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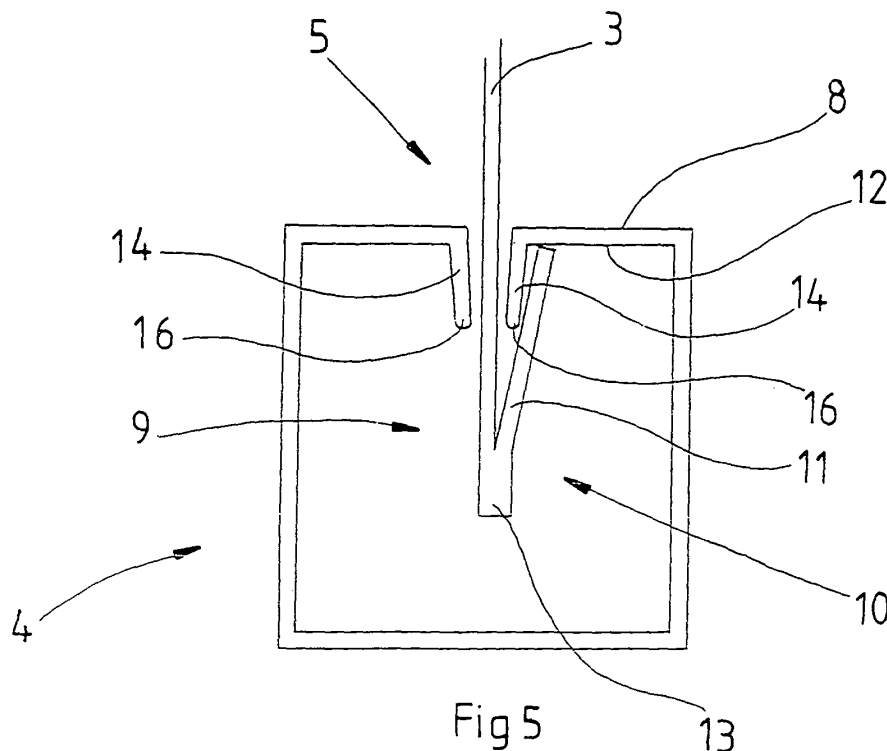
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(54) **An apparatus in a door**

(57) An apparatus in a door comprising a roll operator (2) and two frame profiles (4), a door leaf (3) being fixed in the roll operator with which the door leaf may be rolled up. The door leaf (3) has V-shaped locking sections (9) which are in engagement with guide grooves (5) disposed in the frame profiles (4). The guide grooves (5) are disposed on the sides (8) of the frame profiles (4) facing towards one another in towards the door opening.

The locking sections (9) prevent the door leaf (3) from being pulled out of the guide grooves (5), the locking sections having strips (10) which are disposed on the door leaf (3) along opposing edge portions (13) thereof. The locking sections (9) have free portions (11) which extend towards one another in towards the central region of the door leaf. The free portions (11) are in engagement with the inner surfaces (12) of the frame profiles (4) on opening and closing of the door.



## Description

### TECHNICAL FIELD

**[0001]** The present invention relates to an apparatus in a door which comprises a roll operator and two frame profiles which laterally define a door opening and which display guide grooves along their mutually facing sides, a door leaf secured in the roll operator by means of which the door leaf may be rolled up, the opposing edge portions of the door leaf being accommodated in the guide grooves of the frame profiles, the edge portions having locking sections that prevent the door leaf from being pulled out of the guide grooves.

### BACKGROUND ART

**[0002]** Doors, in particular sliding or roll-up doors, used in factories exist in numerous different variations. The doors may be employed externally at loading bays, internally in industrial premises as partitions, for example for noise protection, or as boundary markers for automatically controlled machines such as robot stations etc.

**[0003]** One prior art door which is shown in Fig. 1 has a roll operator 2 which opens and closes a door leaf 3. The roll operator 2 is secured to vertical frame profiles 4 which have guide grooves 5 running throughout their entire length. In the guide grooves 4, the preferably planar door leaf 3 runs without friction, as shown in Fig. 2 when the door 1 is opened and closed. In the event of minor outer stresses, for example from wind pressure or mechanical action, a door 1 of this design behaves well.

**[0004]** In the event of larger external stresses, for example in the event of powerful gusts of wind, in partial vacuum occurring in a laboratory environment, when a truck reverses into such a door or on mounting of the door 1 in front of an automatically controlled machine, personnel may, for one reason or another, come into contact with the door leaf 3 and the door leaf 3 may be subjected to large external forces. On the application of forces of this type, the door leaf 3 bulges outwards as shown by the broken line in position 6 shown in Fig. 2. In the worst case scenario, this outward bulging may be so great that, as a result, the door leaf 3 is disengaged from the guide grooves 5 in the frame profiles 4, whereafter the door 1 is unintentionally opened. For this reason, the frame profiles 4 have been made wide so that wide edge areas 13 on the door leaf may be accommodated therein. If the door leaf 3 is disengaged from the frame profile 4 when the door 1 is mounted in front of an automatically controlled machine, the personnel working nearby may put their hands in the machine and this can give rise to serious personal injury.

**[0005]** Another solution to this problem is to provide the door leaf 3 with straight, transverse reinforcements that run across the entire width of the door leaf. For example, such reinforcements may consist of thin metal or plastic profiles which are integrated in the door leaf 3.

the width of the reinforcement profiles preferably corresponds to the width of the guide grooves 5 so that they can run without friction therein. The drawback inherent in this variation is that if it is exposed to major external stresses, the profiles are deformed, in which event the deformation persists after the external force has been lifted, in which event it becomes impossible to roll up the door leaf 3 on the roll operator 2 and open the door, since the reinforcements are no longer straight. Another drawback is that the profiles take up space on the roll operator 2, in which event the thickness of the roll operator 2 is increased. On rolling up and rolling down of the door leaf 3, the profiles cause wear on the door leaf 3 which reduces the service life of the door.

**[0006]** Another variation that has been tested in order to retain the door leaf 3 in the guide grooves 5 is, int. al. longitudinal strips 15 which are secured on the longitudinal edges 13 of the door leaf 3, as shown in Fig. 3, these strips forming counter abutments. The strips 15 may preferably be several in number and are thus fixed on one another in order to form wider counter abutments.

**[0007]** The counter abutments are wider in form than the guide grooves 5. The drawback inherent in this solution is that, in the event of large stresses, the guide grooves 5 of the frame profiles 4 "yawn" and the counter abutment wedges into and out of the guide groove 5, whereafter the door leaf 3 becomes disengaged. This also entails that the door leaf 3 will be unintentionally opened. Another drawback in this solution is that, on opening of the door leaf 3, this is rolled up on the roll operator 2, in which event the thickness of the roll will be larger out at the edges than in the centre, which may cause problems.

**[0008]** A roll-up door in industry must withstand large pressure differences and also withstand being collided with by a truck without being deformed, becoming dislocated or breaking apart, and the above-outlined variations cannot meet these requirements. The roll-up doors must also withstand being used often, several times a minute, without the service life of the roll-up door being appreciably affected.

### PROBLEM STRUCTURE

**[0009]** The present invention has for its object to design the apparatus in a door intimated by way of introduction such that it obviates the drawbacks in the prior art technology. In particular, the present invention has for its object to design the apparatus so that this has means for preventing the door leaf from being disengaged from its operative positions in the frame profiles. The present invention further has for its object to make for narrower door frame profiles. Finally, the present invention has for its object to be able to be used often and withstand rapid closing and opening movements.

## SOLUTION

**[0010]** The objects forming the basis of the present invention will be attained if the apparatus is characterised in that the locking sections include strip-shaped formations which are disposed along opposing edge portions of the door leaf and which have portions free from the door leaf extending towards one another in a direction towards the central region of the door leaf, the portions of the locking sections free from the door leaf in engagement with inner surfaces in the frame profiles being disposed to prevent the door leaf from being pulled out from the profiles.

## BRIEF DESCRIPTION OF THE ACCOMPANYING DRAWINGS

**[0011]** The present invention will now be described in greater detail hereinbelow, with reference to the accompanying Drawings. In the accompanying Drawings:

Fig. 1 is a front elevation of a roll-up door;

Fig. 2 is a sectional view taken along the line A-A in Fig. 1 showing the prior art technology;

Fig. 3 is a part of a sectional view taken along the line A-A in Fig. 1, showing the prior art technology;

Fig. 4 is a sectional view showing the apparatus according to the present invention in an unloaded state;

Fig. 5 is a sectional view showing the apparatus according to the present invention in a loaded state;

Fig. 6 is a sectional view of an alternative embodiment of the apparatus according to the present invention; and

Fig. 7 is a sectional view of another alternative embodiment of the device according to the present invention.

## DESCRIPTION OF PREFERRED EMBODIMENT

**[0012]** Fig. 1 shows a roll-up door 1 with a roll operator 2 supported by two frame profiles 4. The roll operator 2 defines a door opening 7 in the vertical direction and the frame profiles 4 define the door opening 7 in the lateral direction against a surrounding building façade or wall. The casing and frame profiles 4 of the roll operator 2 are preferably rectangular profiles of aluminium, manufactured by extrusion, or consisting of other durable material.

**[0013]** Each frame profile 4 has a guide groove 5 disposed on one of its sides 8 which extends along the entire length of the frame profile 4. The frame profiles 4 are

mounted so that the sides 8 with the guide grooves 5 are turned to face towards one another in towards the central region of the door 1.

**[0014]** The door 1 has a door leaf 3 which is secured in the roll operator 2 by means of which the door leaf 3 may be rolled up. The door leaf 3 covers the door opening 7 in the closed position of the door 1 and is rolled up on the roll operator 2 in the open position of the door 1. The door leaf 3 is preferably laminated and manufactured from plastic coated fibre fabrics and/or transparent plastic.

**[0015]** The opposing edge portions 13 of the door leaf 3 are accommodated in the guide grooves 5 of the frame profiles 4. The edge portions 13 of the door leaf 3 have locking sections 9 which prevent the door leaf 3 from being pulled out of the guide grooves 5 on use and on the action of outer forces such as powerful gusts of wind. The locking sections 9 have strip-shaped formations 10 which are disposed on the door leaf 3 along the vertical opposing edge portions 13. The strip-shaped formations may be continuous in one piece or be shorter intermittent sections.

**[0016]** The locking sections 9 have portions 11 which are free from the door leaf and which extend towards one another in towards the central region of the door leaf 3, as shown in Fig. 4. When the free portions 11 of the locking sections 9 are, on outer stresses, in engagement with the inner surfaces 12 of the frame profiles 4, they are disposed to prevent the door leaf 3 from being pulled out of the frame profiles 4, as shown in Fig. 5. The locking sections 9 extend, in one major embodiment, unbroken throughout the entire length of the side edges 13 of the door leaf 3 and distribute the active forces throughout the entire frame profile 4.

**[0017]** The guide grooves 5 have walls 14 inwardly directed towards the centre of the frame profile 4. The walls 14 are separated from one another by the guide groove 5 whose width at least corresponds to the thickness of the door leaf 3. The walls 14 have rounded ends in order to create minimal abutment surfaces against the free portions 11 of the locking sections 9, which generates slight frictional forces on opening and closing of the door 1. The walls 14 are also funnel-like arranged inwards at an angle towards one another in order readily to come into engagement with the locking sections 9.

**[0018]** The guide grooves 5 may preferably be provided with sealing bristles which function as guide means for the door leaf 3.

**[0019]** The free portions 11 of the locking sections 9 are of a length which is longer than the length of the inwardly directed walls 14 which define the guide groove 5. On opening and closing, the free portions 11 of the locking sections 9 are in contact with the inner surfaces 12 of the frame profiles 4 as well as with the rounded ends 16 of the walls 14. This formation of the free portions 11 and the walls 14 contributes to the door leaf 3 running freely in the guide groove 5 without wedging fast.

**[0020]** The strip-shaped formations 10 are free stand-

ing and combined with the door leaf 3 to form a unit. The door leaf 3 and the formations 10 can be phased together by gluing or heat treatment such as vulcanisation in order to realise minimum material thickness in the joints between the different parts. When the door leaf 3 and the strip-shaped formations 10 are combined, the locking sections 9 form V-shaped recesses. In this embodiment, the material composed of the door leaf 3 and the formations 10 will have at most double the material thickness in the edges 13.

**[0021]** The strip-shaped formations 10 may also be formed from the door leaf 3 in that longitudinal non-penetrating incisions 17 are provided on one side of the door leaf 3 whereafter the edges 18 in the incision form the free portions 11 as shown in Fig. 6, V-shaped recesses being formed. On strip-shaped formations of the above-mentioned type, the door leaf 3 realises less than double thickness, preferably only single material thickness, out in the edges of the roll operator 2 when the door leaf 3 is rolled up.

**[0022]** The strip-shaped formations 10 may also be formed from the door leaf 3 in that the longitudinal edges 13 on the door leaf are folded in over the door leaf 3 as shown in Fig. 7, whereafter the formations 10 are fixed against the door leaf 3 by means of heat treatment. In this embodiment, the material composed of the door leaf 3 and the formations 10 will have at most double material thickness in the edges 13.

**[0023]** In those cases where the strip-shaped formations 10 are glued or vulcanised on the door leaf, they may possibly be of lesser material thickness than the door leaf 3 proper.

## Claims

1. An apparatus in a door which comprises a roll operator (2) and two frame profiles (4) which laterally define a door opening (7) and which display guide grooves (5) along their mutually facing sides (8), a door leaf (3) secured in the roll operator (2) by means of which the door leaf (3) may be rolled up, the opposing edge portions (13) of the door leaf (3) being accommodated in the guide grooves (5) of the frame profiles (4), the edge portions having locking sections (9) that prevent the door leaf (3) from being pulled out of the guide grooves (5), **characterised in that** the locking sections (9) include strip-shaped formations (10) which are disposed along opposing edge portions (13) of the door leaf (3) and which have portions (11) free from the door leaf (3) extending towards one another in a direction towards the central region of the door leaf (3), the portions (11) of the locking sections (9) free from the door leaf (3) in engagement with inner surfaces (12) in the frame profiles (4) being disposed to prevent the door leaf (3) from being pulled out therefrom.

2. The apparatus as claimed in Claim 1, **characterised in that** the locking sections (9) extend throughout the entire length of the side edges (13) of the door leaf (3).
3. The apparatus as claimed in Claim 1 or 2, **characterised in that** the guide grooves (5) have walls (14) inwardly directed towards the centre of the frame profiles (4) and provided with rounded ends (16).
4. The apparatus as claimed in Claim 3, **characterised in that** the walls (14) are disposed to be funnel-shaped inwards at an angle to one another.
5. The apparatus as claimed in Claim 1 or 2, **characterised in that** the free portions (11) are longer than the inwardly directed walls (14) which define the guide grooves (5).
6. The apparatus as claimed in Claim 5, **characterised in that** the strip-shaped formations (10) are phased together with the door leaf (3) into a unit, V-profiles thus being formed.
7. The apparatus as claimed in Claim 5, **characterised in that** the strip-shaped formations (10) are formed from the door leaf (3) **in that** longitudinal, non-penetrating incisions (17) are made on the one side of the door leaf (3).
8. The apparatus as claimed in Claim 5, **characterised in that** the strip-shaped formations (10) are formed from the door leaf (3).

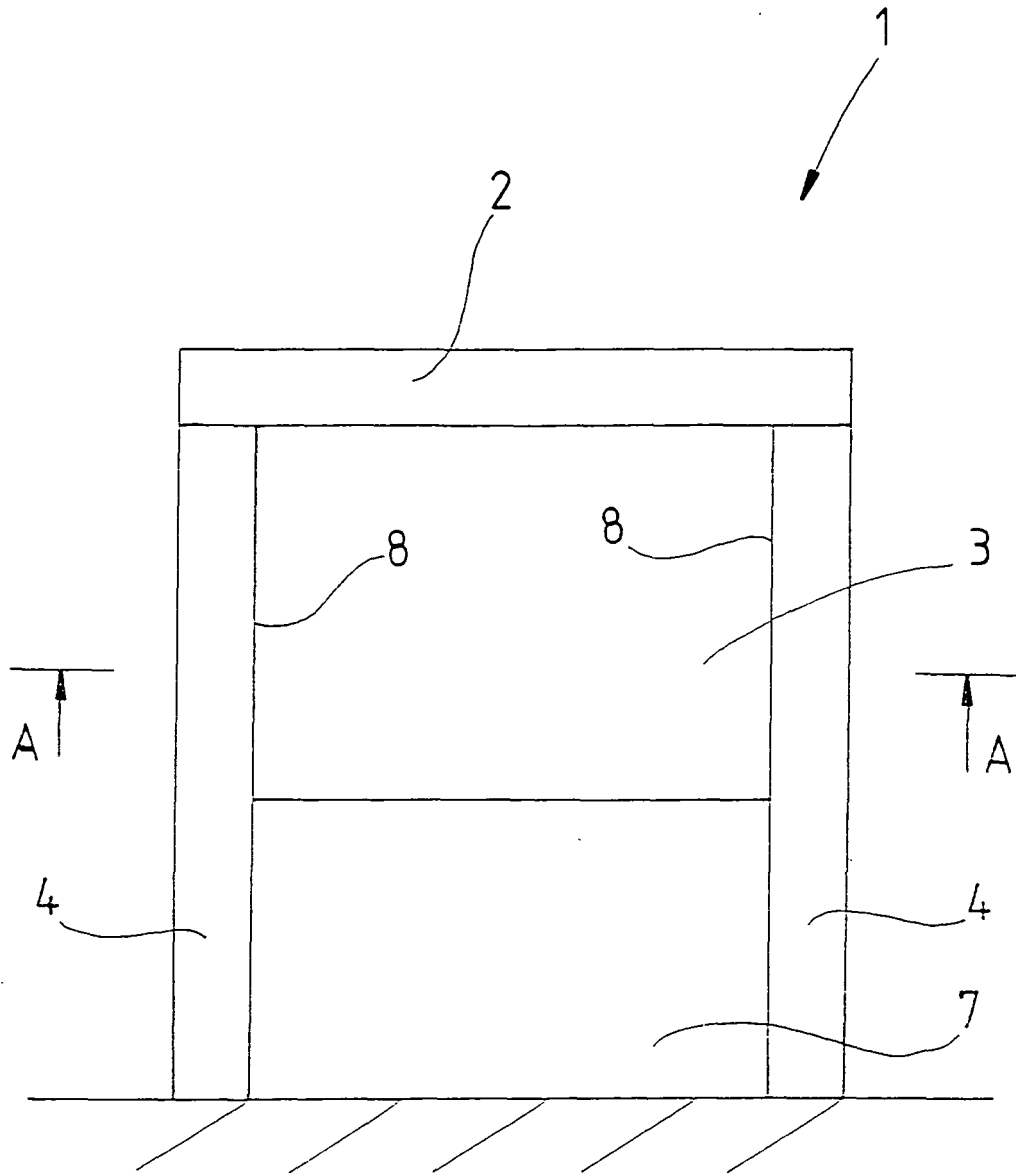
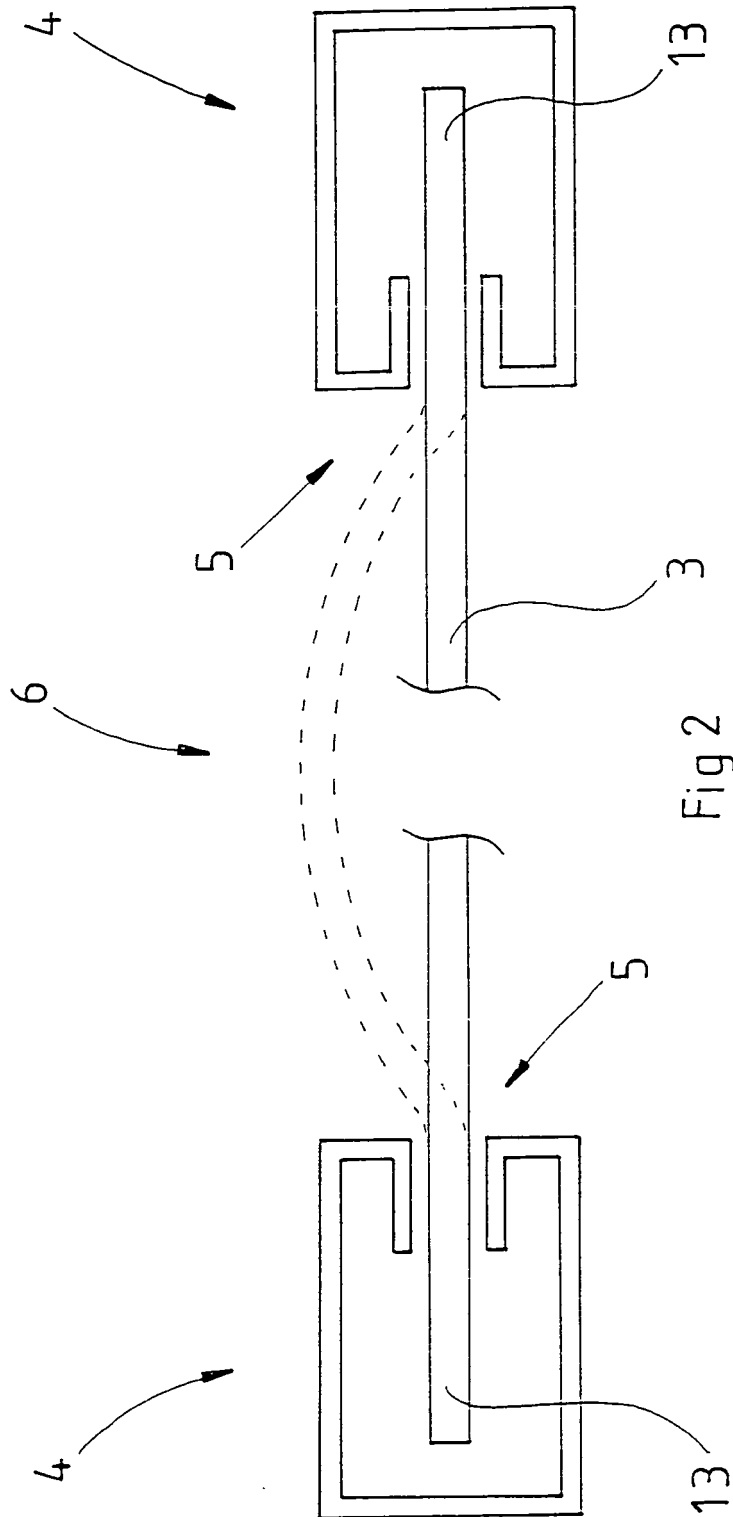


Fig1



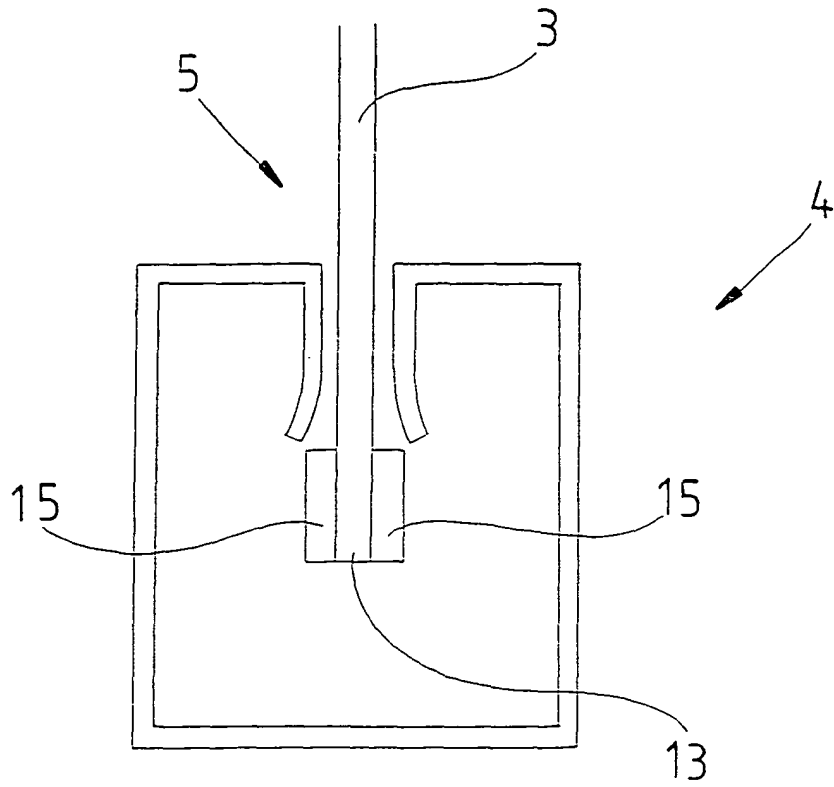


Fig 3

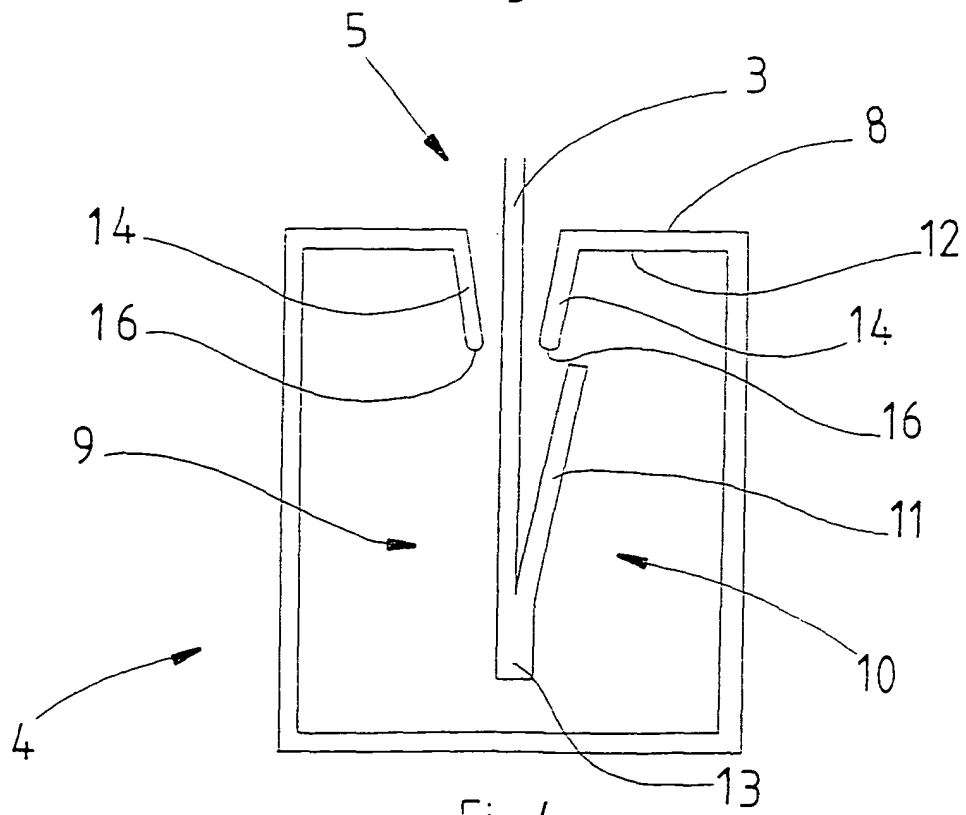
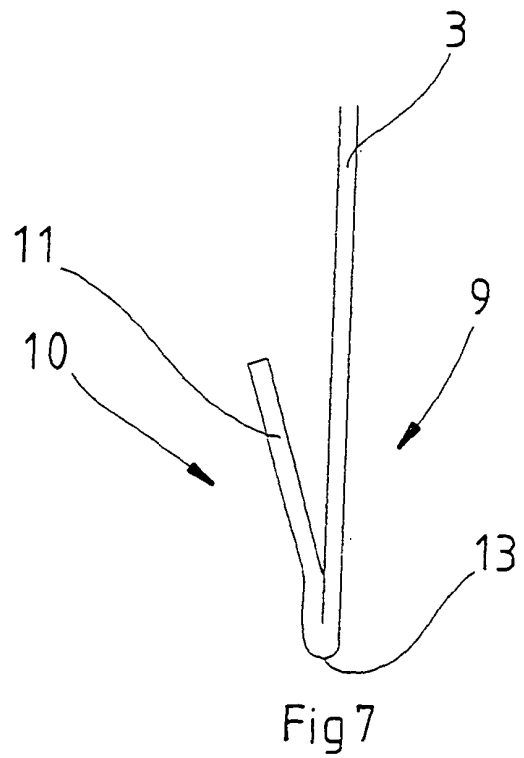
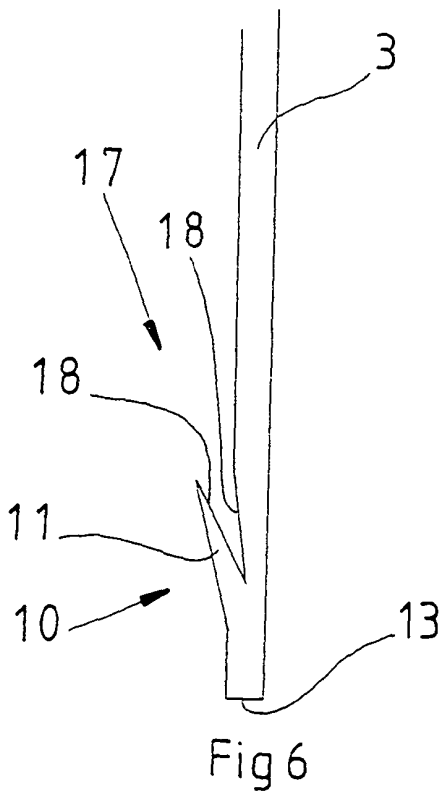
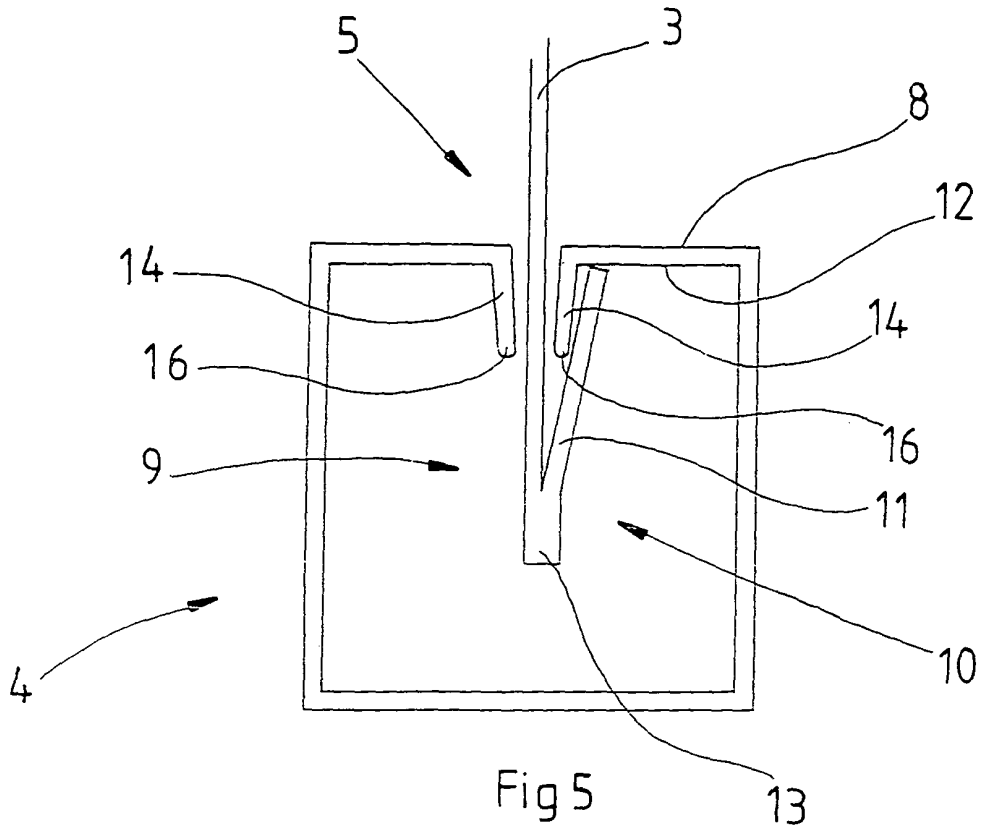


Fig 4





DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
The Hague		20 December 2005	Geivaerts, D
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**ANNEX TO THE EUROPEAN SEARCH REPORT  
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EP 05 07 6948

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on  
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20-12-2005

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