



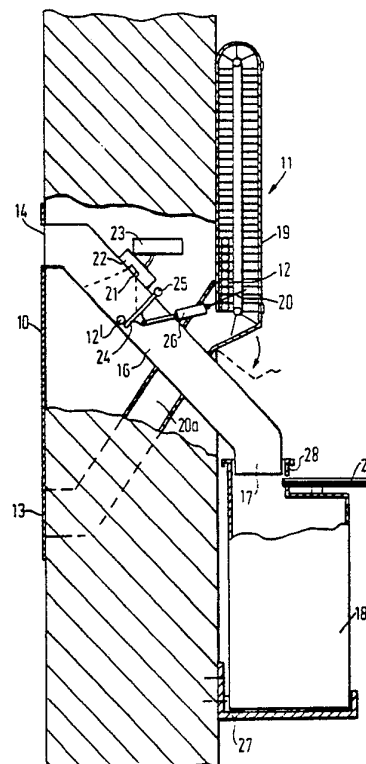
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(21) International Application Number: PCT/NO89/00031 (22) International Filing Date: 13 April 1989 (13.04.89) (30) Priority data: 881632 15 April 1988 (15.04.88) NO (71)(72) Applicant and Inventor: VEIDUNG, Arne [NO/NO]; Torvdalsv. 24, N-5062 Bønes (NO). (74) Agent: A/S BERGEN PATENTKONTOR; Strandgt. 191, N-5000 Bergen (NO). (81) Designated States: AT (European patent), AU, BE (Euro- pean patent), CH (European patent), DE (European pa- tent), DK, FI, FR (European patent), GB (European pa- tent), IT (European patent), JP, LU (European patent), NL (European patent), NO, SE (European patent), US.		Published <i>With international search report.</i> <i>In English translation (filed in Norwegian).</i>

(54) Title: AUTOMAT FOR ONE-TIME SYRINGES

(57) Abstract

An automat (11) for one-time syringes (12, 12'), where a number of syringes (12) are stored in a storage space (19) in the automat and can be dispensed individually via an outlet (13) in the automat on actuation of an actuating means (21-26). The automat (11) comprises a collection chamber (18) for receiving used syringes (12'). An intake (14) for used syringes (12') communicates with the collection chamber (18) via a connecting duct (16). The connecting duct includes the actuating means or a special actuating means (21) for activating the dispensing of unused syringe (12) via a separate outlet (13) as a reaction to the insertion of a used syringe (12') in said connecting duct (16).



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AUTOMAT FOR ONE-TIME SYRINGES.

The present invention relates to an automat for one-time syringes, where a number of syringes are stored in a storage space in the automat and can be dispensed individually via an outlet in the automat on actuation of an actuating means.

It has become an increasing problem that dangerously infectious substances (blood materials) can be transmitted via syringes from person to person. In this connection one-time syringes are a possibility for avoiding repeated use from user to user. However there is also a danger of infection being transmittable by unexpected contact with an infection-carrying syringe and there is a need to be able to take care of used syringes in an effective manner after use.

According to the present invention the aim is a solution where an unused syringe can be given up (free) from an automat on inserting a used syringe into the automat. However great weight is given to the fact, that if an unused syringe is to be given up on inserting a used syringe into the automat, one must be certain that it is a syringe which is inserted. In this connection the objective is to avoid giving up an unused syringe after inserting an imitation object or after other "tampering" of or misuse of the automat. Parallel with or in addition to such (free) giving up of new unused syringes in exchange for a used syringe there can be employed a principle known per se for liberating new,

unused syringes based on inserting coins. At the same time the aim is to be able to collect and to take care in a secure manner of the used syringes, so that the transmission of infection is counteracted to the greatest degree possible, simultaneously with the aim to replace a used syringe with an unused syringe.

The present invention is characterised in that the automat comprises a collection container for receiving used syringes, and that an intake for used syringes communicates with the collection container via a connecting duct which includes the actuating means or a special actuating means for sensing a used syringe and for activating the dispensing of an unused syringe via a separate outlet as a reaction to the insertion of the used syringe in said connecting duct.

It is advantageous that the connecting duct includes a first stop means, for intermittently shutting off the used syringe in a sensing position until the used syringe is discharged further into the collection container, the stop means on actuation by an inserted, used syringe being adapted to activate a second stop means for dispensing an unused syringe from the storage space, as a reaction to the actuation of the first stop means. It is a particular advantage that the connecting duct includes a sensing means, for sensing a used syringe in a specific sensing position in the connecting duct, a positive sensing of a used syringe in the connecting duct releasing a signal for activating a dispensing of an unused syringe.

In practice it is preferred that the first stop means comprises a flap with a normal initial position for shutting off an inserted used syringe in a sensing position in the connecting duct, and that the sensing means comprises a photocell which is arranged directly on or upstream immediately in front of the flap, the flap being adapted to be pivoted to eliminate the stop position after a certain time delay, while the photocell is adapted, in the course of said time delay, to emit a separate signal to the second stop means for dispensing an unused syringe solely on positively sensing a used syringe in said sensing position.

For practical reasons it is preferred furthermore that the collection container constitutes a separate container able to be closed off which is readily mountably and readily dismountably connected to the connecting duct.

In order to avoid undesired manipulation of the automat, for example on the insertion of objects which deviate from the form of a syringe, the automat is characterised in that the intake comprises a combined closing and control arrangement with a positive control mechanism for the controlled transfer of a used syringe from an outwardly uncovered syringe bed outside the automat to a closed discharge position inside the automat.

In this connection it is preferred that the closing and control arrangement comprises a first stationarily arranged part in the form of a guide sleeve and a second part axially displaceably and rotatably mounted relative to the first part in the form of a liner body with associated syringe bed internally in the liner body, the one of the parts being provided with a guide pin, while the second of the parts is provided with a helical guide groove, and that the syringe bed of the liner body is adapted to be positively controlled from an uncovered upwardly opening filling position to a downwardly opening discharge position by means of a positive control between the guide pin and the guide groove, on axially displacing the liner body from a filling position outside the automat to a discharge position within the automat.

In order to ensure that only syringe-like objects are sensed in the automat the latter is characterised in that the connecting duct comprises a guide and control rail extending obliquely downwards having control flaps for the support of opposite parts of the widest portion of a used syringe with the remainder of the syringe projecting downwards below the guide rail and having an intermediate groove for reception of the narrower, downwardly projecting portion of the used syringe, and that sensing means for sensing a used syringe are arranged on the under side of the control rail at its free ending lower end, for exclusively actuating the narrower, downwardly projecting portion of the syringe.

According to the invention there is hereby the possibility of allowing imitation insert bodies to be led outside and thereby to be sorted away from the sensing means for sensing the used syringe. This can happen by either allowing the insert body to pass vertically through the guide and control rail upstream in front of the sensing means or by allowing the insert body to be led outside the sensing means on the top of the guide and control rail, and thereby without the possibility of being brought into a path past the sensing means on the under side of the guide and control rail.

Further features of the present invention will be evident from the following description having regard to the accompanying drawings, in which:

Fig. 1 shows in a front view a front plate on an automat according to the invention according to a first embodiment.

Fig. 2 shows an automat according to the invention represented schematically, partially in side view and partially in vertical section.

Fig. 3 shows in side view a collection container which constitutes a separate part of the automat according to Fig. 1.

Fig. 4 shows in side view a section of an automat according to the invention, in a second embodiment.

Fig. 5 and 6 show a control arrangement for the automat according to Fig. 4 in two different working positions, where the control arrangement is shown from above in the one position (Fig. 5) and in the other position (Fig. 6) is shown from below.

Fig. 7 shows the same as in Fig. 6, illustrated in vertical section.

Fig. 8 shows a detail of Fig. 4 illustrated in plan view.

Fig. 9 shows the same detail as shown in Fig. 8, illustrated in end view.

In Fig. 1 and 2 there is shown a front plate 10 for an automat 11 for dispensing unused one-time syringes 12 via an outlet 13 and for receiving used one-time syringes 12' via an intake 14. The automat is adapted to give up an unused one-time syringe 12 when a used one-time syringe 12' is installed. In addition there is shown a coin insert 15 with which an unused

one-time syringe can be given up exclusively by the insertion of coins. In the instances such a coin insert is employed in the automat, in addition to the mechanism for dispensing an unused one-time syringe 12 for each insert of a used one-time syringe, there can be employed a coin insert mechanism known per se.

The mechanism for giving up an unused syringe in exchange for a used syringe can as mentioned be used together with the coin insert mechanism, but can also be used independently of the coin insert mechanism.

The automat can be erected in arbitrary, publicly accessible locations or in specific locations which are specially designed for special users.

The automat can also be used at dentists' offices, doctors' offices or other arbitrary locations where syringes are placed and where there is a need for easy access to unused syringes and immediately thereafter used syringes can be effectively disposed of without substantial danger of the transfer of infection via used syringes.

In the illustrated embodiment there extends from the intake 14 on the front side 10 of the automat 11 a connecting duct 16 for used syringes 12' obliquely downwards and inwards into the automat to an outlet 17 to a collection container 18. Just by the side of the insert mechanism for used syringes there is arranged a mechanism for dispensing unused syringes 12. There is shown a paternoster-like storage space 19 arranged just above a dispensing mechanism 20 which is connected to a discharge duct 20a extending obliquely downwards and outwards to the outlet 13 for unused syringes.

In the connecting duct 16 there is arranged a photocell 21 in a recording box 22 which is connected to a comparing arrangement 23. The photocell 21 is arranged just in front and just above a flap 24 which is pivotably mounted about an upper pivotal axis at 25. The flap 24 is controlled by an hydraulically, pneumatically or electrically driven cylinder 26 which with a certain time delay is adapted to rotate the flap 24 after the latter is mechanically actuated by an object which is introduced via the intake 14 of the connecting duct 16. In the course of

said time delay the photocell 21 together with the comparing arrangement 23 are adapted to search the inserted object. If the object which is inserted deviates from a one-time syringe the passage is opened by rotation of the flap 24 for the delivery of the object to the collection container 18. If the photocell with associated comparing arrangement establishes that a (used) syringe is received a pulse or a signal is emitted to the dispensing mechanism 20 so that an unused syringe 12 is dispensed from the store to the outlet 13.

As shown in Fig. 2 the collection container 18 rests on a wall fitting 27 with a container opening 28 flush with the outlet 17 of the connecting duct 16. A laterally displaceable cover 29, which is pushed away from the outlet 17 and the opening 28 in the position as illustrated in Fig. 2 is pushed in the position as illustrated in Fig. 3 into place over the opening 28 for effective closing off of the collection container for transport and storage of the latter.

In an alternative embodiment, as shown generally in Fig. 4, the intake 14' is provided with a combined closing and control arrangement 30, such as further illustrated in Fig. 5-7. Further the connecting duct 16' is divided up into a combined guide and sorting rail 31, as is shown in Fig. 8 and 9, and into a bottom guide plate 32 as shown in Fig. 4.

The closing and control arrangement 30 comprises a control sleeve 33 which is stationarily fixed to the automat 11' at its front side 10'. In the sleeve 33 there is fastened a control pin 34 projecting radially inwards which engages a helical line-shaped guide groove 35 in a liner member 36 which is rotatably mounted and axially displaceable in the sleeve 33. On axially displacing the liner member 36 in the sleeve 33 the insert member will be positively adjusted an equivalent angle of rotation relative to the automat, that is to say is rotated an angle of 180° about the longitudinal axis. In this way one can achieve a favorable filling position with the liner member in an extended, upwardly uncovered position and a favorable discharge position with the liner member in a pushed-in position facing downwards. In this manner tampering with the mechanism in an unintentional

manner for the release of an unused syringe as a reaction to the insertion of a used syringe can be prevented, the liner member 36 forming a stop arrangement in the automat even after the liner member is partially pushed in towards the discharge position.

The liner member 36 is shown in the form of a pipe piece with a first end piece 37 in the one end and with a second end piece 38 in the other end. The end piece 38, which faces outwardly on the front side of the automat, is rotatably connected on the outwardly facing side to a finger grip or operating grip 39. Between the end pieces 37 and 38 on one side portion of the pipe piece there is formed a cavity 40 which forms an access opening to a bed 41 for the picking up of a used syringe 12', while on the opposite side portion of the pipe piece there is formed said guide groove 35.

In Fig. 5 the liner member 36 is illustrated in an extended outer position relative to the automat, in which the access opening 40 is uncovered for the insertion of a used syringe 12' in the bed 41. In Fig. 6 the liner member 36 is shown in a pushed-in inner position relative to the automat with the liner member rotated 180°. On pushing in the liner member 36 with associated used syringe 12' from the position illustrated in Fig. 5 to that illustrated in Fig. 6 the liner member 36 is positively rotated an angle of rotation of 180°. By this the used syringe inside the automat is discharged vertically above and just by the upper inner end 31a of the guide and control rail 31. The used syringe thereafter slides obliquely downwards (at an angle of 45-60°) along the guide and control rail 31 towards the lower outer end 31b of the rail where the used syringe is discharged via an approximately vertical guide duct 43 to a collection container not shown further corresponding to the container 18 in Fig. 2.

The guide and control rail 31 has an approximately M-shaped cross-section, such as shown in Fig. 9, that is to say with a V-shaped web portion 31c which forms the guide or control portion itself for a used syringe on the rail 31. In a short upper portion at the upper end of the web portion 31c, that is to say at the inner end 31a of the rail 31, the web portion 31c is

undivided and has a continuous V-shaped cross-section, while in the remaining portion of the web portion 31c lying below, including the lower end 31b of the rail 31, there is formed a through, longitudinal groove 31d.

After the used syringe is discharged on the short, undivided upper portion of the rail 31 the syringe is adapted to be conducted downwards along the rail 31 and to be guided automatically to an intended sensing position with certain (narrow) main parts 12a of the syringe pivoted downwards in the groove 31d and with the (further) projected head portion or actuating portion 12b of the syringe resting against adjacent flaps 31c' and 31c" of the remaining V-shaped middle portion 31. On the under side of the rail 31, at its lower end, there are arranged a pair of photo-cells or similar sensors 45a, 45b which are only adapted to be actuated by an object which is led in a path past the sensors on the under side of the rail 31.

In this way by the aid of simple means objects which correspond to the shape of a syringe can be sorted out. Other objects, which have to have a shape which deviates substantially from the shape of the syringe, will then - either fall through groove 31d of the rail at the upper or central portion of the rail and be conducted along the other guide rail 32 extending downwards more steeply and via the guide duct 43 to the collection container - or will be conducted endways along the rail 31 and be delivered at its lower end and be conducted in its totality from the upper side of the rail 31 via the guide duct 43 to the collection container. Only the objects, which have certain portions (12a) which project sufficiently far downwards on the under side of the groove 31d at the lower end of the rail 31 and which have remaining portions (12b) which rest against the flaps 31c' and 31c" which define the groove 31d, will actuate the sensors 45a, 45b and only these objects will be able to release a control signal from the sensors 45a, 45b to the mechanism for giving up an unused syringe as a reaction to the insertion of a used syringe into the automat.

All objects which are emptied into the automat via the intake 14' and the associated liner body 36 are discharged automatically into the collection container, but only the objects which have the form of a syringe are conducted in such a manner that they can be sensed by the sensors 45a, 45b and only these can bring about the automatic release of unused syringes as a reaction to the insertion of a syringe-shaped body.

CLAIMS.

1. Automat (11) for one-time syringes (12, 12'), where a number of unused syringes (12) are stored in a storage space (19) in the automat and can be dispensed individually via an outlet (13) in the automat on actuation of an actuating means (21-26), characterised in that the automat (11) comprises a collection chamber (18) for receiving used syringes (12'), and that an intake (14, 14') for used syringes (12') communicates with the collection chamber (18) via a connecting duct (16; 30-33, 36, 43) which includes the actuating means or a special actuating means (21; 45a, 45b) for sensing a used syringe and for activating the dispensing of an unused syringe (12) via a separate outlet (13) as a reaction to the insertion of the used syringe (12') in said connecting duct.

2. Automat in accordance with claim 1, characterised in that the connecting duct (16) includes a first stop means (the flap 24), for intermittently shutting off a used syringe (12') in a sensing position until the used syringe is discharged further into the collection container (18), the stop means (24) on actuation by an inserted, used syringe (12') being adapted to activate a second stop means (the cylinder 26) for dispensing an unused syringe (12) from the storage space (19), as a reaction to the actuation of the first stop means (24).

3. Automat in accordance with claim 1 or 2, characterised in that the connecting duct (16) includes a sensing means (photocell 21) for sensing a used syringe (12) in a sensing position in the connecting duct, a positive sensing of a used syringe in the connecting duct releasing a signal for activating a dispensing of an unused syringe (12).

4. Automat in accordance with the claims 1-3, characterised in that the first stop means comprises a flap (24) with a normal initial position for shutting off an injected used syringe (12') in a sensing position in the connecting duct (16), and that the sensing means comprises a photocell (21) which is arranged directly on or upstream immediately in front of the flap, the flap being adapted to be pivoted to eliminate the stop position after a certain time delay, while the photocell is adapted, in the course of said time delay, to emit a separate signal to the second stop means (26) for the dispensing of an unused syringe (12) solely by positive sensing of a used syringe (12') in said sensing position.

5. Automat in accordance with claim 4, characterised in that the collection container (18) constitutes a separate container able to be closed off which is readily mountably and readily dismountably connected to outlet (17) of the connecting duct (16).

6. Automat in accordance with claim 1, characterised in that the intake (14') comprises a combined closing and control arrangement (30) with a positive control mechanism (33-36) for the controlled transfer of a used syringe (12') from an outwardly uncovered syringe bed (41) outside the automat to a closed discharge position inside the automat.

7. Automat in accordance with claim 6, characterised in that the closing and control arrangement (30) comprises a first stationarily arranged part in the form of a guide sleeve (33) and a second part axially displaceably and rotatably mounted relative

to the first part in the form of a liner body (36) with associated syringe bed (41) internally in the liner body, the one of the parts being provided with a guide pin (34), while the second of the parts is provided with a helical guide groove (35), and that the syringe bed (41) of the liner body (36) is adapted to be positively controlled from an uncovered upwardly opening filling position to a downwardly opening discharge position by means of a positive control between the guide pin (34) and the guide groove (35), on axially displacing the liner body from a filling position outside the automat to a discharge position within the automat.

8. Automat in accordance with claim 1, characterised in that the connecting duct (16') comprises a guide and control rail (31) extending obliquely downwards having control flaps (31c', 31c'') for the support of opposite parts of the widest portion (12b) of a used syringe (12') with the remainder of the syringe projecting downwards below the guide rail and having an intermediate groove (31d) for the reception of the narrower, downwardly projecting portion (12a) of the used syringe, and that sensing means (45a, 45b) for sensing a used syringe are arranged on the under side of the control rail (31) at its free ending lower end, for exclusively actuating the narrower, downwardly projecting portion of the syringe.

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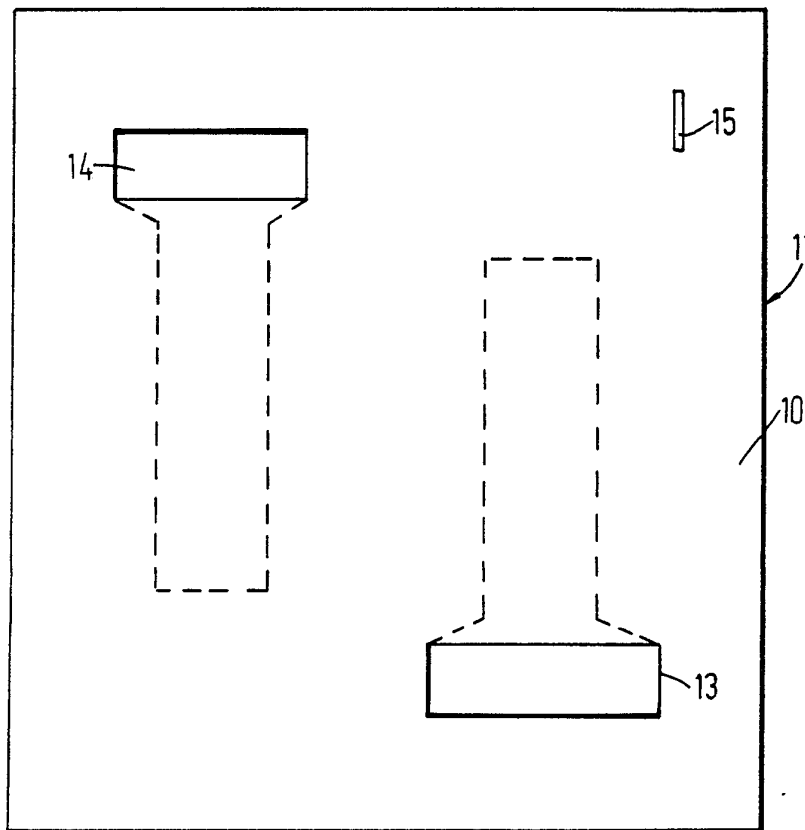


FIG. 1

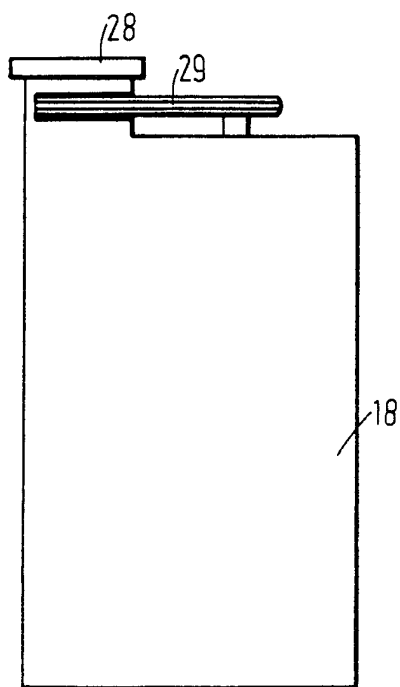


FIG. 3

SUBSTITUTE SHEET

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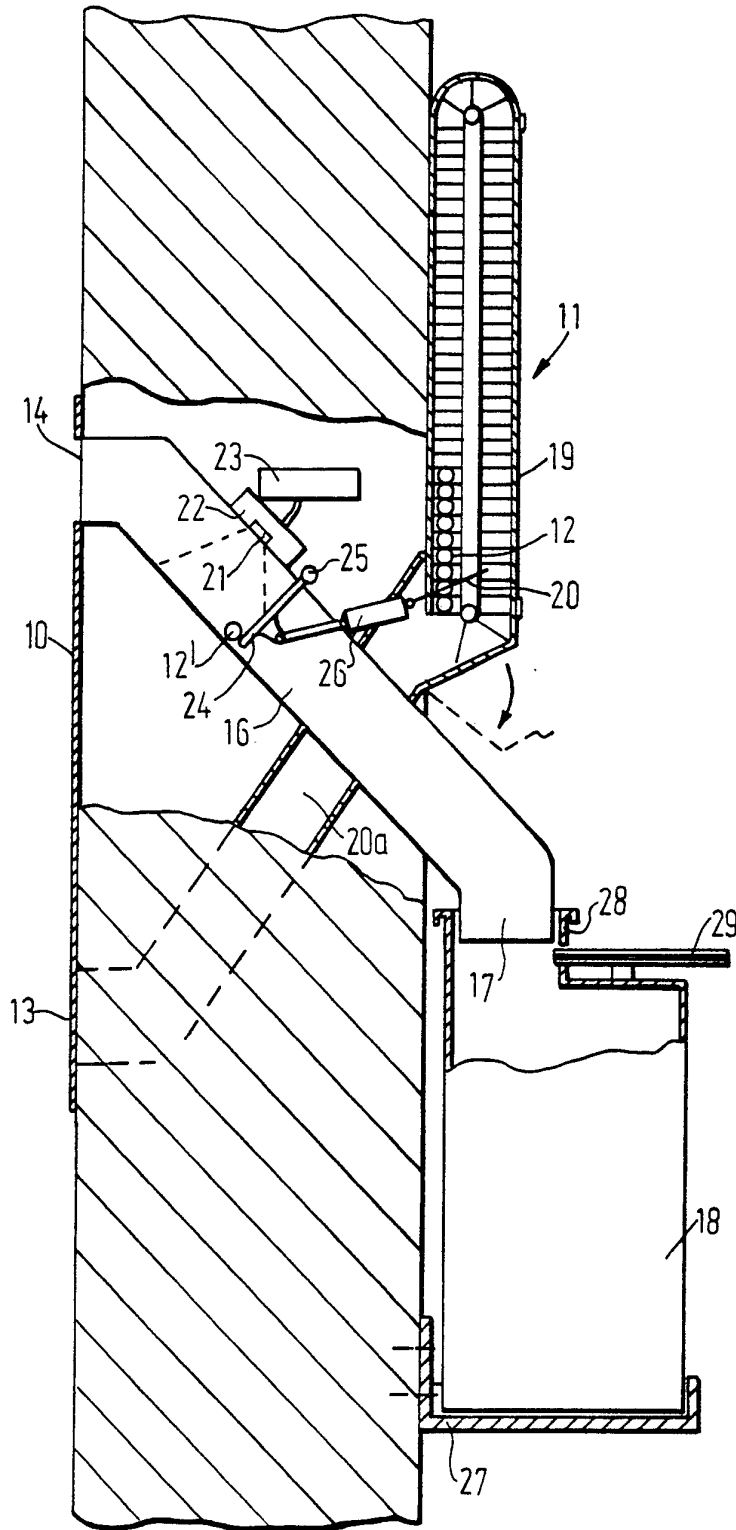


FIG. 2

SUBSTITUTE SHEET

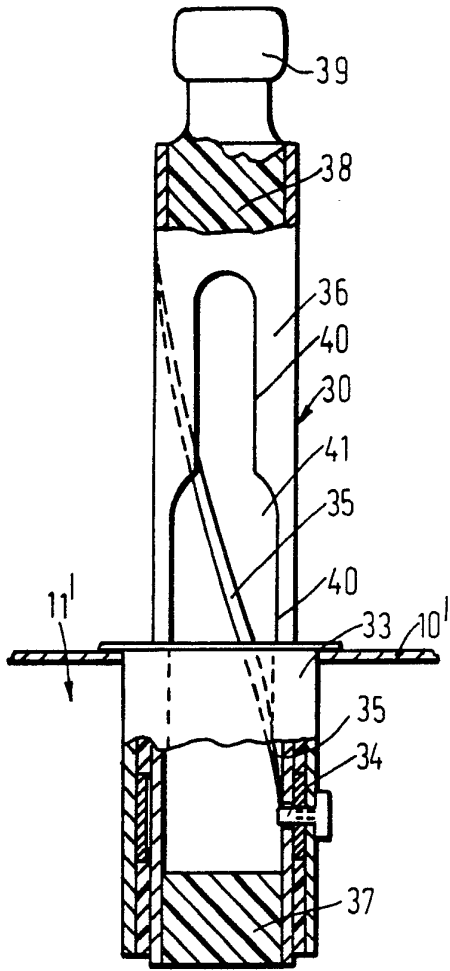


FIG. 5

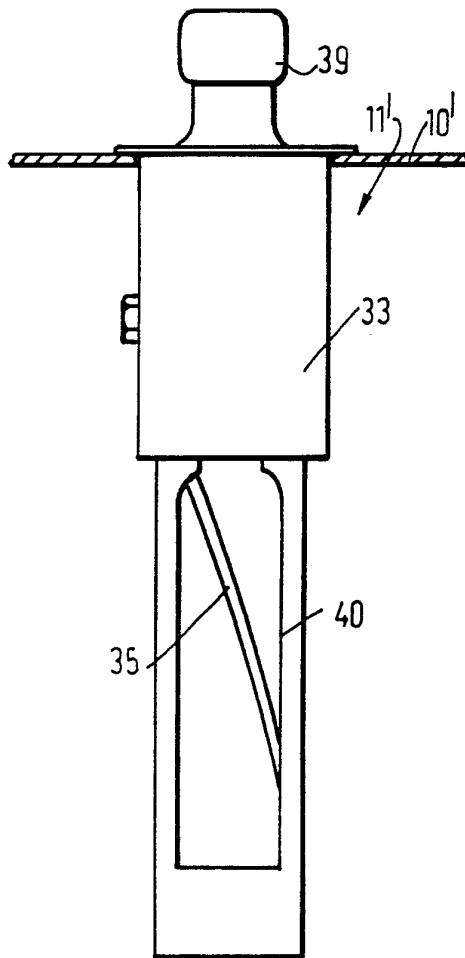


FIG. 6

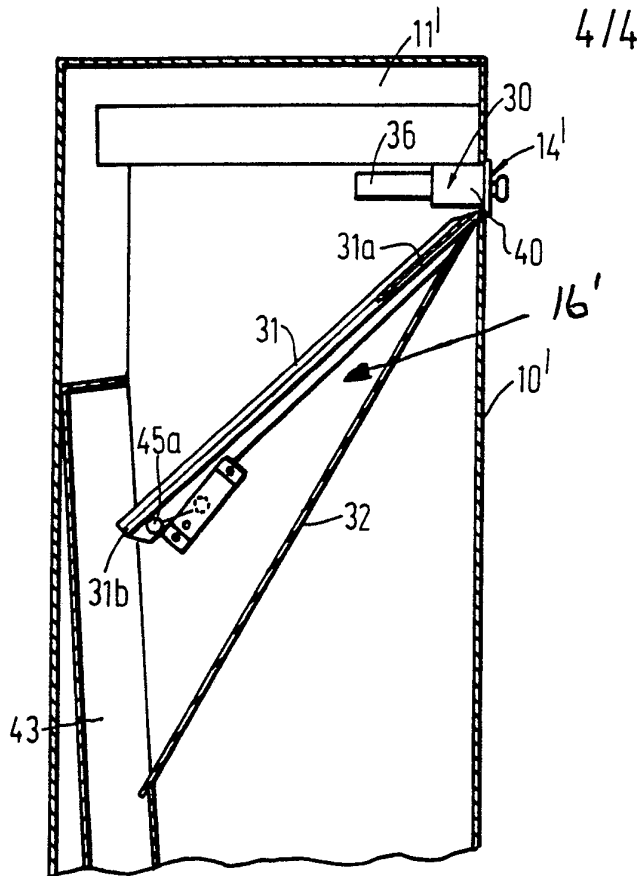


FIG. 4

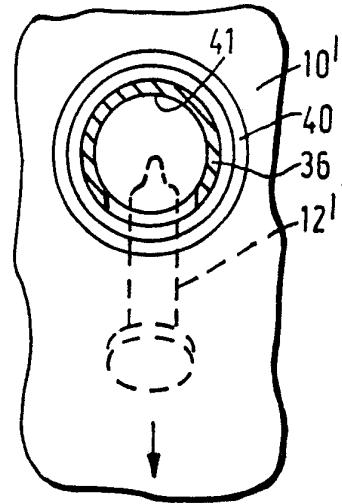


FIG. 7

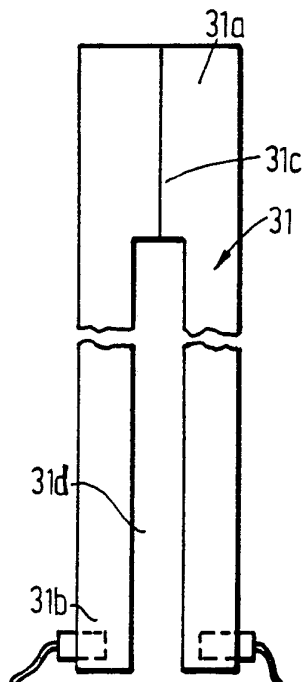


FIG. 8

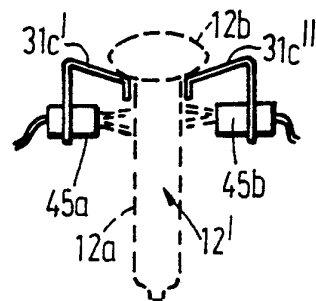
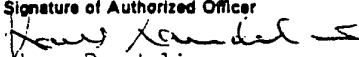


FIG. 9

INTERNATIONAL SEARCH REPORT

International Application No PCT/NO 89/00031

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) ⁶		
According to International Patent Classification (IPC) or to both National Classification and IPC IPC4: G 07 F 7/06		
II. FIELDS SEARCHED		
Minimum Documentation Searched ⁷		
Classification System	Classification Symbols	
IPC4	G 07 F	
Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched ⁸		
SE, NO, DK, FI classes as above		
III. DOCUMENTS CONSIDERED TO BE RELEVANT ⁹		
Category ¹⁰	Citation of Document, ¹¹ with indication, where appropriate, of the relevant passages ¹²	Relevant to Claim No. ¹³
X	FR, A1, 2602355 (BUTAGAZ) 5 February 1988, see page 5, line 12 - line 23; page 8, line 4 - page 9, line 4 --	1-3,6
X	FR, A, 2506479 (SOCIETE POUR L'UTILISATION RATIONNELLE DES GAZ) 26 November 1982, see page 2, line 12 - line 20; page 6, line 28 - page 7, line 33 --	1-3
X	FR, A1, 2554263 (JAMET) 3 May 1985, see page 3, line 27 - line 34; page 5, line 8 - line 24 --	1-3
X	US, A, 4411351 (M. LOWDER ET AL) 25 October 1983, see column 1, line 55 - column 2, line 9 -- -----	1-3
<p>¹⁰ Special categories of cited documents: ¹⁰</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.</p> <p>"A" document member of the same patent family</p>		
IV. CERTIFICATION		
Date of the Actual Completion of the International Search 1989-07-19	Date of Mailing of this International Search Report 1989-07-28	
International Searching Authority Swedish Patent Office	Signature of Authorized Officer  Hans Bandelin	

ANNEX TO THE INTERNATIONAL SEARCH REPORT
ON INTERNATIONAL PATENT APPLICATION NO. PCT/NO 89/00031

This annex lists the patent family members relating to the patent documents cited in the above-mentioned international search report.

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
FR-A1- 2602355	05/02/88	FR-A-B- 2540080	03/08/84
FR-A- 2506479	26/11/82	NONE	
FR-A1- 2554263	03/05/85	NONE	
US-A- 4411351	25/10/83	NONE	