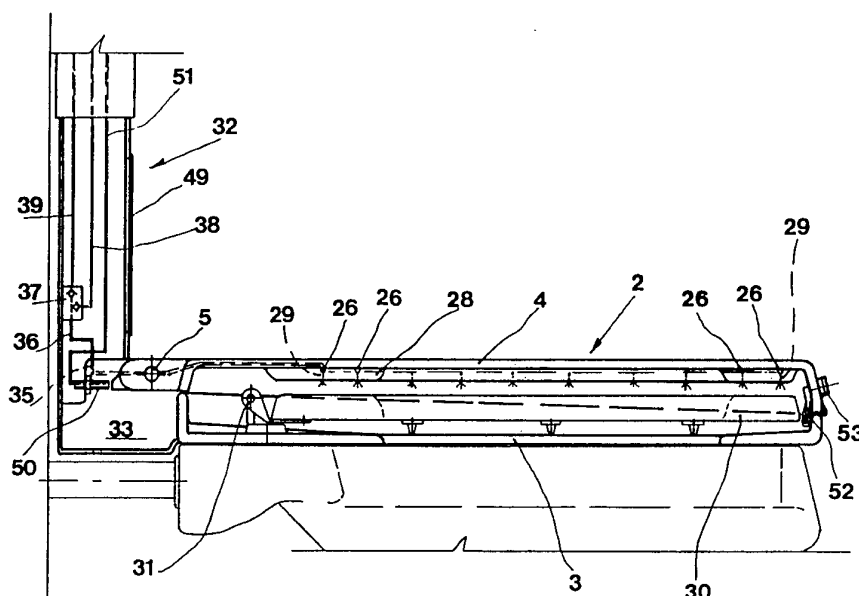




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(54) Title: CLEANSING AND DISINFECTING DEVICE FOR WATER CLOSET SEATS



(57) Abstract

The cleansing and disinfecting device for water-closet seats is directed to obtain a proper cleansing and disinfection of the seat after each time it is used; the device consists of a cover (2) divided in two parts: a lower part (3) fixed removably to the upper rim of the bowl (1) and on whose internal surface sits the seat (30), and an upper part (4) made to sit over and seal the said lower part (3) and which can be angularly lifted up from it; in said upper part (4) there being a pair of closed circuit channels (26, 27) with holes (29) on the underside, preferably of capillary section, to distribute on the seat (30) the cleansing and disinfecting fluid or hot air.

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CLEANSING AND DISINFECTING DEVICE FOR WATER CLOSET SEATS

The invention concerns a cleansing and disinfecting device for water closet seats, that is, an apparatus, incorporated in the water closet, that has the function of
5 cleansing and disinfecting the seat after each time it is used, in order to guarantee its hygiene.

The prior art does not include devices, incorporated in the water closet, that have the function of cleansing and disinfecting the seat, these functions being carried out
10 manually.

There are public lavatories, consisting of a small chamber which contains the water closet, which have appliances for the automatic cleansing and disinfecting of the entire lavatory after each time it is used. Such lavatories are
15 very expensive, requiring, furthermore, the provision of an appropriate structure to house the water closet, which needs to be able to be completely sealed during the cleansing and disinfecting cycle.

The prior art also involves a water closet with a device,
20 connected to the water plunger button, that has the function of substituting the seat on the bowl with another clean and disinfected one, each time the said button is activated. This device is bulky and costly and needs to be used in conjunction with another device that has the
25 function of cleansing and disinfecting the substituted lavatory seats.

Finally, there are also water closets in which the seat is covered with a tubular element made of plastic: an appropriate device has the function, after each time the
30 water closet is used, of advancing the tubular element so that a new section of it covers the seat.

This water closet is also costly and bulky; furthermore, it does not entirely guarantee the hygiene of the seat as the plastic tubular element is subject to failure which
35 can, moreover, prevent it from being advanced over the seat.

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Such prior art may be subject to further improvements with a view to eliminating the said drawbacks.

From the foregoing emerges the need to resolve the technical problem of inventing a water closet with a
5 cleansing and disinfecting device for the seat which is economical, of reduced dimensions, easily fitted even on water closets which have already been installed and which is able to guarantee proper cleansing and disinfection of the seat each time it is used.

10 The invention resolves the said technical problem by adopting a device consisting of a cover divided into two parts: a lower part fixed removably to the upper rim of the bowl and on whose internal surface sits the seat, and an upper part made to sit over and seal the lower part and
15 which can be lifted up from it; in said upper part there being a pair of closed circuit channels with holes on the underside, preferably of capillary section; the said channels being supplied with the cleansing and disinfecting fluid for the seat, or with hot air, via a
20 three-way valve, with two inlets and one outlet, which is in turn supplied with the cleansing and disinfecting fluid, for example by means of a pump, and with hot air, for example by means of a ventilator; the device possibly having an actuator with the function of lowering and
25 lifting the said upper part at the beginning and at the end of each cleansing and disinfection cycle.

The advantages offered by the invention are: simplicity of manufacture and reduced cost of the apparatus as described; maximum certainty of the hygiene of the water
30 closet; low operating costs; possibility of fitting the apparatus to any water closet that has already been installed.

Some embodiments of the invention are illustrated, by way of example, in the five drawing tables attached, in
35 which: Figure 1 is a schematic, partially sectioned front view of the apparatus as described; Figure 2 is a side

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view of the apparatus, also schematic and partially sectioned; Figure 3 is a partially sectioned top view of the apparatus; Figure 4 is a partial, vertical, longitudinal section of the apparatus; Figure 5 is an enlarged detail view of Figure 3 showing the hinge of the bowl cover; Figure 6 is a section as in Figure 4 showing a second version of the apparatus as described having a device for the lifting and the lowering of the bowl cover; Figure 7 is an enlarged detail view of Figure 6 showing the device for the lifting and lowering of the bowl cover; Figure 8 is a detail view as in Figure 5, but showing the second version of the apparatus as described; Figure 9 is a view as in Figure 7, but with the bowl cover in a lifted position.

The figures show: 1, the bowl; 2, the bowl cover, consisting of lower part 3, fitted by means of bolts in the standard holes provided in the rear part of the said bowl used to fit customary lavatory covers, and by upper part 4, angularly mobile with respect to the said lower part 3, rotationally supported by horizontal pin 5 (Figure 2) having, on both sides, closed cylindrical cavities 6 and 7 (Figure 3) closed at one end by respective screw plugs 8 and 9; 10 and 11 (Figure 5), two seal rings, to prevent liquid losses from plugs 8 and 9; 12 and 13, two circumferential grooves connected to cavities 6 and 7 by means of sets of radial holes 14 and 15; 16 and 17, two pairs of seal rings positioned on each side of grooves 12 and 13; 18 and 19, another two circumferential grooves, also connected to cavities 6 and 7 by means of respective sets of radial holes 20 and 21; 22 and 23, two pairs of seal rings positioned on each side of grooves 18 and 19; 24 and 25, a pair of ducts in upper part 4 of the cover, with outlets, at one end, in grooves 18 and 19, and, at the other end, in a pair of closed circuit channels 26 and 27 (Figure 4) in removable internal annular projection 28 in upper part 4 of the cover: there being a seal (not

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shown) between said part 4 and said annular projection 28; 29, a set of vertical holes, preferably of capillary section, in said projection 28, to channel water, or air, onto seat 30 hinged at the rear with horizontal pin 31; 5 32, a hollow column fixed at its base to lower part 3 of cover 2; 33, a pair of internal projections in the lower part of column 32, in which there are two ducts 34 and 35, connecting, at one end, with the respective grooves 12 and 13 of pin 5 and, at the other end, with a pair of tubes 36 10 originating at the outlet port of three-way valve 37, whose two, no-return inlets are connected to two tubes 38 and 39 for the supply of hot air and cleansing fluid: tube 38 is supplied by ventilator 40, having an air heating circuit, and tube 39 is supplied by pump 41, the 15 respective electrical control circuits being inserted in housing 42 located in tank 43 containing liquid 44 used for the cleansing and disinfection of seat 30; 45 and 46, the operating lights of the apparatus, fixed to tank 43; 47, a button, also fixed to tank 43 to activate the 20 cleansing and disinfecting cycle of the seat; 48, a connecting duct between column 32 and tank 43; 49, a hatch to allow access to the inside of duct 48; 50, a sensor, placed close to the rear of cover 2, to measure the position, open or closed, of the cover; 51, electrical 25 cables that connect sensor 50 to the electrical control circuit of the apparatus; 52, a catch to fasten upper part 4 of cover 2 to lower part 3, during the cleansing and disinfecting operations of seat 30; 53, a button to release catch 52; 54 (Figure 6), a fork protruding from 30 the rear of upper part 4 of cover 2 hinging on horizontal pin 55, which passes through telescopic stem 56 of electrically activated linear actuator 57, hinged to the internal walls of hollow column 32; 58, electrical cables of actuator 57.

35 With reference to the version of the present invention as in figures 1 to 5, operation is as follows: the user,

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after having made use of the water closet, manually closes the upper part 4 of cover 2, locking it to the lower part 3 with catch 52, and pushes button 47 that activates the cleansing and disinfecting cycle of the seat, subject to 5 verification, by sensor 50, that the cover 2 has been closed; pushing button 47 activates pump 41 which channels cleansing and disinfecting liquid 44, drawn from tank 43, to a first inlet of three-way valve 37 and, from there, through ducts 36, 34 and 35, cavities 6 and 7 of pin 5 and 10 ducts 24 and 25, to channels 26 and 27 in the upper part 4 of cover 2: these channels uniformly distribute the cleansing and disinfecting fluid through vertical holes 29 onto seat 30; after a set time, the pump shuts down and ventilator 40 is activated, which channels hot air to a 15 second inlet of three-way valve 37 and, from there, through the same ducts used to channel the cleansing and disinfecting fluid, to channels 26 and 27 and to vertical holes 29, which distribute the air over the surface of the seat, in order to dry it; after a set time, sufficient to 20 guarantee drying of the seat, the ventilator shuts down and the cycle ends, so making the water closet available for further utilisation.

If the user does not close the cover of the water closet before pressing button 47, the sensor 50 prevents the 25 cleansing and disinfecting cycle from beginning.

In the case of the version of the present invention as in figures 6 to 9, operation is as follows: when the user, after having made use of the water closet, pushes button 52, the linear actuator 57 is activated, which effects the 30 closure of the upper part 4 of cover 2; when the closure of the cover has been completed, the cleansing and disinfecting cycle described previously begins. At the end of the cleansing and disinfecting cycle linear actuator 57 is automatically activated, which effects the lifting of 35 the upper part 4 of the cover 2, so making the water closet available for further utilisation.

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In practice, the materials, dimensions and details of execution may be different from but technically equivalent to those described without departing from the giuridical domain of the present invention. For example, the water
5 used for the cleansing of the seat may be drawn directly from the water cistern of the water closet and subsequently mixed with a disinfecting liquid; furthermore, the actuator 57 could also be pneumatic, hydraulic or of other convenient nature.

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CLAIMS

1. A device for the cleansing and disinfecting of water closet seats, characterised in that it consists of a cover (2) divided in two parts: a lower part (3) fixed removably to the upper rim of the bowl (1) and on whose internal surface sits the seat (30), and an upper part (4) made to sit over and seal the said lower part (3) and which can be lifted up from it; in said upper part (4) there being a pair of closed circuit channels (26, 27) with holes (29) on the underside, preferably of capillary section, which are supplied with the cleansing and disinfecting fluid for the seat (30), or with hot air.
2. A device as claimed in claim 1, characterised in that the said upper part (4) of the cover (2) can be lowered and lifted by means of an actuator (57) respectively at the beginning and at the end of each cleansing and disinfecting cycle.
3. A device as claimed in claims 1 or 2, characterised in that the said closed circuit channels (26, 27) are located in a removable, internal annular projection (28) of the upper part (4) of the cover (2): there being a seal between said annular projection and the internal surface of the upper part (4) of the cover (2).
4. A device as claimed in claims 1 or 3, characterised in that the said closed circuit channels (26, 27) connect respectively with a pair of supply ducts (24, 25) located in the rear of the said upper part (4) of the cover (2): the said ducts open out in a pair of closed cavities (6, 7), located in the opposite ends of the hinge pin (5) of the cover (2); said closed cavities connecting with two ducts (34, 35) for channelling the cleansing and disinfecting liquid, and air, to the cover (4).
5. A device as claimed in claim 4, characterised in that the said hinge pin (5) has a first pair of opposed, circumferential grooves (12, 13) connecting respectively with said cavities (6, 7) by means of sets of radial holes

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(14 and 15) and a second pair of circumferential grooves (18, 19) located between the said first pair of grooves and connecting respectively with said cavities by means of sets of radial holes (20, 21); said supply ducts (34, 35) for the water and cleansing liquid to the cover (4) opening into the said first pair of circumferential grooves (12, 13); the supply ducts (24, 25) of the said channels (26, 27) originating from the said second pair of circumferential grooves (18, 19).

10 6. A device as claimed in claim 5, characterised in that there is a pair of annular seals (16, 17, 22, 23) on the opposite sides of each circumferential groove (12, 13, 18, 19).

7. A device as claimed in claim 4, characterised in that
15 said supply ducts (34 and 35) are located in a pair of projections (33) in the lower part of a hollow column (32), fixed at its base to the lower part (3) of the cover (2) of the bowl (1): said supply ducts being connected, by means of a pair of tubes (36), to the outlet port of a
20 three-way valve (37), having two inlets and an outlet, located inside the said hollow column (32); the two said inlets of the three-way valve being connected, respectively, by means of tubes (38, 39), also located inside the hollow column (32), to a pump (41) for the
25 cleansing and disinfecting fluid, and to a ventilator (40).

8. A device as claimed in claim 7, characterised in that said pump (41), said ventilator (40) and the respective electrical control circuits are inserted in a housing (42)
30 located inside a tank (43) containing the liquid (44) for the cleansing and the disinfection of the seat (30).

9. A device as claimed in claim 1 and one or more of claims 3 to 9, characterised in that a sensor (50) is placed close to the rear part of the cover (2) of the
35 water closet and is connected, by means of electrical cables (51), to the electrical control circuit of the

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apparatus.

10. A device as claimed in one or more of claims 2 to 8, characterised in that said upper part (4) of the cover (2) has on its rear side a fork (54) protruding rearwards, 5 hinged on a horizontal pin (55) inserted in a through-hole in the telescopic stem (56) of the actuator (57), hinged to the internal walls of said hollow column (32).

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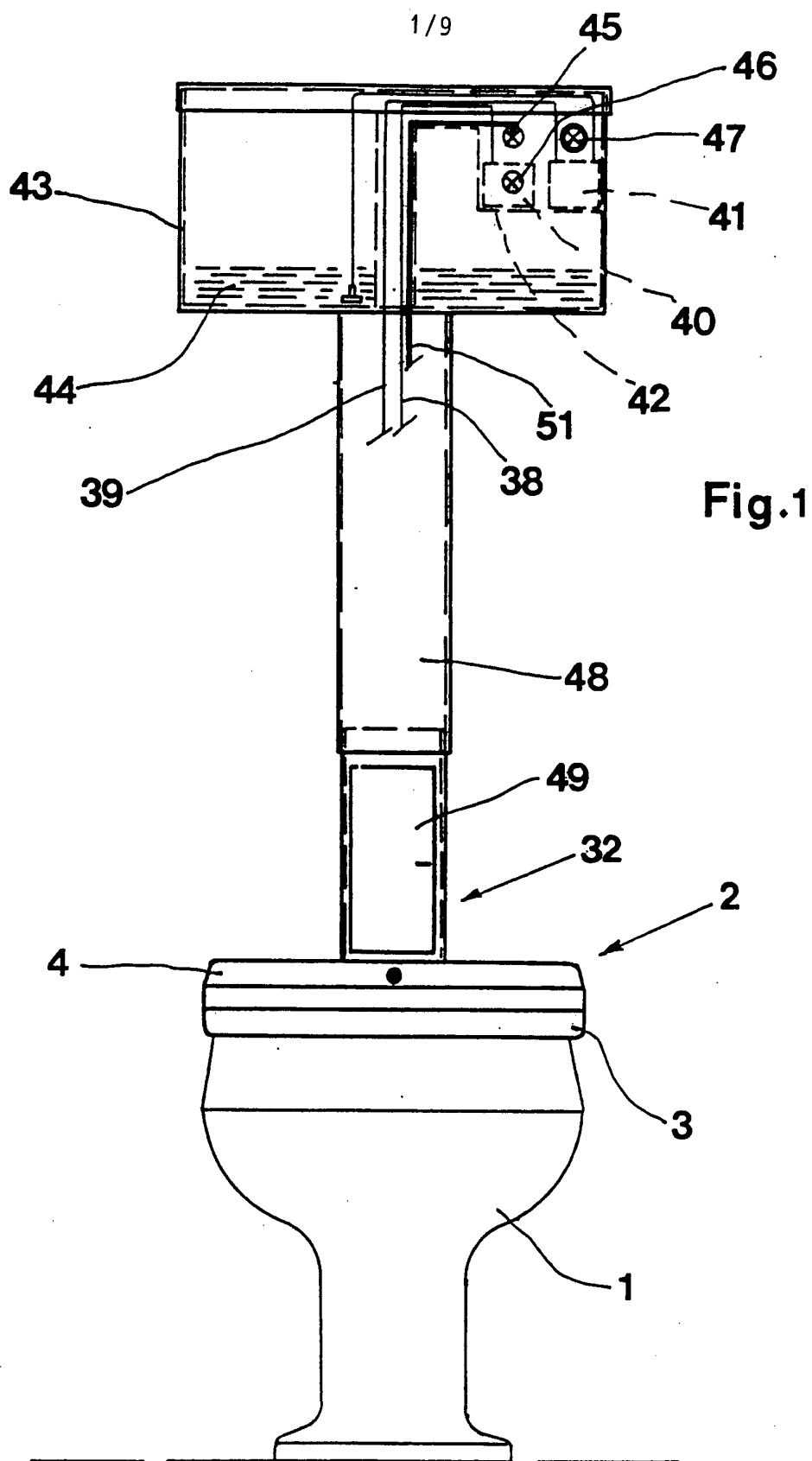
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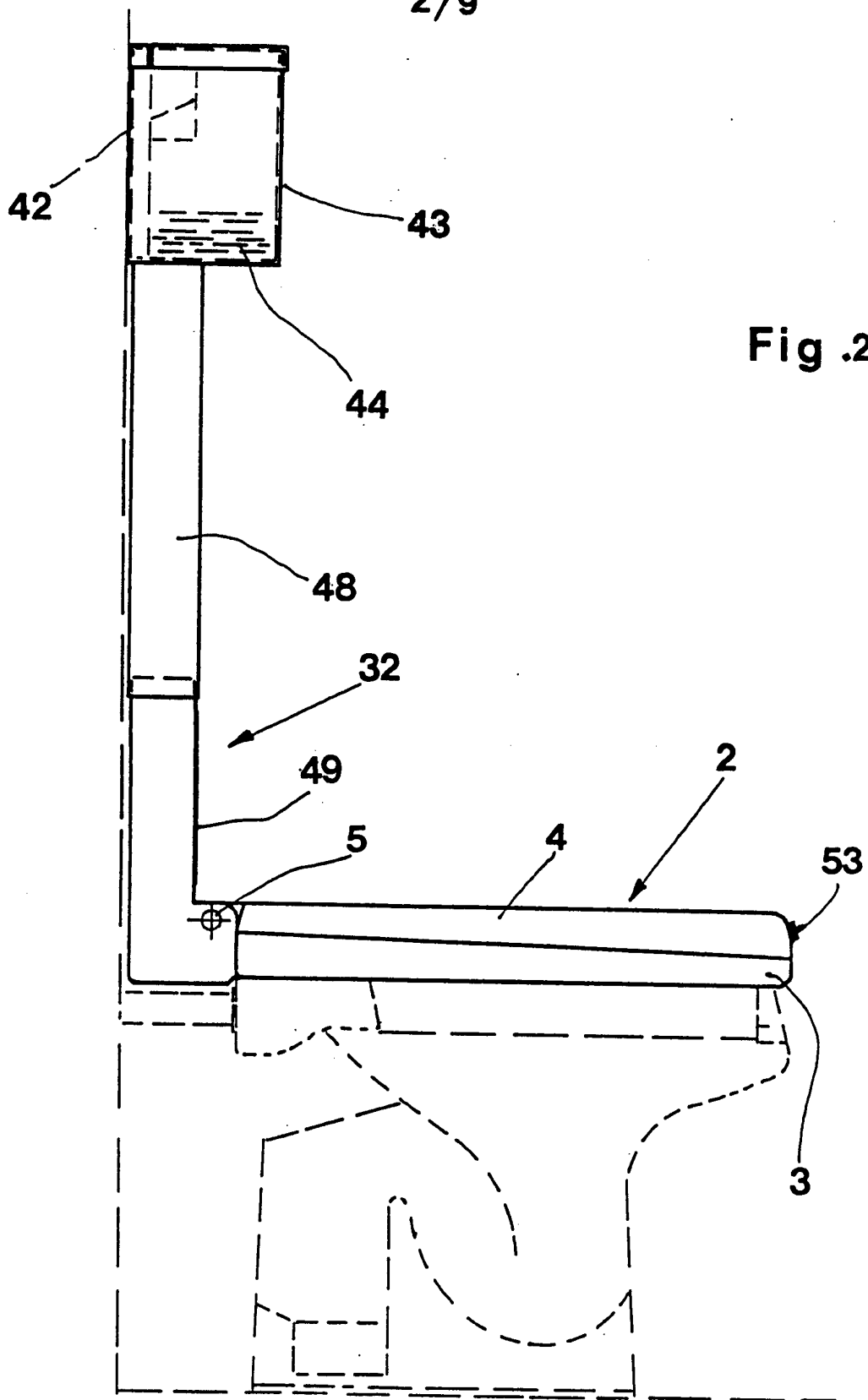
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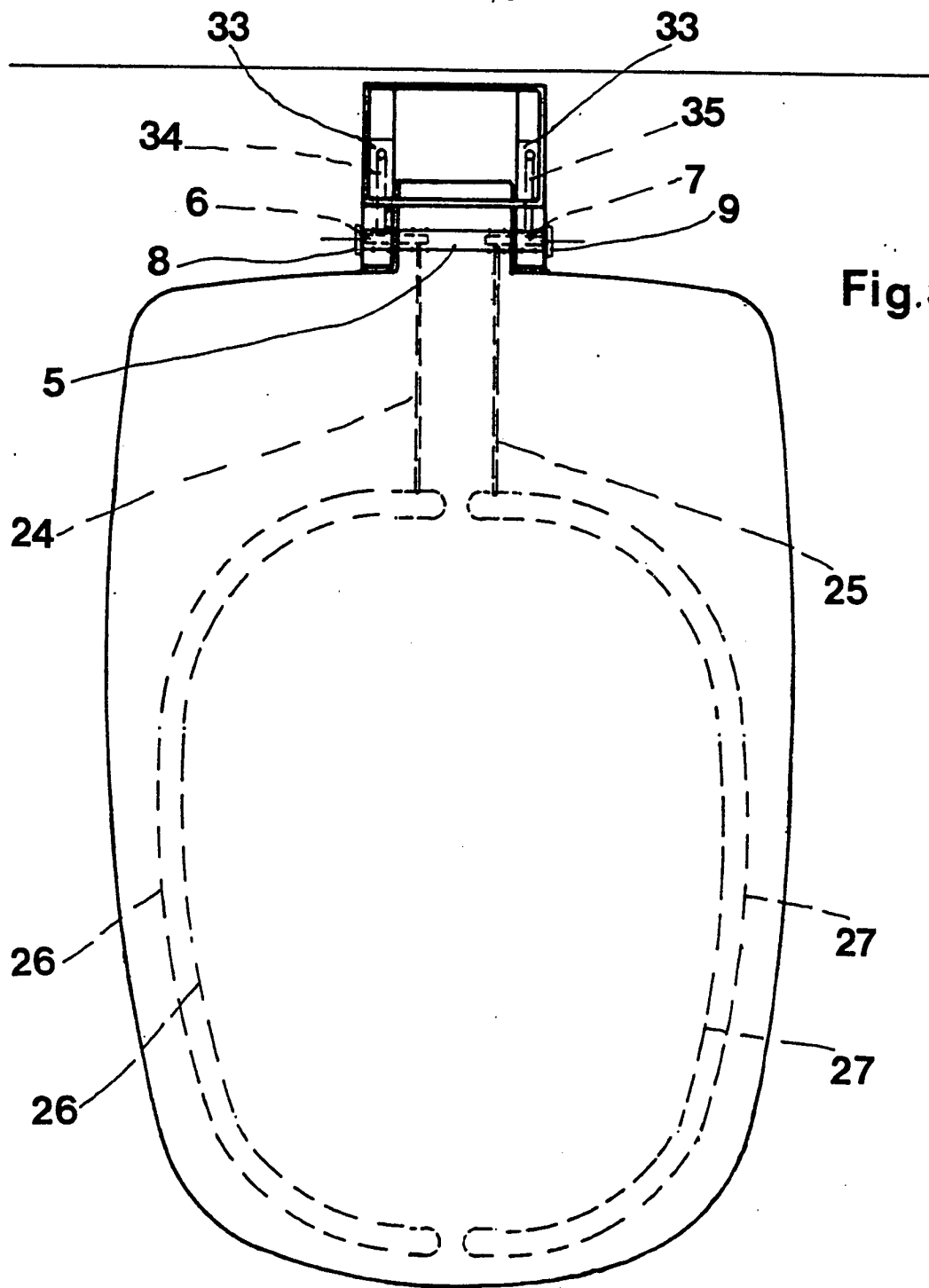


Fig.4

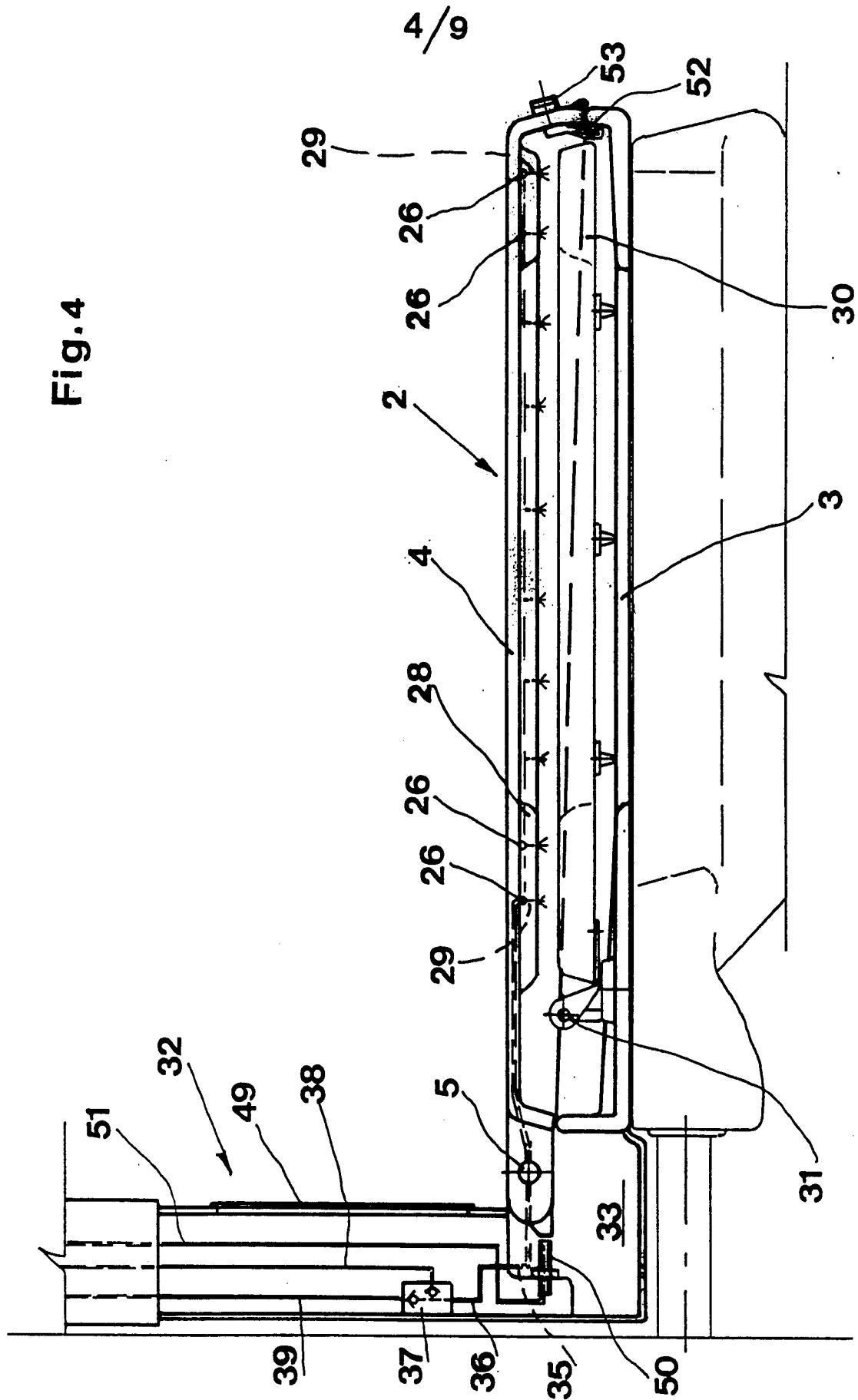
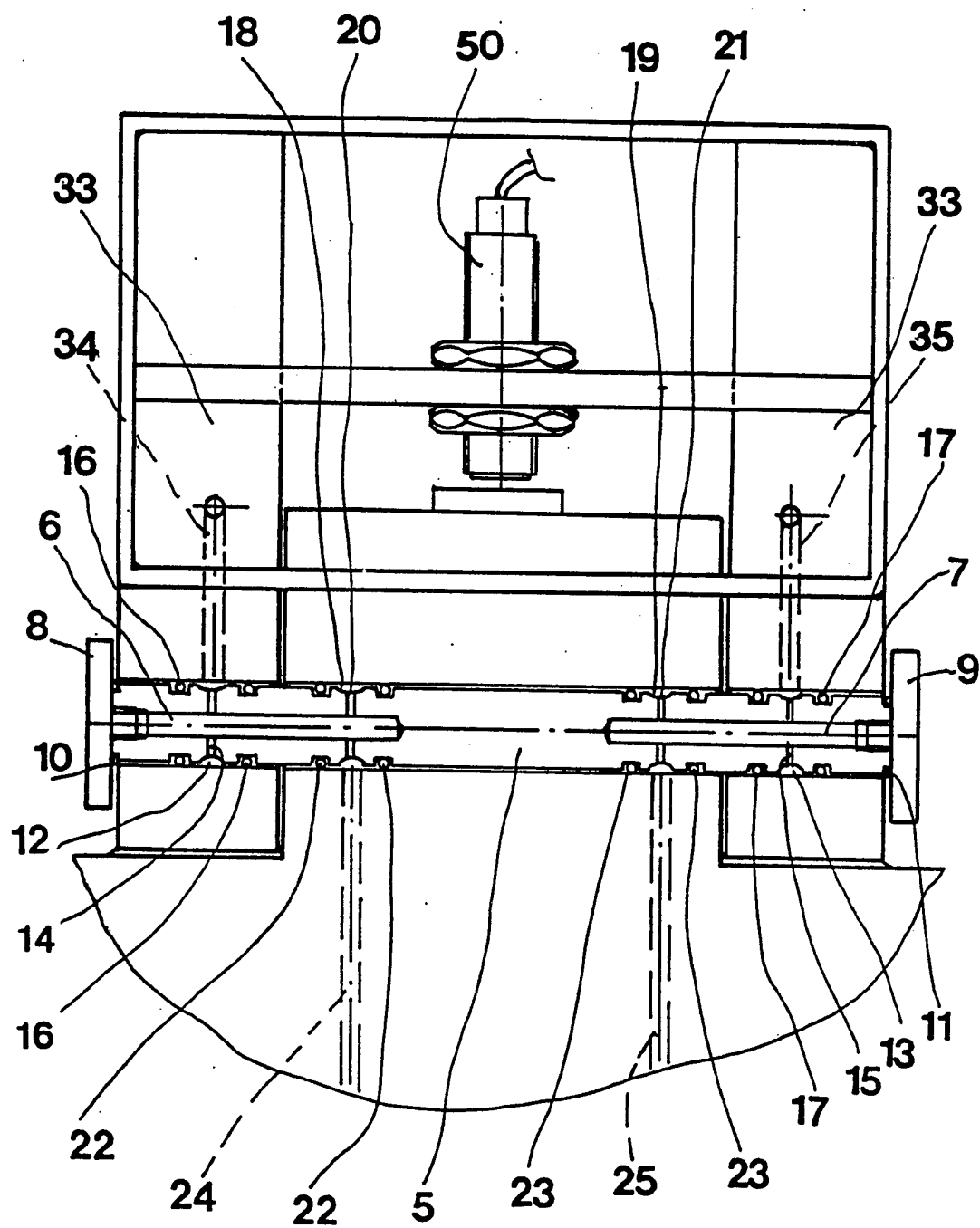
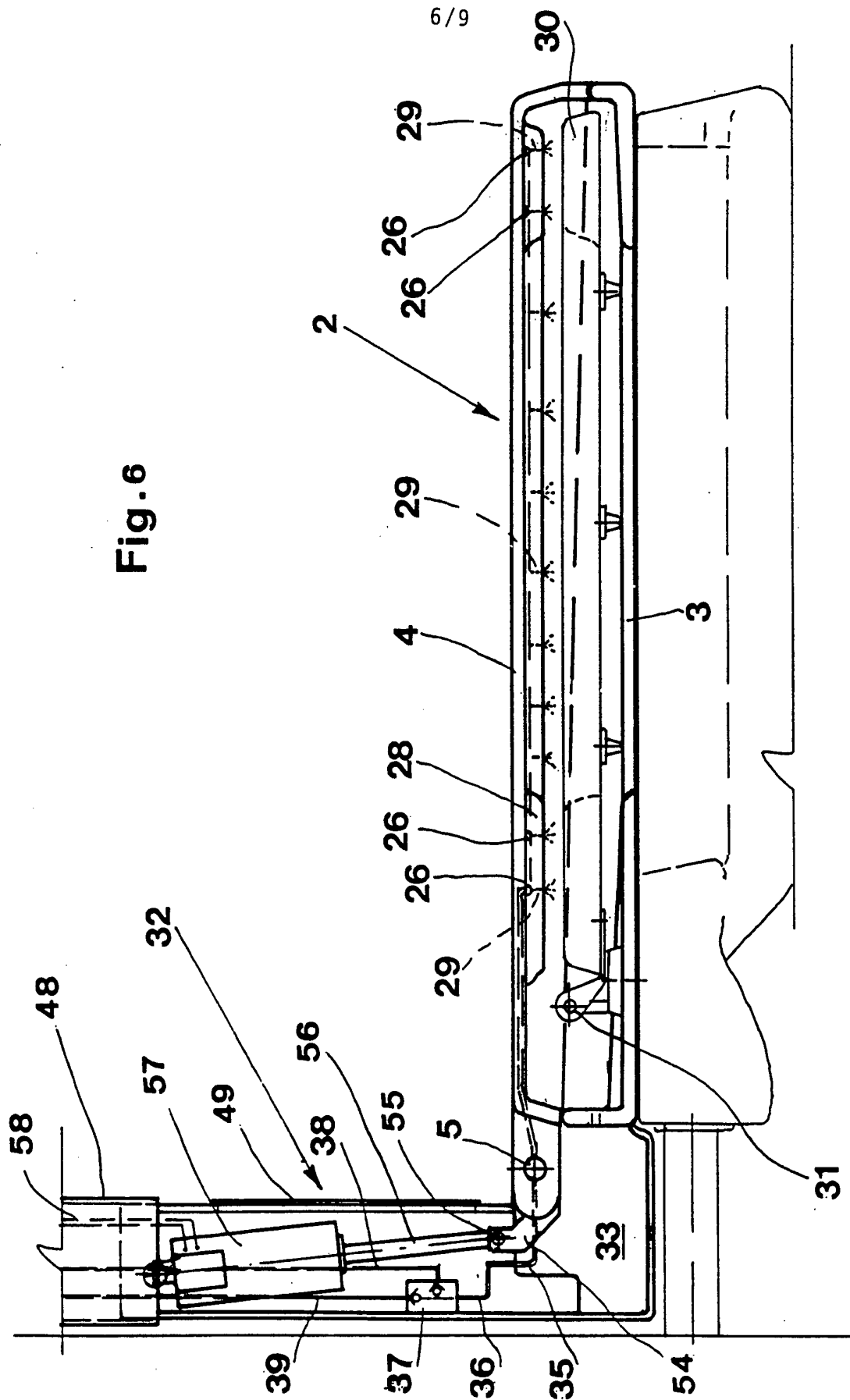


Fig.5



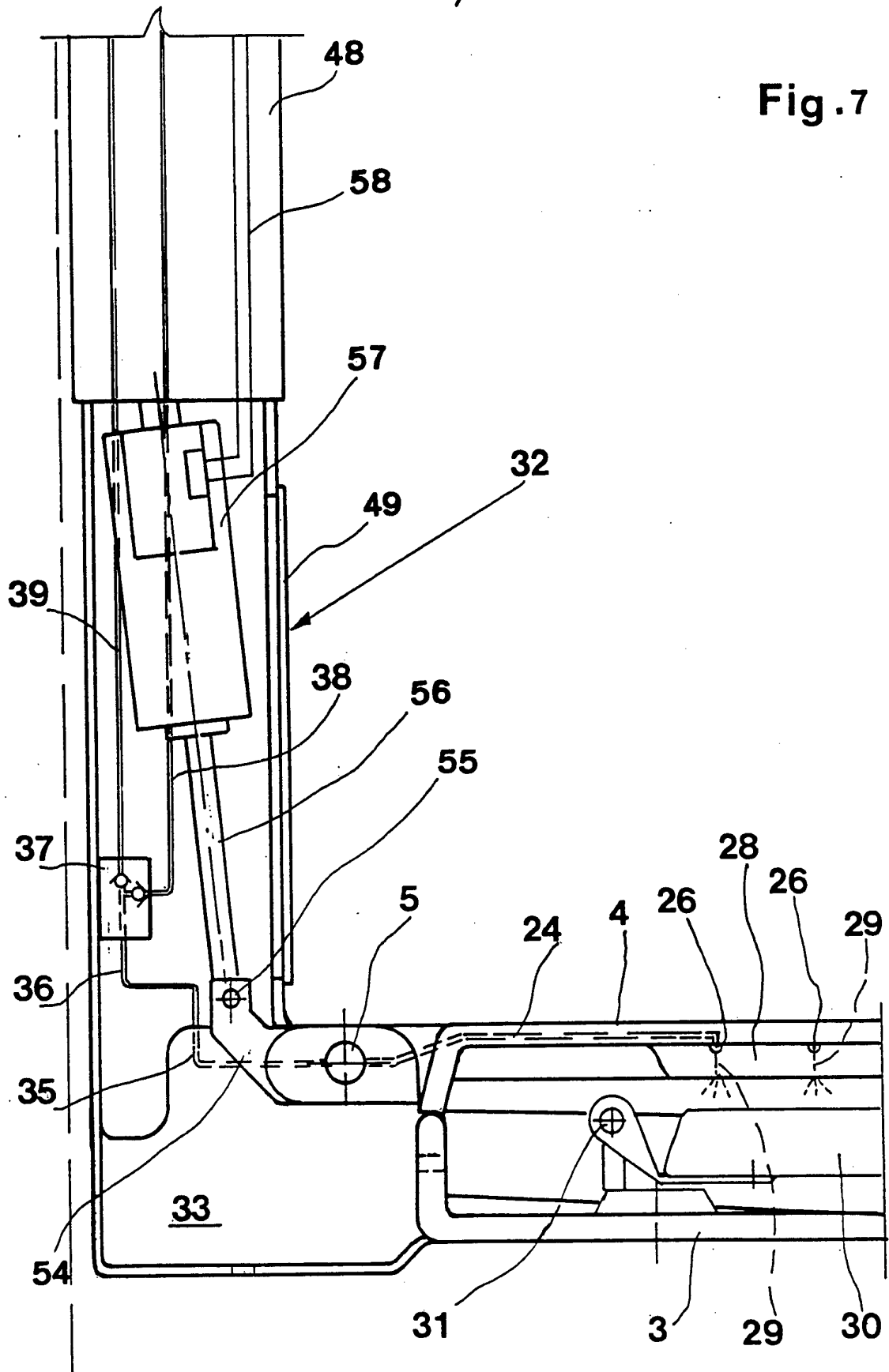
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Fig. 6



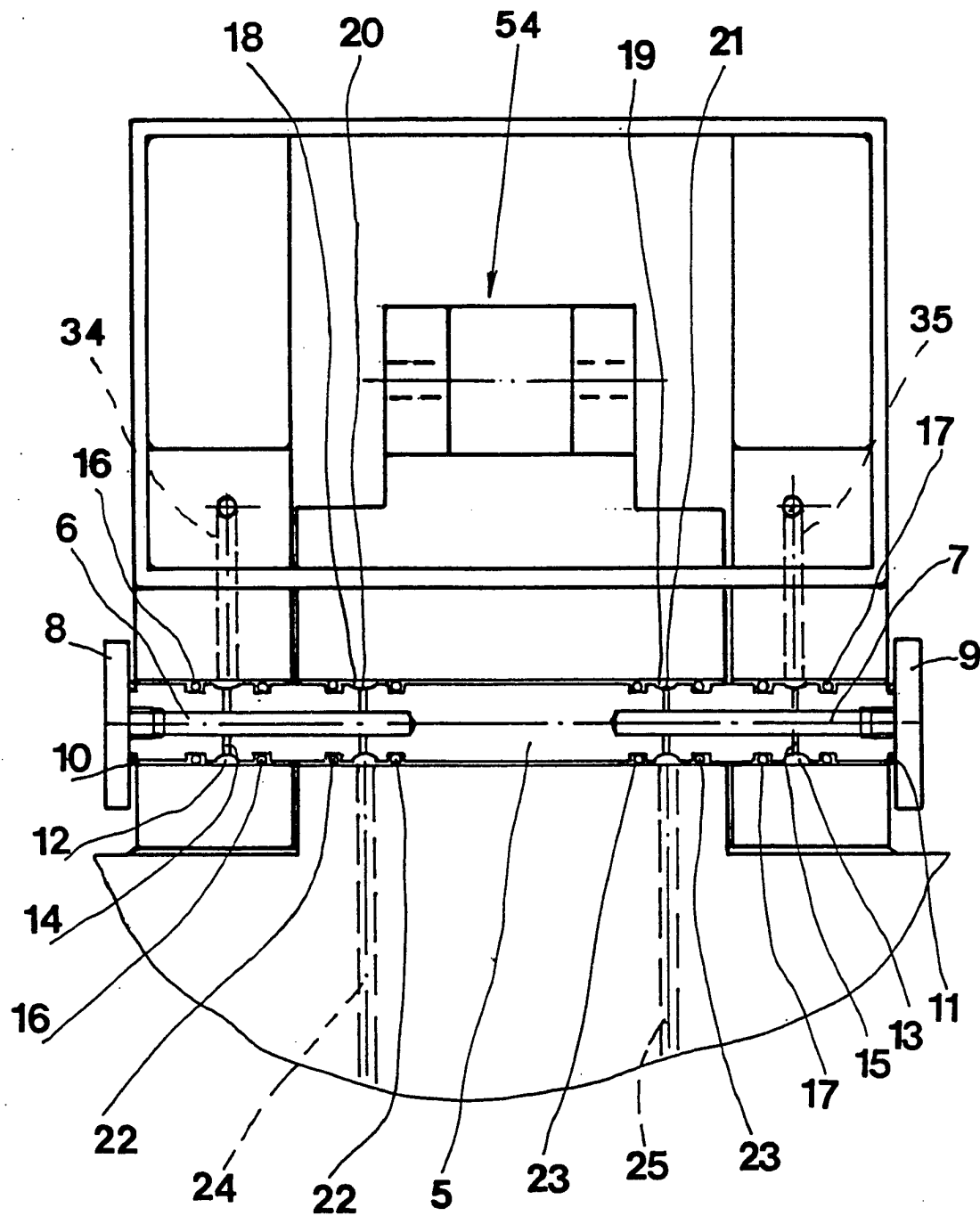
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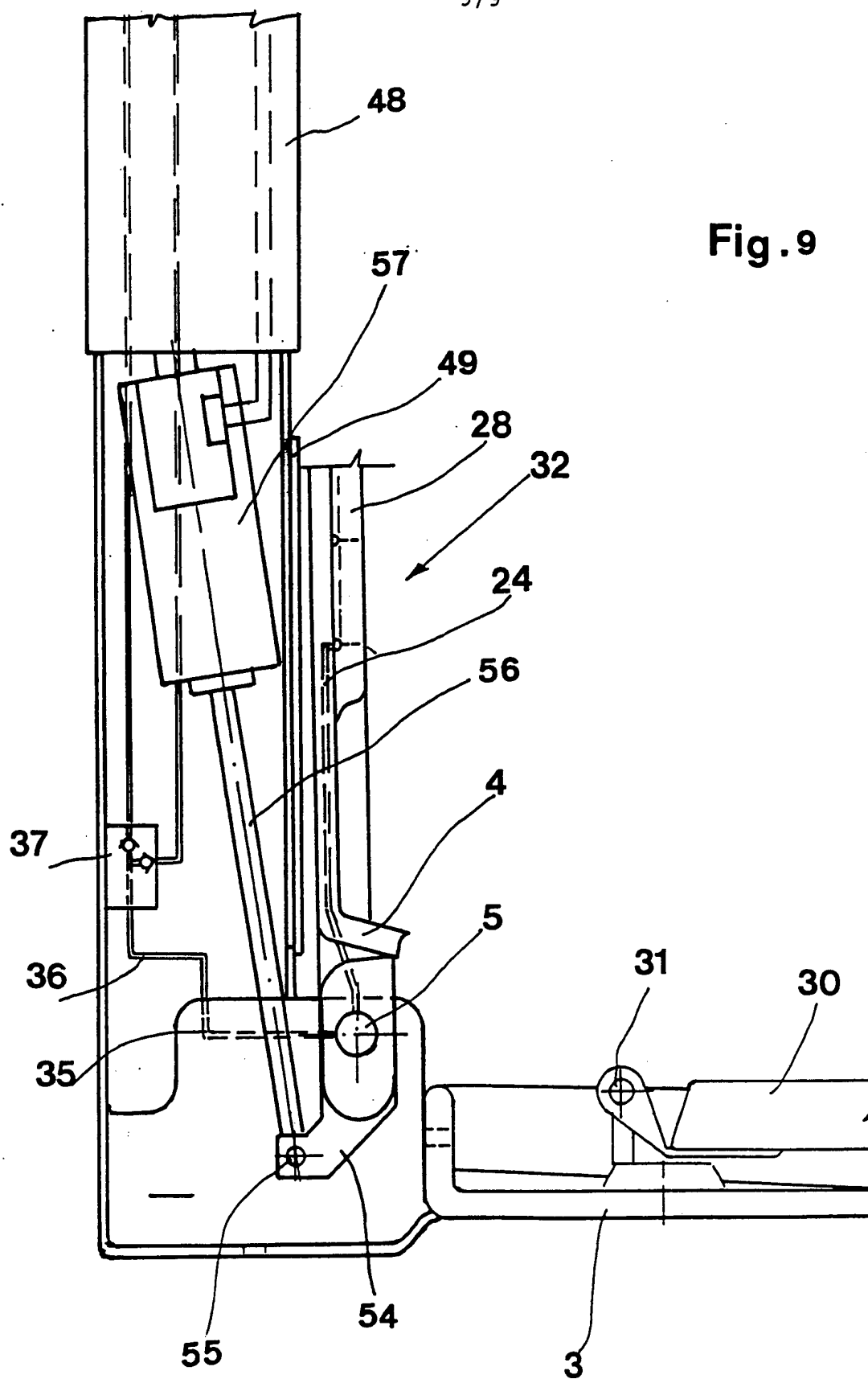
Fig. 7



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Fig.8





INTERNATIONAL SEARCH REPORT

International Application No

PCT/EP 93/01741

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 Int.Cl. 5 A47K13/30; E03D9/00		
II. FIELDS SEARCHED		
Minimum Documentation Searched ⁷		
Classification System	Classification Symbols	
Int.Cl. 5	A47K ; E03D	
Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched ⁸		
III. DOCUMENTS CONSIDERED TO BE RELEVANT⁹		
Category ¹⁰	Citation of Document, ¹¹ with indication, where appropriate, of the relevant passages ¹²	Relevant to Claim No. ¹³
X	DE,A,2 907 754 (G. STOCKBURGER) 4 September 1980 see page 7, paragraph 3 - page 8, paragraph 3 see page 10, paragraph 4 - page 12, paragraph 1; figures	1,2
A	---	3,10
X	US,A,4 924 532 (D. PANNESTRI) 15 May 1990 see the whole document	1
A	---	3,4,7,8
X	DE,A,4 027 337 (HSU CHANG) 5 March 1992 see the whole document	1,2
A	---	8,9
-/-		
¹⁰ Special categories of cited documents : "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filing date "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) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "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 "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step "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. "&" document member of the same patent family		
IV. CERTIFICATION		
Date of the Actual Completion of the International Search		Date of Mailing of this International Search Report
27 SEPTEMBER 1993		04. 10. 93
International Searching Authority		Signature of Authorized Officer
EUROPEAN PATENT OFFICE		KRIEKOUKIS S.

INTERNATIONAL SEARCH REPORT

International Application No

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III. DOCUMENTS CONSIDERED TO BE RELEVANT (CONTINUED FROM THE SECOND SHEET)		
Category °	Citation of Document, with indication, where appropriate, of the relevant passages	Relevant to Claim No.
A	US,A,4 087 868 (P. GENTZ) 9 May 1978 see column 4, line 15 - line 46; figure 4 ---	4,5,6
A	DE,A,2 519 337 (M. STAROSTA) 11 November 1976 -----	-

**ANNEX TO THE INTERNATIONAL SEARCH REPORT
ON INTERNATIONAL PATENT APPLICATION NO.**

EP 9301741
SA 76300

This annex lists the patent family members relating to the patent documents cited in the above-mentioned international search report.
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27/09/93

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE-A-2907754	04-09-80	None	
US-A-4924532	15-05-90	None	
DE-A-4027337	05-03-92	None	
US-A-4087868	09-05-78	None	
DE-A-2519337	11-11-76	None	