Abstract Title: Threshold with retractable closure member

A doorway threshold comprises a pivotally mounted lever 7 movable between a first position and a second position and closure member 2 pivotally mounted 5 on the lever and when the lever is moved between the first and second positions the closure member is slidable in a substantially vertical plane between lowered and raised positions. The lever is preferably mounted at the centre of the closure member. The lever may extend upwardly of the threshold and in use engage with a portion of the door 8 causing the pivot to move about its mount. Preferably the closure member is biased in the lower position, possibly by springs 6.
THRESHOLD WITH RETRACTABLE CLOSURE MEMBER

Field of the Invention

This invention relates to thresholds for doorways, and in particular to a threshold provided with a retractable closure member.

Background of the Invention

Doorways are generally provided with a threshold, the function of which is to prevent ingress of dirt, moisture and rainwater underneath the door. Thresholds of the type generally used consist of a plate with a raised portion against which a part of the door shuts, such that part of the door extends downwards in front of the raised portion of the threshold.

In the United Kingdom, new building works and some renovation works are governed by Building Regulations, which set down standards. One of the standards is aimed at permitting access to buildings for disabled people. This standard sets a maximum height for a threshold, the maximum height being 15mm, i.e. sufficiently low that a wheelchair may traverse a threshold easily.

Whilst the Building Regulation has been in force for some time there are very few thresholds which meet the requirement of the Regulation. Those thresholds that do meet the Regulation and which are on the market do not function well as thresholds insofar as they do not prevent dirt, moisture and rain water from entering under the door.

The structural requirements for a threshold to permit access by wheelchairs are diametrically opposed by the structural requirements of a threshold to prevent ingress of matter beneath a doorway. The first requires a substantially flat surface, whilst the second requires an upstand or step.
One proposed solution to this problem is described in GB 2316970, which describes a threshold water excluding device which rises as a door closes. In this device a bar is raised by relative movement between co-operating wedges.

Another proposed solution to the problem is described in GB 2364731, which describes a threshold having a water excluding bar that is retractable to provide a smooth surface over which a wheelchair may pass. The bar is urged into an extended position by springs and is pushed downward into a retracted position by the wheels of a wheelchair passing over the bar.

It would therefore be desirable to provide a simple arrangement in which a smooth surface is presented upon opening a door.

Summary of the Invention

According to the invention there is provided a retractable threshold as specified in Claim 1.

Brief Description of the Drawings

In the drawings, which illustrate a preferred embodiment of the invention, and are by way of example:

Figure 1 is a side view of a threshold according to the invention;

Figure 2 is a plan view of a part of the threshold illustrated in Figure 1;

Figure 3 is a plan view of the threshold illustrated in Figure 1;

Figure 4 is a cross-sectional end elevation of the threshold illustrated in Figure 1;

Figure 5 is a schematic illustration of a door including the threshold illustrated in Figures 1 to 4; and
Figure 6 is a schematic representation of the closure member of the invention.

**Detailed Description of the Preferred Embodiments**

Referring now to Figures 1 to 3, a threshold comprises a housing 1 in the form of a box, and mounted therein a movable closure member 2. The closure member 2 includes a notch 5 with which a pin 5a extending from a lever 3 engages. The lever 3 is mounted on a pivot 4 to move the closure member from a lowered to a raised position. The lever 3 further includes an upwardly projecting member 7, a part of which projects slightly inwardly of a door frame 8. The closure member 2 is urged into the position illustrated in Figure 1, i.e., the retracted position, by springs 6 which are attached at one end to pins 18 extending from each of the end most guide members 10 and the other end to pins 2a extending from the closure member 2.

The housing 1 includes flanges 1a and a first cover plate 22, which is attached to the flanges 1a by suitable fastening means, such as screws 17. The first cover plate 22 is provided with a pair of spaced apart slots 23, 23' which are aligned with the closure member 2, in use the said closure member passing through one of the said slots 23, 23'. A second cover plate 14 is attached to the first cover plate 22 such that one of the slots 23, 23' is covered and the other is uncovered, the closure member 2 passing through the uncovered slot to move the said closure member to its extended configuration.

By mounting the closure member 2 on the lever 3 at a single pivot point any misalignment in the mounting of the door can be taken up by the closure member. When a door is closed, the edge of the door presses against the part of the member 7 extending inwardly of the door frame 8 causing the lever 3 to pivot about the axis of pin 4 which attaches the lever 7 to the housing 1. The end of the lever mounting pin 5a is caused to rise, thereby lifting the closure member 2. The notch 5 in closure member 2 allows the said member to pivot with respect to the housing 1. In use, one end of the closure member 2 rises before the other, which end being immaterial. When the higher end
engages with the underside of the door, continued application of force on the lever 7 causes the
other end of the closure member to rise until it engages with the underside of the door. When the
door is fully closed the closure member 2 engages with the underside of the door substantially across
the door's full width.

With reference to Figure 1, the housing 1 is fastened to the underside of the door frame 8 by
means of screws 8'. In the example each end of the housing 1 is attached to the underside of the
door frame 8 by two such screws 8'.

Referring now to Figure 4, the housing 1 is mounted within an outer case 15, which is
substantially U shaped. In use, the outer case 15 is set into the ground under the base of a door. A
guide member 10 is mounted within the housing 1, the guide member including a slot 12 formed
between a pair of uprights 11. The upright walls of the housing 1 together with the outer walls 11a
of uprights 11 form two spaced apart slots 13a, 13b. The lever 3 sits in the slot 12, and the closure
member 2 sits in one of the slots 13a, 13b depending on whether the door is to open outwards or
inwards. A rib 21 is formed on the inner wall of housing 1 facing one of the outer walls 11a. The
ribs 21 provide a gap between the closure member 2 and the inner wall of the housing through which
water, and debris may pass.

The apparatus of the invention is designed to be simple to set up for use with any door,
whether hung to open inwards or outwards, on the left or right hand door frames. This is achieved
by the provision of two slots 13a, 13b in the guide members 10 and corresponding and aligned slots
23, 23' in the first cover plate 22 as mentioned above, the locating of the closure member 2 on the
lever by means of a pin that engages with a notch, the two elements not being positively attached to
each other, and the provision of a cover plate 14. As can be seen from Figure 3, the width of cover
plate 14 is substantially equal to the width of the housing minus the width of one of the slots 13a or
13b.
In use, the builder places the housing 1 into the outer casing 15 which has previously been built into the construction, for example the brickwork of a house. The housing 1 is dropped into the casing 15, the flanges 1a of the housing resting on flanges 15a of outer casing 15.

The closure member 2 is placed into the appropriate slot 13a or 13b to match the door being hung either to open inwards or outwards. The 2nd cover plate 14 is then attached to leave a free path in which the closure member 2 may slide up and down, the 2nd cover plate being fastened to the first cover plate 22 by means of screws or other suitable fasteners 17. The whole housing 1 is securely attached to a door frame.

From Figure 3, it can be seen that the cover 14 includes slots 16 which function as drain holes. Any water running down the closure member 2 passes through the slots 16 and into the housing 1. Water exits the housing 1 via weep holes 17 into the outer case 15. The outer case 15 is also provided with orifices (not shown) through which water may pass to escape to a drain.

Referring now to Figure 5, there is shown a doorway comprising threshold as illustrated in Figures 1 to 4 in its extended configuration. In this example the door 20 is provided with a sealing strip 19 against which the upright face of the closure member 2 sits.

The threshold of the invention provides a simple arrangement which is easy to install, by virtue of the simple arrangement of components, extremely effective in excluding dirt, moisture and water, and provides a substantially smooth surface allowing easy passage of a wheelchair.
Claims

1. A threshold comprising a pivotally mounted lever movable between a first position and a second position, and a closure member pivotally mounted on the said lever and slidable in a substantially vertical plane between lowered and raised positions, wherein moving the lever between the first and second positions causes the closure member to slide in the substantially vertical plane between the lowered and raised positions.

2. A threshold according to Claim 1, wherein closure member is located to one side of the lever.

3. A threshold according to Claim 1 or 2, wherein the pivotal mounting of the closure member on the lever comprises a detent located in one of the closure member and the lever, and a protrusion extending from the other, wherein the protrusion and the detent co-operate to provide the said pivotal mounting.

4. A threshold according to Claim 3, wherein the protrusion is a pin.

5. A threshold according to any preceding claim, wherein the closure member is pivotally mounted on the lever substantially at the centre of the said closure member.

6. A threshold according to any preceding claim, wherein the lever comprises a portion extending upwardly of the threshold and inwardly of an edge of the threshold, in use the said portion being engaged by a door and causing the lever to pivot about its pivot mount.

7. A threshold according to any preceding claim, further comprising at least one guide member, the at least one guide providing a guide for the lever and the closure member.

8. A threshold according to Claim 7, wherein the guide member provides three slots and wherein the lever is located and guided in the centre slot, and the closure member is located in and guided by a slot to one side of the centre slot.
9. A threshold according to Claim 7, further comprising a cover plate providing two spaced apart slots, each aligned with one of the slots in which a closure member may be mounted.

10. A threshold according to any preceding claim, further comprising a cover, and wherein the cover is mountable in two different positions, in each position an opening being provided through which the closure member is raised and lowered.

11. A threshold according to any preceding claim, further comprising a housing, the components of the threshold as claimed in any preceding claim being mounted in said housing.

12. A threshold according to Claim 11, wherein at least one rib is provided on an inner wall of said housing.

13. A threshold according to Claim 11 or 12, wherein the housing is mounted in an outer case.

14. A threshold according to any preceding claim, wherein the closure member is biased into the lowered position.

15. A threshold substantially as shown in, and as described with reference to the drawings.
Patents Act 1977: Search Report under Section 17

Documents considered to be relevant:

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<th>Category</th>
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<td>GB897970 A (JARVIS), see Figures esp. - closure member 1, lever 8 and pin 9.</td>
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<td>A</td>
<td>1</td>
<td>US4425738 A (CHRISTENSEN), see whole document.</td>
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Field of Search:

Search of GB, EP, WO & US patent documents classified in the following areas of the UKC:

EIJ Worldwide search of patent documents classified in the following areas of the IPC

E05B The following online and other databases have been used in the preparation of this search report

EPODOC, WPI