. However, it is particularly advantageous according to the invention if the filler is a polystyrene concrete mortar (PC mortar). The most important constituents of a PC mortar are: granulate (expanded polystyrene grains of, for example, 2 - 4 mm diameter, expanded vermiculite (for example with a diameter of up to 3 mm); cement; water; as well as auxiliary materials. Such a PC mortar has various advantages. It is light in weight and highly compression-resistant. It can be screwed and nailed. Furthermore, one very important advantage is that it can be laid as a brick. In fact, because of its porosity it bonds well with cement and concrete. In this context it is important to note that bricklaying mortar can be laid on a foundation such as a layer of bricks and the threshold according to the invention can then be placed on top with the free ends of the U-section facing downwards, so that the PC mortar previously applied and usually already hardened comes into contact with the bricklaying mortar. One example of a PC mortar is the mortar currently marketed under the trade name BETOPOR by Van Wylick Isolierende Mortels B.V.

[0012] In order to give the threshold a natural appearance and, moreover, make it highly durable, it is advantageous if the threshold, in particular the upper side there-

of and possibly also the first and/or second longitudinal side thereof, is provided with a stony coating. Moreover, such a stony coating makes the threshold more easy to incorporate into a building, on account of the fact that bricklaying mortar and concrete mortar bond with a stony coating.

[0013] In this respect it is advantageous according to the invention if the coating contains corundum. Corundum is a highly durable material.

[0014] With a view to applying the coating, it is advantageous according to the invention if the coating contains a binding agent such as an epoxy resin, mixed with grains of a stony material, such as corundum grains. Thus the coating can be applied as a fluid, or at any rate, smearable mass which can be applied to the threshold by smearing or spraying. It is also possible to apply the binding agent to the threshold and then apply the grains, for example by scattering or by pressing the surface provided with binding agent into a bed of grains.

[0015] In this respect it is advantageous according to the invention if the corundum contains at least 92 percent by mass Al_2O_3 , in particular about 95 percent by mass, and/or 0.75 to 1.25 percent by mass SiO_2 , and/or 2.5 to 3.0 percent by mass TiO_2 .

[0016] To enable fixing of a cover flashing or angle section, it is advantageous according to the invention if a slot is provided at the first longitudinal side extending essentially completely along said longitudinal side. To prevent water being able to enter and freeze in the slot (and thereby causing frost damage by expansion), it is advantageous according to the invention if the slot opens downwards and preferably into the lower side of the threshold.

[0017] The invention further relates to an assembly comprising a wall, a passage element provided hinged or mobile in said wall, such as a window or door, as well as a threshold according to the invention provided in said wall, wherein the threshold extends underneath said passage element when the passage element is closed, wherein the underside of said passage element is provided with a sealing strip, which seals against the threshold when the passage element is closed, and wherein said one or more second drainage passages are located on the outside of the sealing strip when the passage element is closed.

[0018] The present invention will be explained in more detail below with reference to the appended drawing. In the drawing:

Figure 1 shows a cross-section of a threshold according to the invention; and

Figure 2 shows diagrammatically a perspective view of a threshold, which owing to the absence of the threshold part and run-off part does not conform to the invention, but otherwise, by means of the perspective representation, illustrates that a threshold according to the invention is a beam-like body and demonstrates the coating according to a preferred

embodiment.

[0019] The threshold in Figure 1 is indicated in its entirety by 1. To clearly illustrate the difference between the two thresholds, the threshold in Figure 2 is indicated by 30. For the rest, corresponding reference numerals and symbols are used in Figure 1 and Figure 2 for corresponding parts.

[0020] The thresholds 1 and 30 shown in Figures 1 and 2 both have a first longitudinal side 2, an opposing longitudinal side 3, a lower side 6 and an upper side 5. In both cases, the threshold 1, 30 is composed of a U-shaped section part, the first limb 23 of which determines the first longitudinal side 2 in each case and the second limb 22 the second longitudinal side 3 in each case. In both cases the body 24 determines the upper side of the threshold 1 and 30, respectively.

[0021] In the case of the threshold according to Figure 1, the upper side 5, i.e. the limb 24, is composed of a run-off part 7 and a raised threshold part 8. Such a construction for the upper side 5 made up of run-off part 7 and a threshold part 8 is known as such from the state of the art. The threshold part 8 has an upright side 9 facing outwards, i.e. towards the first longitudinal side 2. With the upright side 9, the threshold part 8 arrests any water as well as dust and sand blown inwards over the run-off part according to arrow A, so that it does not pass under the door 4. In this case the run-off part is usually not much more than a surface with a fall (in Figure 1 the fall is approximately 4°), the high edge 10 of which faces the inside 3 of the threshold and the low edge 11 of which faces the outside 2 of the threshold.

[0022] According to the invention this threshold part is now made as a tubular part 8. The tube, which extends essentially along the entire threshold perpendicularly to the plane of the drawing in Figure 1, has a base 12, a top wall 13 and two opposing side walls 14, 15. The first side wall 14 thereof determines the upright side 9. The second side wall, in this example, forms part of the second longitudinal side 3 of the threshold. It should be noted, however, that the second side wall can also be situated some distance away from the second longitudinal side 3 of the threshold, i.e. can be provided set back to the right (according to Figure 1).

[0023] The base 12 of the tube 8 has an upper surface 16 which is situated higher than or level with the high edge 10 of the run-off part. This ensures that, under the effect of gravity, drainage from this upper surface 16 can occur towards the run-off part 7. One advantage of the tube 8 is that water attempting to penetrate past the door can be collected therein and can possibly be buffered here temporarily.

[0024] This water can have been collected as such at various places along the door and directed towards and into the tube 8 from these place(s). In particular it is known in practice that water can be driven onto the threshold part by the wind. According to the invention this water can be collected in the inside 19 of the tube 8 by providing

the top wall 13 of the tube 8 with second drainage passages 17. (The term second drainage passages is used here to distinguish them from the first drainage passages to be discussed later). In order to collect the water more efficiently, a groove 21 is provided in the outside of the top wall 13 of the tubular part 8. Another, second groove 20 can optionally be provided with additional second drainage passages, which are indicated by the centre line 29. This second groove can, for example, take care of the collection of water which still passes the draught exclusion/sealing strip 28 at the bottom of the door 4.

[0025] In order to discharge water collected in the tube 8 from the tube to the run-off part 7, one or more first drainage passages 18 are provided in the upright wall.

[0026] It will be clear to a person skilled in the art that the drainage passages can already be made during manufacture in the works, but can also be easily provided by drilling in situ at the building site.

[0027] It should be noted that in Figure 1 a so-called inwardly opening door 4 is depicted, but this could just as easily be a so-called outwardly opening door. The threshold according to the invention is just as much applicable to an outwardly opening door. For that matter, it should be noted that the threshold according to the invention is also highly applicable to a sliding door, an outwardly or inwardly opening window or a sliding window.

[0028] As Figures 1 and 2 further show, the cavity between the limbs 22 and 23 in the U-shaped section is filled with a filler 25, in particular a polystyrene concrete mortar. Such a mortar is light in weight and highly compression-resistant. Furthermore, such a mortar ensures that the lower side of the threshold can be laid as a brick, that is to say it can be bonded to a foundation such as a layer of bricks by means of bricklaying mortar.

[0029] As is illustrated in more detail in Figure 2 by means of accentuation of the outer contour of the front end face, it is advantageous according to the invention if the outside of the threshold, or at least the longitudinal sides and upper side, is coated with a stony coating 26 (which reference numeral is also indicated in Figure 1). This provides greater durability as well as a possibility for bricklaying mortar to adhere. In particular it is advantageous if the coating contains corundum, preferably in granular form. Corundum grains can be bonded to the surface of the metal or plastic U-shaped section by means of a binding agent.

[0030] Figure 1 shows, furthermore, a slot 31 and screw recesses 32. The slot 31 is used to take a flashing, such as a lead flashing, or a section part. The screw recesses are used to screw on further parts against the end faces of the threshold.

Claims

1. Threshold (1), such as for an external door (4), comprising a first longitudinal side (2) and an opposing second longitudinal side (3) as well as an upper side

(5) and lower side (6), wherein, in use, the first longitudinal side (2) faces outwards and the second longitudinal side (3) faces inwards; wherein the upper side (5) comprises :

- a run-off part (7), the top surface of which drains towards the first longitudinal side (2) and the low edge (11) of which adjoins the first longitudinal side (2);
- a raised threshold part (8) with an upright side (9) facing the first longitudinal side (2), which upright side (9) adjoins the high edge (10) of the run-off part (7) at the bottom;

characterised in that

the threshold part is a hollow tubular part (8) with a base (12), a top wall (13) and two opposing side walls (14, 15), the first side wall (14) of which determines the upright side (9);

the top surface (16) of the base part (12) is situated higher than or level with the high edge (10) of the run-off part (7); and

the threshold part is provided with inlet means to feed water to be collected into the tubular part as well as discharge means to discharge from the tubular part water collected therein.

2. Threshold (1) according to Claim 1, wherein the first side wall (14) is provided with discharge means in the form of one or more first drainage passages (18) which connect the inside (19) of the hollow tubular part (8) to the high edge (10) of the run-off part (7).
3. Threshold (1) according to Claim 1 or 2, wherein the top wall (13) of the tubular part (8) is provided with inlet means in the form of one or more second drainage passages (17, 29) which connect the outside of the top wall (13) of the tubular part (8) to the inside (19) of the tubular part (8).
4. Threshold (1) according to Claim 3, wherein the top wall (13) of the tubular part (8) is provided externally with at least one groove running in the longitudinal direction of the tube (20, 21) and wherein one or more of said second drainage passages (17, 29) open into said groove (20, 21).
5. Threshold (1) according to one of the preceding claims, wherein the threshold is made up of one essentially U-shaped section part (22, 23, 24), the limbs (22, 23) of which determine the first and second longitudinal sides (2 and 3, respectively) of the threshold (1) and the web (24) of which determines the upper side (5) of the threshold.
6. Threshold (1) according to Claim 5, wherein the U-shaped section part (22, 23, 24) and the tubular part (8) thereof are a one-piece extruded or pultruded

section.

7. Threshold (1) according to Claim 5 or 6, wherein the U-shaped section part (22, 23, 24) and the tubular part (8) thereof are manufactured in a metal, such as aluminium or an aluminium alloy, or a plastic, such as a glass fibre reinforced plastic.
8. Threshold (1) according to one of Claims 5 - 7, wherein the cavity between the limbs of the U-shaped section part (22, 23) is filled with a filler (25).
9. Threshold (1) according to Claim 8, wherein the filler (25) consists of a polystyrene concrete mortar.
10. Threshold (1) according to one of the preceding claims, wherein the external surface of the upper side (5) of the threshold is provided with a stony coating (26).
11. Threshold (1) according to one of the preceding claims, wherein the external surface of the first (2) and/or second (3) longitudinal side is provided with a stony coating (26).
12. Threshold (1) according to Claim 10 or 11, wherein the coating (26) comprises corundum.
13. Threshold (1) according to one of Claims 10- 12, wherein the coating (26) contains a binding agent, such as an epoxy resin, mixed with grains of a stony material, such as corundum grains.
14. Threshold (1) according to Claim 12 or 13, wherein the corundum contains at least 92 percent by mass Al_2O_3 , in particular about 95 percent by mass.
15. Threshold (1) according to one of Claims 12 - 14, wherein the corundum contains 0.75 to 1.25 percent by mass SiO_2 .
16. Threshold (1) according to one of Claims 12 - 15, wherein the corundum contains 2.5 to 3.0 percent by mass TiO_2 .
17. Threshold (1) according to one of the preceding claims, wherein a slot (31) is provided at the first longitudinal side (2) extending essentially completely along said longitudinal side (2).
18. Threshold (1) according to Claim 17, wherein the slot (31) opens downwards and preferably into the lower side (6) of the threshold (1).
19. Assembly comprising a wall, a passage element (4) provided hinged or mobile in said wall, such as a window or door (4), as well as a threshold (1) according to one of the preceding claims provided in

said wall, wherein the threshold extends underneath
said passage element when the passage element
(4) is closed, wherein the underside of said passage
element (4) is provided with a sealing strip (28),
which seals against the threshold part (8) of the 5
threshold (1) when the passage element (4) is
closed, and wherein said one or more second drain-
age passages (17) are located on the outside of the
sealing strip (28) when the passage element (4) is
closed. 10

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Fig 1

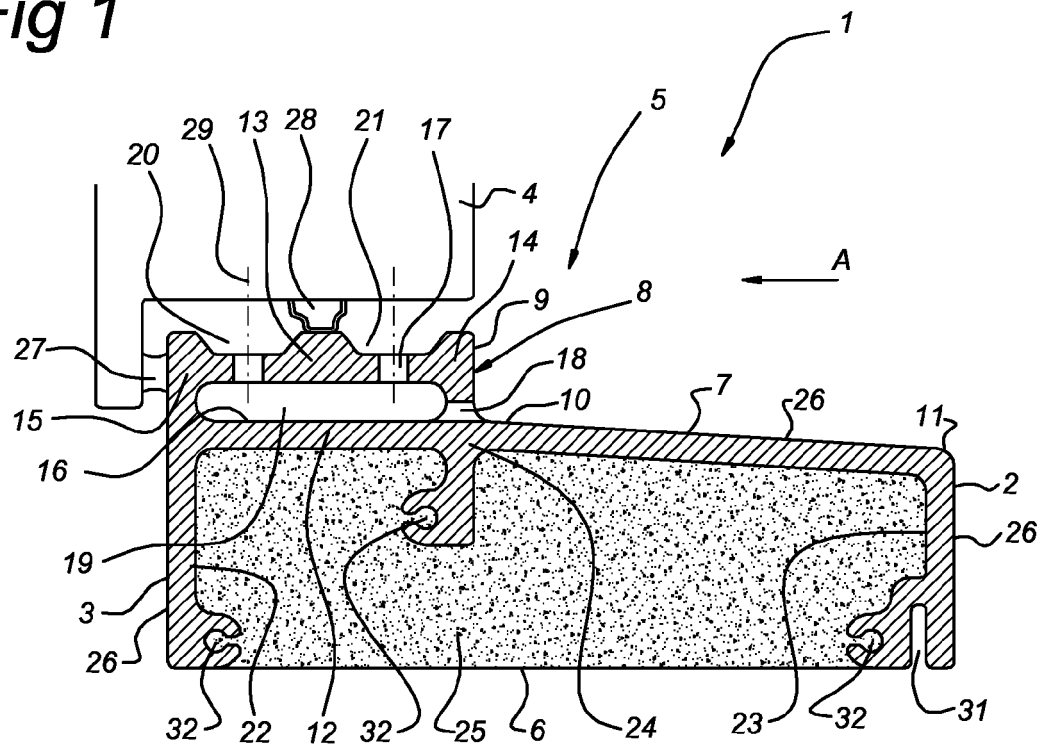


Fig 2

