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(54) Shutter which shifts vertically as a consequence of being rotated

(57) In a rotating shutter (1) supported by hinges (2) comprising two members (3, 4) hinged to each other and positioned one above the other, of which the lower (4) is joined to a fixed structure (5) and the upper (3) is joined to the shutter (1) itself, the supporting surfaces (4a, 3a) of the two members (4, 3) which are in contact with each other, have respectively concave parts (4b) and protruding parts (3b) substantially complementary to each other, the protruding parts (3b) of a member (3) being contained by the concave parts (4b) of the other (4) when the shutter (1) is in closed position, in such a way that a relative rotation between the two members (3, 4) causes a vertical shift between these equal to the height (h) of the protruding parts (3b).

FIG. 1

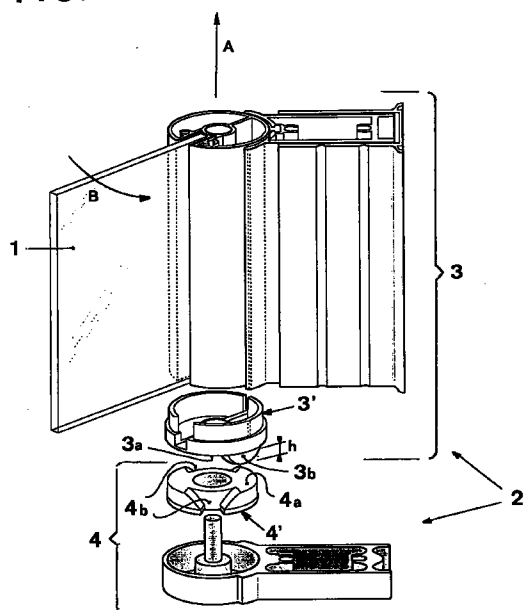
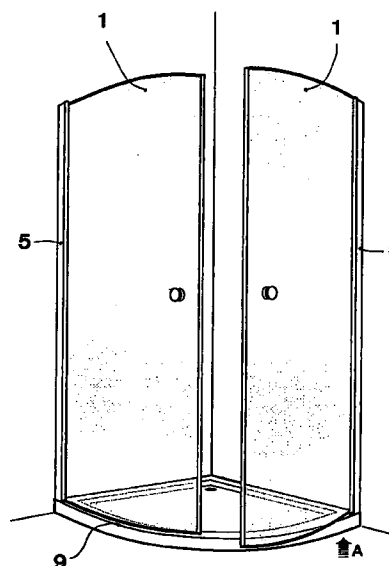


FIG. 3



EP 0 693 607 A1

Description

The present invention is in the sphere of window and door frames, more specifically, the particular type of shutter or door that is suitable for separating rooms which have liquids lying on the floor, so, when closed, they must exert a certain sealing pressure on elastic sealing elements which are placed on the floor at the point of contact with these to prevent these liquids from leaking out and spreading into the adjacent rooms.

The applicant considers that, in the current state of technology, no shutter exists that is in any way similar to the one to be described below. According to this invention, as in almost all cases, the shutter is supported by hinges formed by two members hinged with each other and placed one above the other, one resting on the other, with contact surfaces on the members themselves.

Currently it is very inconvenient to use such shutters in cases where, as mentioned, the intention is to exercise a sealing action on a seal below: the continual and repeated dragging of the lower part of the shutter on the elastic seals inevitably leads to their being worn and adversely affects their sealing capacity. Furthermore, it is often rather difficult to open a shutter which has a seal exercising sealing pressure against it.

The aim of the inventor of the present idea has been to provide a revolving shutter which lifts vertically to a sufficient extent to eliminate contact, and consequently wear, with the seal below, as soon as it begins to rotate, thus considerably prolonging the life of the seal and making it easier to open and close the shutter.

For this purpose he has developed a shutter which is fitted with a new type of hinge, which enables the shutter to lift as soon as the opening rotation begins, and to then reposition itself, exercising the desired pressure on the seal below, when its returning rotation is completed and it is closed.

The object of the invention is in fact a revolving shutter supported by at least one hinge, consisting of two members hinged with each other, and positioned one above the other; the lower of these is joined to a fixed structure and the upper one, which rests on this, is joined to the shutter for rotation. The device is characterized by the fact that the supporting surfaces of the two aforementioned members in contact with each other have one or more concave parts respectively and the same number of protruding parts, which substantially match each other, the protruding parts of a member being contained by the concave parts of the other member when the shutter is in its closed position, so that a relative rotation between the two aforementioned members brings about a vertical shift between them which is equal to the height of the protruding parts. The advantages offered by the invention and a more detailed illustration of this will be clearer from the description which follows, in which reference will also be made to the enclosed drawing, which show:

in Fig. 1: the enlarged exploded perspective view of a hinge on a shutter, with the invention executed in the preferred manner;

in Fig. 2: the enlarged exploded perspective view of another type of hinge which may also be fitted with a shutter in accordance with the invention;

in Fig. 3: the perspective view of a shower box fitted with two shutters in accordance with the invention, of which one, slightly open, is raised;

in Fig. 4: the plan view of the shower box in Fig. 3.

It must first be pointed out that the shutters, as in the invention, depending on their weight and the dimensions of the hinges, may be fitted with a single hinge or, in the most common case, with two or more hinges, with two of which positioned at the two extremities, upper and lower, as in fact usually occurs already with the revolving shutters and doors in use today.

In the execution in the preferred manner which will be described, the most typical case with two hinges is shown. Of these one (2) at least (see Fig. 1) has the characteristics making it possible to obtain the result already mentioned before, that is, to make shutter 1 lift vertically to a preset degree (see arrow A Figs. 1 and 3), as it revolves (see arrow B, Figures 1 and 4), moving away from seal 9.

This is obtained through the special shape given to the two members, 3 and 4, which comprise hinge 2, or rather, to their respective supporting surfaces 3a and 4a, which are in contact with each other. Of these, the supporting surface 4a of the lower member 4 has one or more appropriately shaped concave parts 4b (two in the example shown), while the supporting surface 3a of upper member 3 has the same number (one is not visible in the drawing) of shaped protruding parts 3b which substantially match those of 4b, and these concave 4b and protruding 3b parts are positioned in such a way that, with shutter 1 in closed position, each protruding part 3b is contained in one of the concave parts 4b.

It does not make any difference to the operation whether the concave parts are in the lower member (as shown) or on the upper member, and consequently the same obviously applies to the protruding parts.

By shaping said parts appropriately, for example, as shown in Fig. 1, in which the protruding parts 3b have a more or less semicircular "cam-shaped" profile and the concave parts 4b have a trapezoidal profile, and by appropriately connecting the various sections of the profile, a result is obtained in which, by rotating shutter 1 supported by a hinge 2 of this type, the cam-shaped protruding part 3b is raised along one of the sloping sides of the trapezoidal section of the concave part 4b coupled with it, thus sliding the shutter upwards (arrow A) to an extent equal to the "raise height", that is, to height "h" of the protruding parts 3b.

As can be appreciated from the drawings, even a very limited angle of rotation of upper member 3 can raise shutter 1 sufficiently to release it from seal 9 below.

Once the lifting phase is completed, the protruding parts 3b then run on the remaining flat part of the supporting surface 4a of the lower member 4 without varying the position of shutter 1 vertically as the rotation continues. A particularly favourable ratio between the measurement of vertical lift of the shutter and the angle of rotation of this is 0.1 mm per 4° of rotation approximately, with a maximum lift of 0.7 mm per 30° of rotation approximately, but other scalings are possible without any particular repercussions on operating.

The example is shown in the drawings of an execution in the preferred manner in which, to allow an easier working of the parts and to permit easy replacement, the two aforementioned supporting surfaces 3a and 4a, rather than being directly or respectively on the two members 3 and 4 comprising hinge 2, are on two special organs 3' and 4', which are then fixed onto members 3 and 4; but it is clear that both the concave parts 4b and the protruding parts 3b can also be realized directly on the aforementioned members if there is some convenient reason for doing so.

Obviously, by rotating shutter 1 in the opposite closing direction, the protruding parts 3b will follow the same path in reverse and will fit again into the corresponding concave parts 4b of lower member 4 with shutter 1 closed. And it can also be immediately grasped that the closing or opening movement of the shutter may be carried out by making it revolve, depending on requirements and on its position, in either of the two directions of rotation, as the shutter itself, during the course of a 180° rotation, makes two distinct lifting and repositioning runs in geometrically specular positions.

The materials preferred for making the hinges, for instance in the case plastic or glass shutters for a shower box, are aluminium for the upper and lower members proper, and one of the numerous self-lubricating synthetic materials for the organs 3' and 4' of which the surfaces have the concave parts 4b and protruding parts 3b.

For the second hinge 6, which is usually situated at the highest part of shutter 1, the inventor proposes using a variety (Fig. 2) in which both the hinge pin 11 and other parts 12 have shapes and lengths suitable to enable member 8 joined to shutter 1 to shift vertically to an extent equal to the height "h" of maximum vertical lift of the shutter itself during the course of its rotation.

We do not deem it necessary to provide further details, as this type of hinge, the functioning of which in itself is known, will immediately be understood by a technician working in the field by simply observing Fig. 2.

The representation in the drawings and the description so far have only illustrated an execution in the preferred manner in the field of shutters for shower boxes, but it is clear that different realizations of the shutter shown in the invention, for other uses too, are possible without going outside the scope of protection conferred by the enclosed claims, with respect to which the above

execution in the preferred manner is neither limiting nor binding.

Claims

1. Rotating shutter (1) supported by at least one hinge (2) comprising two members (3, 4) which are hinged with each other and positioned one above the other, of which the lower one (4) is joined to a fixed structure (5) and the upper one (3), which rests upon this, is joined to the shutter (1) in rotation, characterized by the fact that the supporting surfaces (3a, 3b) of the two aforementioned members (3, 4), which are in contact with each other, have one or more concave parts (4b) respectively and the same amount of protruding parts (3b) which are substantially complementary to each other, the protruding parts (3b) of a member (3) being contained by the concave parts (4b) of the other member (4) when the shutter (1) is in closed position, so that a relative rotation between the two aforementioned members (3, 4) causes a vertical shifting between these equal to the height (h) of the protruding parts (3b).
2. Rotating shutter in accordance with claim 1, also fitted with one or more hinges (6) in which the two upper (7) and lower (8) members comprising the hinge are capable of shifting lengthwise during the rotation of the shutter (1) to an extent at least equal to the lift height (h) of the shutter (1) due to said protruding part(s) (3b) of the other hinges (2) connected to the shutter (1) itself.
3. Rotating shutter in accordance with either of the previous claims, in which said supporting surfaces (3a, 4a) of the two aforementioned members (3, 4) in contact with each other, which have the aforementioned concave (4b) and protruding (3b) parts which are complementary to each other, are on two organs (3', 4') fixed to one of the two members (3, 4) respectively.
4. Rotating shutter in accordance with claim 3, in which the two members (3, 4) comprising a hinge (2) are made of aluminium, and said organs (3', 4') are made of a self-lubricating synthetic material.
5. The use of one or more rotating shutters in accordance with any of the previous claims as closing shutters for a shower box (10).

FIG. 1

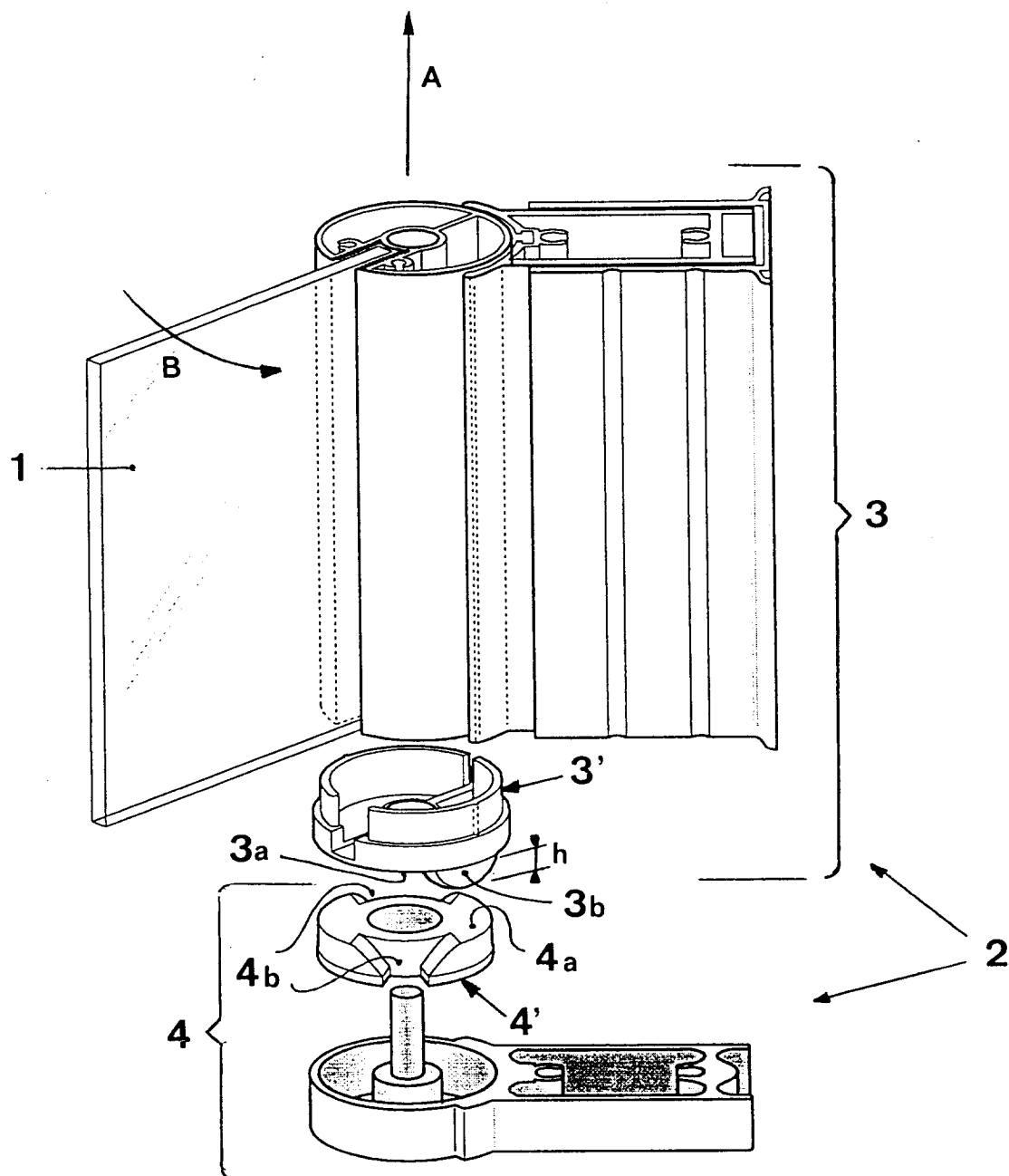


FIG. 2

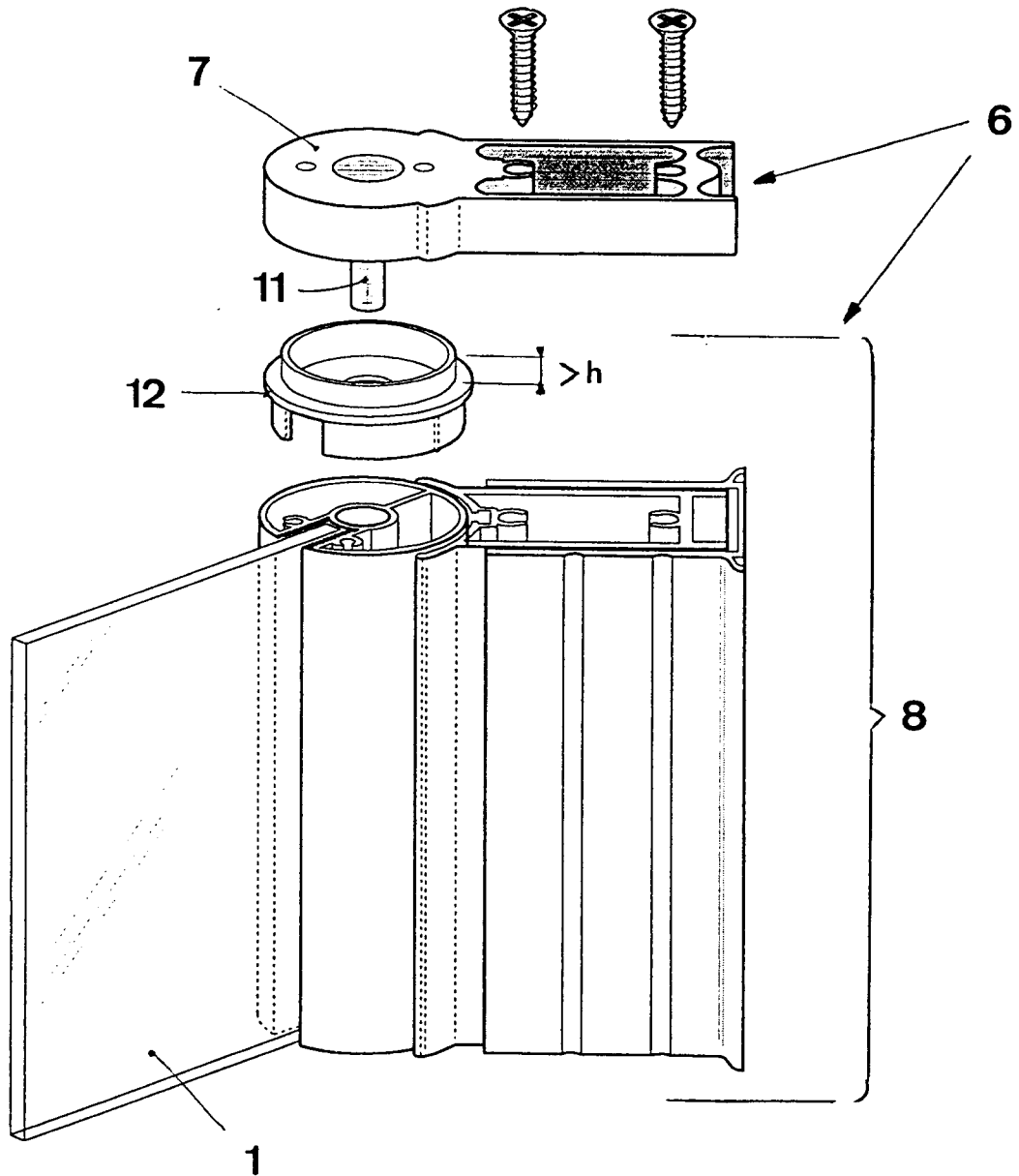


FIG. 3

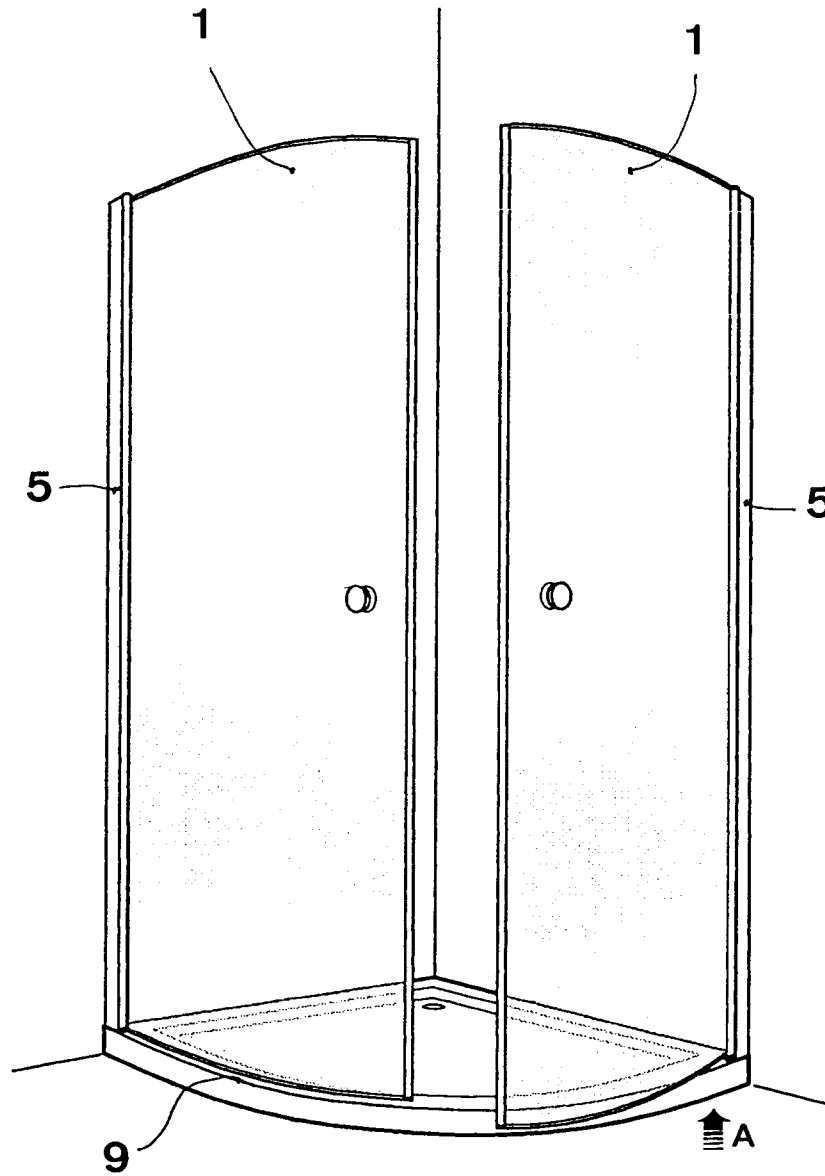
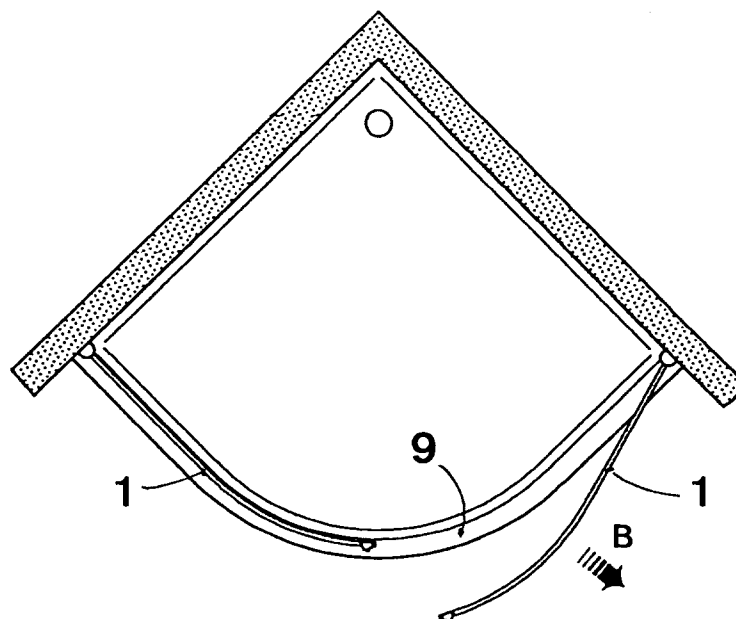


FIG. 4





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EUROPEAN SEARCH REPORT

Application Number
EP 94 81 0434

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X	EP-A-0 386 342 (HÜPPE)	1-3,5	E05D11/10
Y	* column 3, line 54 - column 6, line 15; figures 6-8 *	4	
Y	--- GB-A-1 404 765 (ARTHUR SHAW MANUFACTURING) * page 1, line 9 - line 60; figures 1,2 * -----	4	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int.Cl.6) E05D
Place of search THE HAGUE		Date of completion of the search 9 December 1994	Examiner Guillaume, G
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