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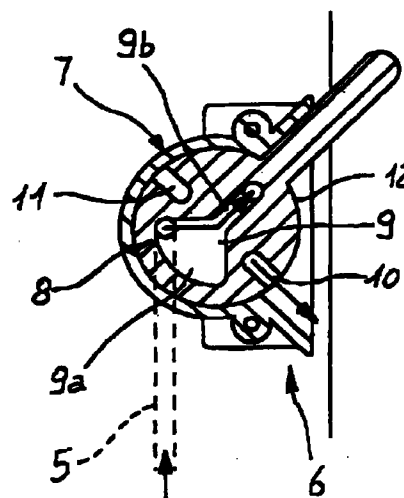
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**(54) Multi-purpose device in particular for evacuating packages**

(57) The invention relates to a multi-purpose device in particular for household use comprising an air pump (2), equipped with a respective suction duct (3) and a respective delivery duct (4), and an operating element (5), put into fluid communication with said pump (2) and capable of being passed through by an air stream. Also provided is switching means (6) interposed between the operating element (5) and the pump (2). The switching means (6) is selectively shiftable between a first operating condition, in which a fluid communication between the operating element (5) and the suction duct (3) is carried out, and a second operating condition in which a fluid communication between the operating element (5) and the delivery duct (6) is carried out.

**FIG. 5**



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## Description

The present invention relates to a multi-purpose device in particular for household use.

It is known that in recent years there has been an increasing diffusion of apparatuses mainly for household use by which it is possible to execute vacuum packaging of foods, which will result in a prolonged preservation of same.

These apparatuses generally are comprised of a suction pump, normally housed within a base structure, and a tubular terminal member to be operatively connected to the container inside which the vacuum is to be created. In apparatuses adapted for packaging of foods into rigid containers the terminal member generally comprises a rubber nozzle to be sealingly coupled with a seating arranged in a single-acting valve associated with the container.

Also provided are other solutions adapted for packaging of foods into plastics envelopes or bags according to which the air-sucking terminal member is inserted into the bag the opening of which is maintained sealingly closed by a closing element operating on the surface located backward of the sucking terminal member. When suction is over, the final sealing of the bag is carried out by means of a heat sealing operation executed before the sucking terminal member, by a heating element for example, against which the bag opening is pressed by a pressure bar.

In conclusion, a great number of solutions exist that enable achievement of a predetermined degree of vacuum both in rigid containers and in flexible containers.

It is however well apparent that the use of vacuum packaging apparatuses of the known type is greatly specific and therefore restrained to the cases in which, as already said, a given type of foodstuff needs to be conveniently packaged.

Therefore these apparatuses have a very reduced use and often costs for purchasing them which due to the presence of powered elements and the indispensable control circuits are often relatively high, may appear unjustified.

It is also to note that particularly felt in the household field is the requirement of reducing the number and bulkiness of the household appliances normally employed.

Furthermore, from a strictly operating point of view, it is to note that the tubular terminal member very often has a tendency to obstruction, due to suction of particles that often separate from the product being packaged. This fact, in addition to requiring the use of very efficient filtering elements, compels the operators to carry out continuous servicing and cleaning actions at the tubular terminal member.

Under this situation, the problem that the Applicant intended to solve was that of providing a device that, by substantially utilizing the same components as the known vacuum-creating apparatuses and therefore substantially involving the same manufacturing costs as

said known apparatuses, was also capable of offering a much wider variety of possibilities of use.

In particular, it is a fundamental object of the present invention to provide a multi-purpose device capable of operating in an excellent manner both as a device for creating the vacuum, to be applied to any type of container, and as a device for air delivery, to be used for example for cleaning and/or drying surfaces or kitchen utensils, i.e. cutlery, pots and pans, and others.

Another object of the invention is to provide a multi-purpose device of very simple structure and therefore reliable from an operative point of view.

A further important object of the present invention is to provide a multi-purpose device in which passage from the suction condition to the blowing condition is carried out through a substantially mechanical switching system so as to ensure sturdiness and operative reliability to the device, which factors are essential in the domestic field where in general users pay little attention and care in the apparatus use.

A not least object of the present invention is to provide a device which is of very easy and intuitive use, due to the presence of a control circuitry capable of immediately signalling achievement of the desired operating conditions and in which servicing and cleaning operations can be carried out in a very practical manner.

The foregoing and further objects that will become more apparent in the course of the following description are substantially achieved by a multi-purpose sucking and blowing device as defined in the appended claims.

Further features and advantages will be best understood from the detailed description of a preferred but not exclusive embodiment of a multi-purpose device in accordance with the invention. This description will be taken hereinafter with reference to the accompanying drawings, given by way of non-limiting example, in which:

- Fig. 1 is a front view of a multi-purpose device in accordance with the invention;
- Fig. 2 is a diagrammatic view of a driving and control circuitry associated with the multi-purpose device in question;
- Fig. 3 is a sectional view showing a detail of the device in question relating to the suction/blowing selection system.
- Fig. 4 shows the detail of Fig. 3 seen from plane IV-IV;
- Fig. 5 is a sectional view taken along line IV-IV in Fig. 4;
- fig. 6 is a section similar to Fig. 5 corresponding to a second operating condition of the device in question;
- Figs. 7 and 8 diagrammatically show operation of the device in question in the suction mode and blowing mode respectively;
- Figs. 9, 10 and 11 are sectional views of terminal members to be operatively associated with the device in question;

- Fig. 12 is a front view of a flexible container to be used as a package for foods and with which the device in question operating in the suction mode can be associated for obtaining a vacuum package;
- Fig. 13 is a perspective view of the container shown in Fig. 12 during a sealing step of same; and
- Fig. 14 is a sectional view taken along line XIV-XIV in Fig. 12.

With reference to the drawings, a multi-purpose device in particular for household use, in accordance with the present invention, has been generally identified by reference numeral 1.

The multi-purpose device 1 comprises an air pump 2 provided with a respective suction duct 3 and a respective delivery duct 4. Clearly, from the point of view of construction, the pump can be either of the reciprocating type or of the rotary type.

Pump 2 is put into fluid communication with an operating element 5, capable of being passed through by an air stream. In particular, in the embodiment shown in Fig. 1, the operating element 5 consists of a tubular body of variable length depending on requirements.

Preferably, element 5 is made of flexible plastic material so that it may exhibit good qualities in terms of duration of life and capability of being wound on a support 5a during the non-operating steps of the multi-purpose device 1.

Advantageously, switching means 6 operatively interposed between the operating element 5 and pump 2 is provided. The switching means 6 is selectively shiftable between a first operating condition in which a fluid communication between the operating element 5 and the suction duct 3 is carried out and a second operating condition in which a fluid communication between the operating element 5 and the delivery duct 4 takes place. In this manner, due to the switching means alone, the device 1 can be operated either in the suction mode or in the blowing mode, without any intervention on the pump being necessary.

Still in an advantageous manner, the switching means 6 comprises a fixed valve body 7 within which a diversion element 8 is rotatably movable, which element is shiftable between two positions in such a manner as to define the above mentioned first and second operating conditions.

As can be viewed from the accompanying drawings, the diversion element 8 is formed of a single disc-shaped body internally defining a connecting chamber 9 which, in turn, has a first portion 9a which is constantly put into fluid communication with the operating element 5. The connecting chamber 9 also has a second portion 9b communicating with the first portion 9a and selectively carrying out a fluid communication of the first portion 9a with the suction duct 3 at the first operating condition, and a fluid communication of the delivery duct 4 with the first portion itself 9a, at the second operating condition.

More particularly, as can be specifically viewed from Figs. 5 and 6, the diversion element is oscillatably movable in a predetermined operating plane and through a predetermined working angle, in this case of 90°, to define the first and second operating conditions.

Still with reference to Figs. 5 and 6, one can notice that the first portion 9a of the connecting chamber 9 has an angular extension at least as wide as the working angle, in order to be able to ensure a fluid communication with the operating element 5 under both operating conditions. Preferably, this connecting chamber is in the form of a sector of a circle.

Still with reference to the diversion element, said element has at least one evacuation channel 10 and at least one feeding channel 11 disposed at symmetrically opposite positions relative to the symmetry axis of the connecting chamber 9. In this case, the above two channels are opposed at 180°. As shown in Fig. 5, the evacuation channel, at the first operating condition, carries out a fluid communication between the delivery duct and the surrounding atmosphere. In turn, as shown in Fig. 6, the feeding channel, at the second operating condition, carries out a fluid communication between the surrounding atmosphere and the suction duct.

From the point of view of construction, the evacuation and feeding channels 10 and 11 are preferably positioned at a perimetric edge 12 of the diversion element 8 such arranged as to be selectively opened or closed to advantage by the casing itself of the filed valve body 7. It should be also noted that the diversion element is directly operable from the outside by a gripping lever 8a emerging from an access opening formed in said valve body.

Advantageously, in accordance with a further aspect of the present invention, the device 1 is also comprised of driving means for the air pump which comprises at least one power unit 13 mechanically connected to the pump itself and one driving and control circuitry 14 for the power unit itself. Such a circuitry preferably consists of at least one switch 15 for selectively opening and closing an electrical supply connection to the power unit and at least one timer device 16 interposed in circuit between the switch and the power unit. The timer device can be operated from the outside, by a conventional knob 17 for example, to enable and inhibit electrical supply based on a predetermined time setting to be adjusted by the user.

The driving and control circuitry is also provided with vacuum-detecting means 18, obviously brought into fluid communication with the suction line of pump 2, which means can be optionally provided with respective signalling means 19 consisting of a buzzer or a lamp for example, which is electrically connected to the timer circuit and the switch.

We will now examine the structure of the operating element 5 in detail. As already said, this element normally consists of a tubular body of flexible plastic material and is generally equipped, at one working end thereof, with a terminal member 20 which will advantageously

geously have a great variety of conformations depending on the operating use to be performed by the device 1.

In particular, if a foodstuff is to be packaged for example in a rigid container, a terminal member of the type shown in Fig. 9 should be preferably used. Such a member will comprise a central body 21 of substantially cylindrical conformation, one coupling end portion 22 arranged to be coupled with the operating element and one working end 23, normally of conical conformation and provided with a sealing ring 24, which is adapted for coupling with an attachment valve provided at one of the container walls.

If a container of the flexible type, in the form of a bag 25 as shown in Figs. 12 to 14 is instead intended for use, in which tightness is ensured by a closure involving mutually coupled ribs 26 and optionally a safety clip 27 engaging the closing edge 28 of the bag itself, the terminal member shown in Fig. 10 will be used.

On the contrary, when the device is to be used in the blowing mode, that is with the selecting means in the second operating condition, it will be possible to associate another type of terminal member 20 with the operating element. This terminal member 20 will be provided for example with brushes (as shown in Fig. 11) or rotating members to be operated by the air coming out of the operating element at high speed, or it will be of still other types depending on the operations to be performed.

It should be noted that the terminal member shown in Fig. 10 could be also used in the blowing mode if for example one wishes to utilize the air coming out at high speed for either carrying out cleaning operations at areas of difficult accessibility or drying kitchen utensils or executing still other works.

At all events it is apparent that the device 1 in accordance with the present invention is capable of offering a versatility of use never reached until now by merely employing terminal members of differentiated conformation depending on the different intended uses and by utilizing the device itself either in the suction mode or in the blowing mode, depending on requirements.

The invention achieves important advantages.

It is to point out in fact that the multi-purpose device in accordance with the invention is much more versatile in use than the known vacuum packaging devices.

In addition and advantageously, the above is obtained practically without any construction heaviness in comparison to the structure of the traditional devices.

It should be also noted that through the switching means 6 the device can be brought from the first operating (suction) condition to the second (blowing) condition, so as to exert an efficient cleaning action of the operating element 5 that, being intended for packaging foodstuffs, can be often partly or completely obstructed by parts of said foodstuffs accidentally drawn in.

It is also important to point out that the switching means structure is particularly efficient with reference to applications in the household field, due to the great sim-

plicity and sturdiness of same from a structural point of view. In other words, since switching from the first to the second operating conditions takes place manually by driving the diversion element 8 in rotation, switching from suction to blowing and vice versa occurs immediately without any intervention being necessary either on the power system of the pump or on any of the electrical parts in the machine.

The invention is also advantageous in its most specific aspects.

In fact, the diversion element has a particularly simple conformation and, by virtue of its symmetry, no problem arises during the assembling step.

The control circuitry too, although restricted to its fundamentally necessary elements, succeeds in ensuring a constant control on the apparatus operation during the suction step (due in particular to the presence of the vacuum signalling device) and is capable of offering a timed control both during the suction and blowing steps.

Obviously, many modifications and variations can be made to the present invention, all of them falling within the scope of the inventive idea characterizing it.

It will be also understood that the invention can be applied to advantage to fields other than the household one, on an industrial scale for example, clearly by adopting suitable changes as regards the sizes of the different parts forming the device in question.

## Claims

1. A multi-purpose device in particular for household use, comprising:

- an air pump (2) equipped with a respective suction duct (3) and a respective delivery duct (4);
- an operating element (5) put into fluid communication with said pump (2) and capable of being passed through by an air stream, characterized in that switching means (6) interposed between said operating element (5) and pump (2) is provided, which switching means (6) is selectively shiftable between a first operating condition in which a fluid communication between the operating element (5) and the suction duct (3) is carried out and a second operating condition in which a fluid communication between the operating element (5) and the delivery duct (4) takes place.

2. A multi-purpose device according to claim 1, characterized in that the switching means comprises:

- a fixed valve body (7); and
- a diversion element (8) rotatably movable in the fixed valve body between said first and second operating conditions.

3. A multi-purpose device according to claim 2, characterized in that the diversion element (8) defines a

connecting chamber (9) having a first portion (9a) put into fluid communication with the operating element, and a second portion (9b) which, at said first operating condition, is brought into fluid communication with said suction duct and, at said second operating condition, is brought into fluid communication with said delivery duct.

4. A multi-purpose device according to claim 1, characterized in that said diversion element (8) is oscillatably movable in a predetermined operating plane and through a predetermined working angle from said first to said second operating conditions and vice versa. 10
5. A multi-purpose device according to claim 4, characterized in that the first portion (9a) of said connecting chamber (9), at said operating plane, has an angular extension at least as wide as said working angle. 15  
20
6. A multi-purpose device according to claim 2, characterized in that the diversion element (8) has at least one evacuation channel (10) and at least one air feeding channel (11) located at symmetrically opposed positions, said evacuation channel carrying out a fluid communication between the delivery duct (4) and the surrounding atmosphere at said first operating condition, and carrying out a fluid communication between the surrounding atmosphere and said suction duct (3) at said second operating condition. 25  
30
7. A device according to claim 6, characterized in that said evacuation channel (10) and air feeding channel (11) are disposed close to a perimetric edge (12) of the diversion element (8). 35
8. A multi-purpose device according to claim 1, characterized in that it comprises means for driving said pump, comprising: 40
  - at least one power unit (13) mechanically connected to the pump; and
  - a driving and control circuitry (14) for said power unit. 45
9. A multi-purpose device according to claim 8, characterized in that said driving and control circuitry (14) comprises: 50
  - at least one switch (15) for selectively opening and closing an electrical supply connection to the power unit; and
  - at least one timer device (16) interposed in circuit between said switch (15) and power unit (13) and operable from the outside to enable and inhibit the electrical supply, based on a predetermined time setting to be adjusted by 55

the user.

10. A multi-purpose device according to claim 9, characterized in that said driving and control circuitry (14) further comprises vacuum-detecting means (18) optionally provided with respective signalling means (19), which are electrically connected to said timer circuit (16) and switch (15).

FIG. 1

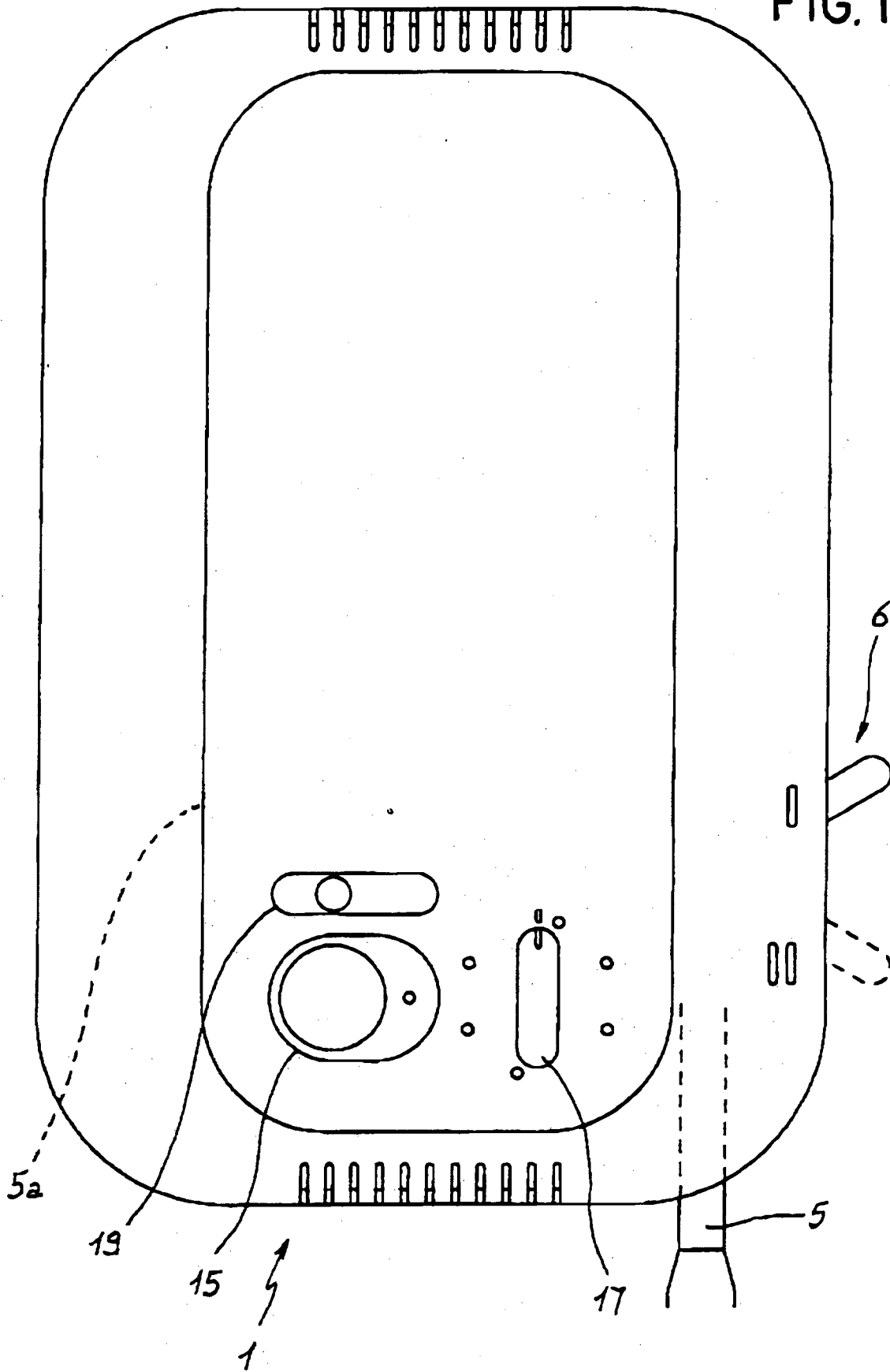


FIG. 2

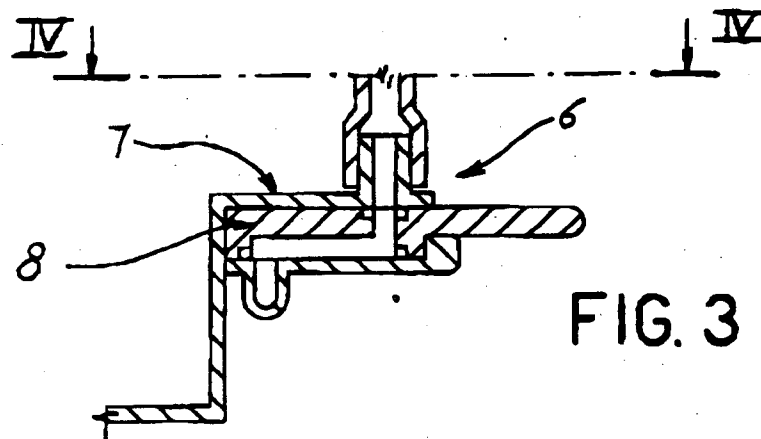
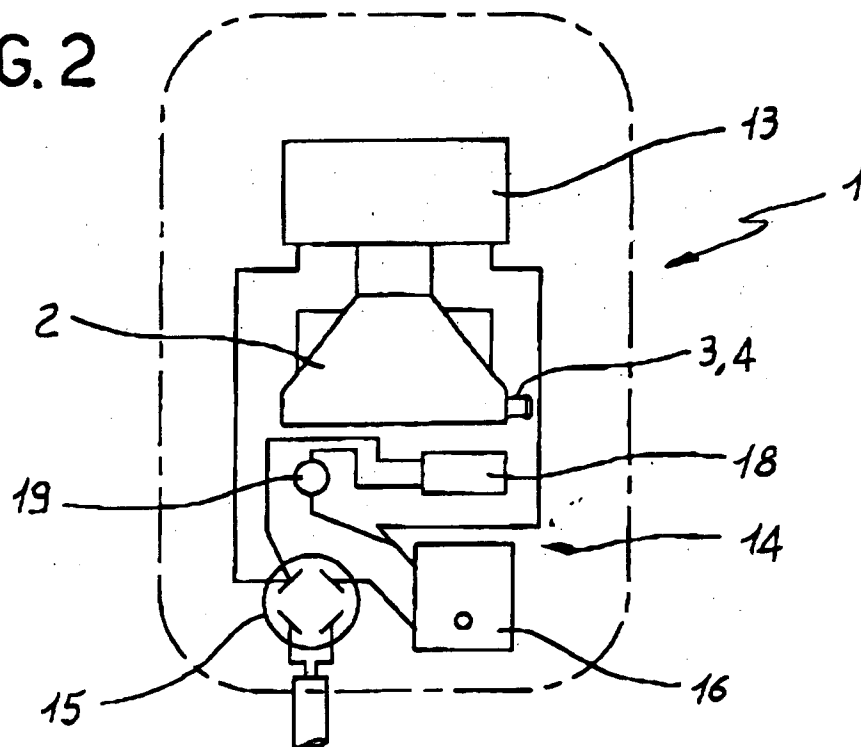


FIG. 3

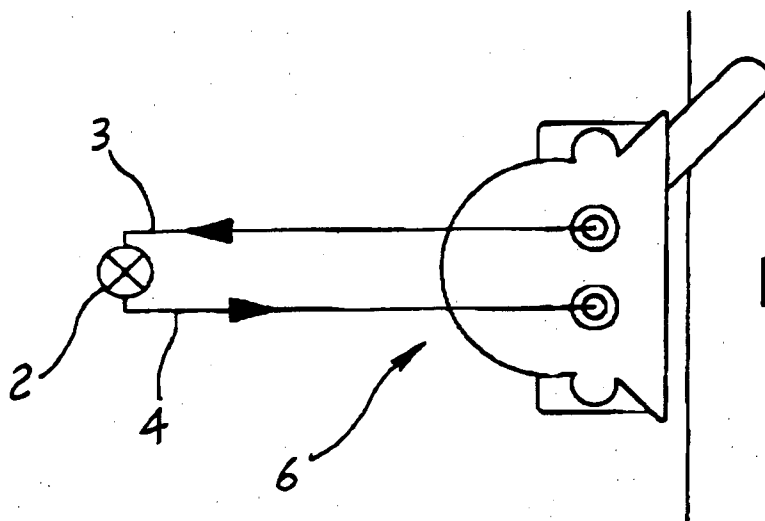


FIG. 4

FIG. 5

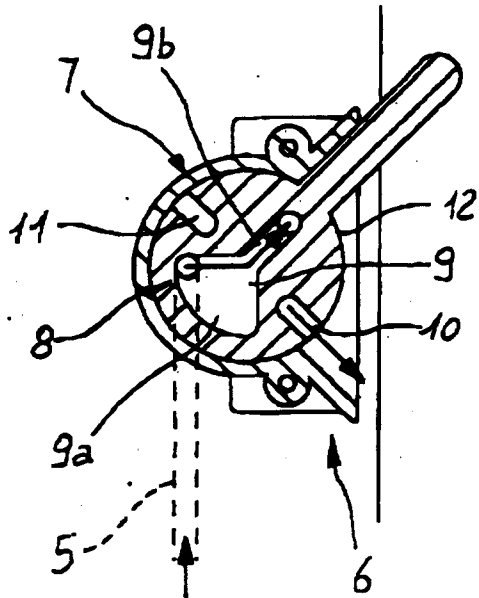


FIG. 6

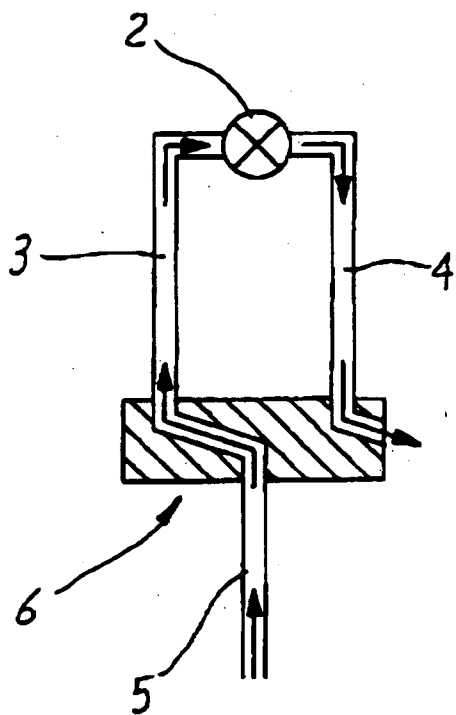
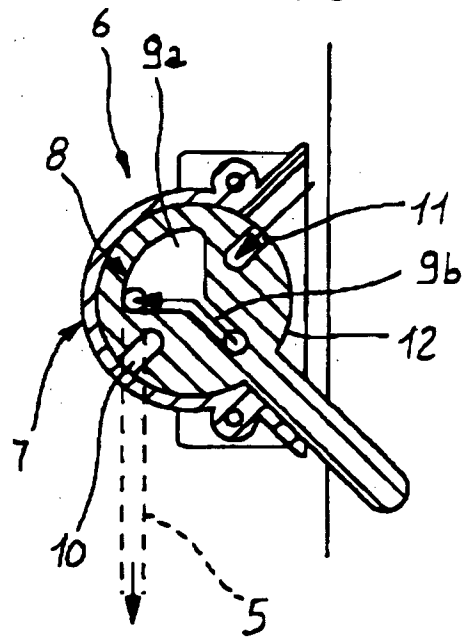


FIG. 7

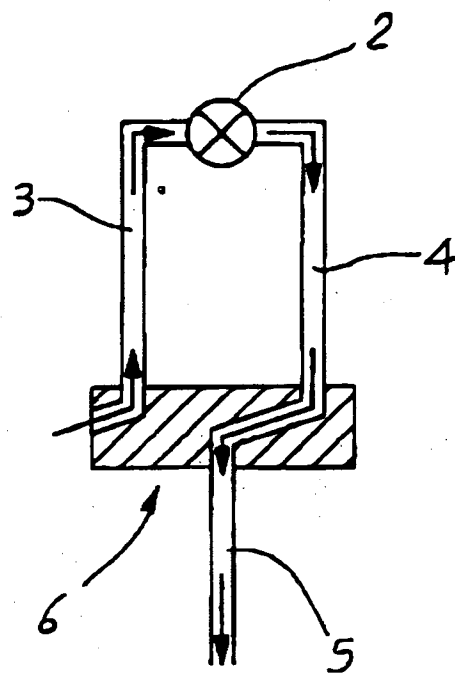


FIG. 8



FIG. 9

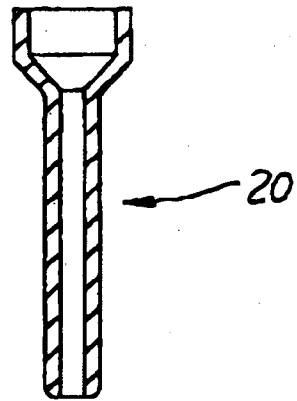
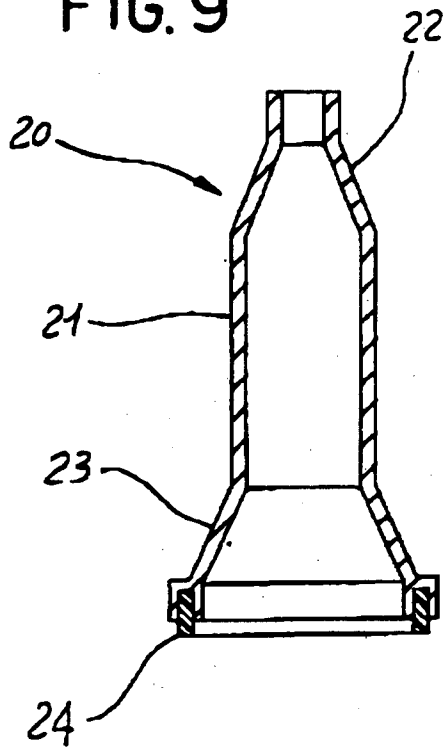
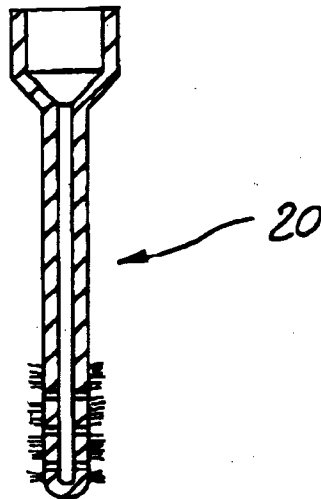
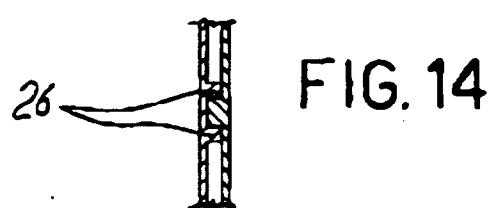
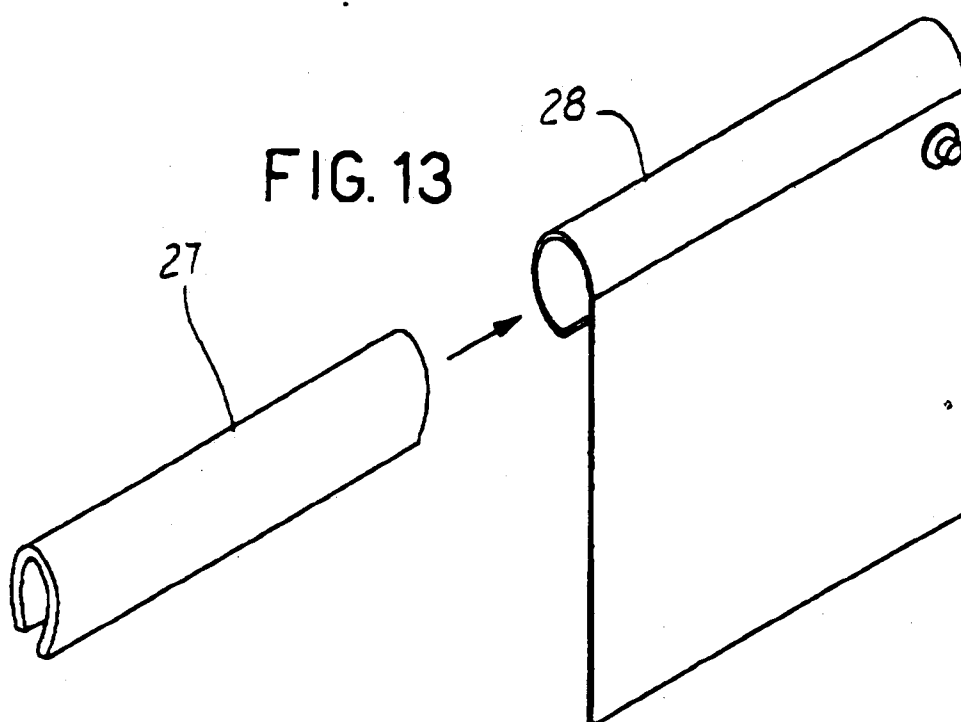
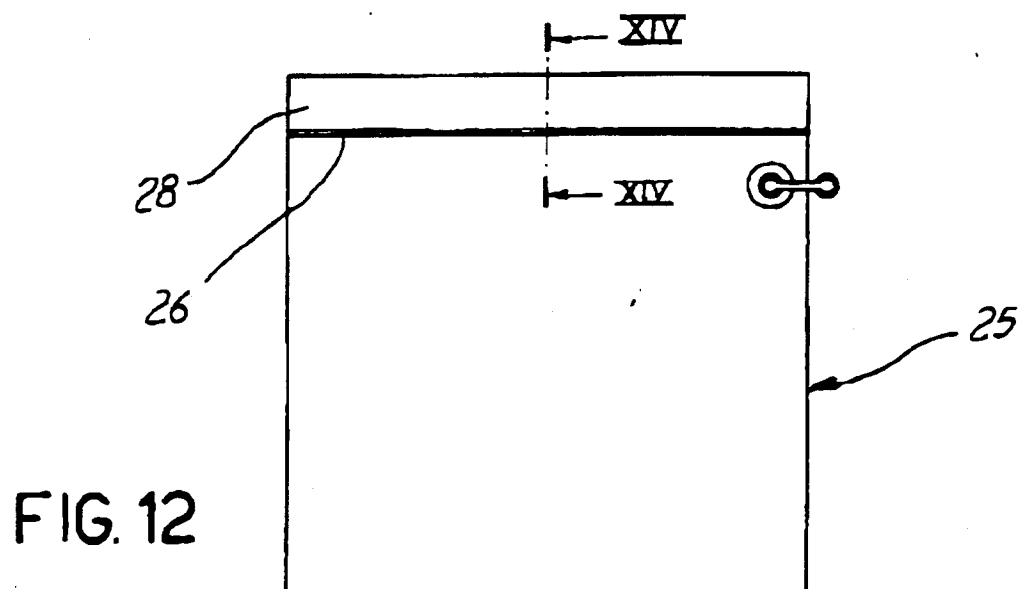


FIG. 10

FIG. 11







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# EUROPEAN SEARCH REPORT

Application Number  
EP 96 83 0329

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	US-A-4 817 230 (KATSUMI KIYOOKA)	1	B65B31/04
A	* the whole document *	2	B65B31/06
	---		A47L5/14
A	DE-A-37 02 706 (ANSCHUETZ)	1	
	* the whole document *		
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			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			B65B A47L
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
THE HAGUE		8 November 1996	Claeys, H
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