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(71) Applicant *(for all designated States except US)*: **SANILAND - S.R.L.** [IT/IT]; Via Sacco e Vanzetti, 10, I-60131 Ancona (IT).

(72) Inventor; and

(75) Inventor/Applicant *(for US only)*: **GRAZIOSI, Maurizio** [IT/IT]; Via Alpi, 25, I-60131 Ancona (IT).

(74) Agent: **BALDI, Claudio**; Piazza Ghislieri, 3, I-60035 Jesi (IT).

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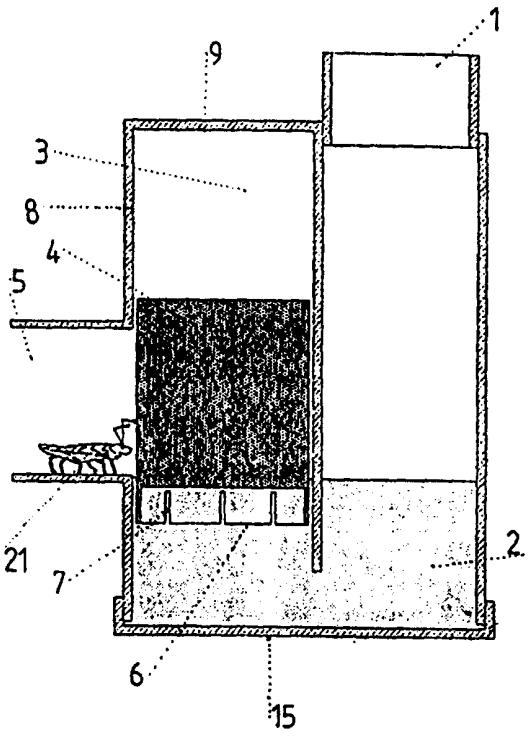
Published:
— *With international search report.*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: A SYSTEM TO PREVENT THE RISE OF INSECTS AND OTHER ANIMALS IN DRAINPIPES OF HYDRAULIC INSTALLATIONS IN BUILDING INDUSTRY AND ROADS



(57) Abstract: The present invention relates to a system comprising a siphon apparatus in which wastewater goes through an inlet (1) and a water stagnation seat (2), causing the rising, in a chamber (3) above, of the obstruction float (4) that closes the access to the stagnation seat (2) on the drain side, and exits through an outlet (5), bringing the obstruction float (4) back in closed position to prevent the passage of insects and other animals from the bottom of the drainpipe through the immersed section of the stagnation seat (2).

WO 01/09443 A1

Description

A system to prevent the rise of insects and other animals in drainpipes of hydraulic installations in building industry and roads.

The present invention relates to an ecological system designed to maintain the environment free from the insects and other animals present in drainpipes by preventing their rise through the drainpipes of hydraulic installations in building industry, such as sanitary fittings and road installations, i.e. manholes.

In the current technology the exit of smells through drainpipes is prevented by using a siphon, which permanently determines the separation between the internal air from the sewerage and the external air, and a water jet caused by a device in building industry and by rainwater in road installations, which washes and dynamically removes the residues, leaving clean water inside it.

However, the failure to periodically disinfect sewerage causes the rise of insects and other animals, such as rats, into the drainpipes of the installations through the water of siphons.

This results in a serious environmental problem with immediate physical risks and infection problems for individuals.

The system according to the present invention provides an integral solution by means of a new siphon apparatus characterised by the presence of an obstruction float closing the internal space of the drainpipe, which is raised by water, occupying an upper internal part of non-interference of the siphon, and then brought again to the initial position when water ends, closing the drainpipe from the inside again.

Since the obstruction float can only move up and down inside a chamber with vertical walls, in absence of water, the obstruction float becomes an integral part with the siphon section that contains it, creating a rigid single structure with continuous mass resistance which cannot be accessed by insects or other animals from the other side of the drain.

Basically, the system according to the present invention comprises a siphon apparatus in which wastewater goes through an inlet (1) and a water stagnation seat (2) causing the rising, in a chamber (3) above, of the obstruction float (4) that closes the access to the stagnation seat (2) on the drain side, and exits through an outlet (5), bringing the obstruction float (4) back in closed position to prevent the passage of insects and other animals from the bottom of the drainpipe through the immersed section of the stagnation seat (2).

The lower annular section (6) of the cylindrical obstruction float (4) is provided with a parallel equidistant series of slots (7) for the passage of air bubbles. In the embodiment for building industry application, the obstruction float with chamber (3) is formed by a coaxial cylindrical body (8) with flat end (9) in which the obstruction float (4) moves along the vertical direction.

In another embodiment for building industry application, the retaining body (10) with chamber (3) comprises opposite sloping tapered ends (11 and 12) leading to the upper ascending limit (13) and lower descending limit (14) of a spherical obstruction float (4).

To allow for maintenance operations inside the apparatus, the siphon bottom is provided with an inspection plug (15) with ring. In the embodiment for road installations, a manhole is provided with a siphon apparatus with retaining body (16), grid (17) stagnation tank (18), tank supports (19) and obstruction float (4) with square base with central opening for the vertical movement of the central structure (20) in order to close the access to the stagnation tank (18).

For major clarity the description of the present invention continues with reference to the enclosed drawings 1, 2, 3 and 4, which are intended for purposes of illustration and not in a limiting sense.

Fig. 1 and 2 show a siphon apparatus for building industry with cylindrical obstruction float (4) which moves in vertical direction inside the coaxial cylindrical body (8) with flat end (9).

Fig. 1 is a longitudinal cross-section of the apparatus according to the present invention in idle state with the obstruction float (4) preventing the

access from the outlet (5) to the water stagnation seat (2).

The figure shows an insect (21), whose rise is prevented by the obstruction float (4).

Fig. 2 is a transversal cross-section of the same apparatus in idle state.

Fig. 3 is a longitudinal cross-section of the same apparatus inturbulence state due to the passage of wastewater. As shown in the figure, the obstruction float (4) has reached the upper limit (9) of the chamber (3) to drain wastewater through the outlet (5).

Fig. 4 is a transversal cross-section of the same apparatus in turbulence state.

Fig. 5 is a perspective view of the apparatus showing the position of the obstruction float (4) in idle state.

Fig. 6 is a view of the obstruction float (4) with lower slots (7) on the annular section (6) used in the embodiment according to the present invention.

Fig. 7 is a perspective view of the apparatus showing the position of the obstruction float (4) during the passage of wastewater. Drawing 3 shows an embodiment of the siphon apparatus with obstruction float (4) moving in chamber (3) with sloping tapered ends (11 and 12) with upper ascending limit (13) and lower descending limit (14).

Fig. 8 is a longitudinal cross-section of the apparatus in idle state.

Fig. 9 is a transversal cross-section of the apparatus in idle state.

Fig. 10 is a longitudinal cross-section of the apparatus in turbulence state due to the passage of wastewater.

Fig. 11 is a transversal cross-section of the apparatus in turbulence state. Drawing 4 shows the siphon apparatus for road installations.

Fig. 12 is a longitudinal cross-section of the apparatus in idle state.

Fig. 13 is a transversal A-A' cross-section of the apparatus in idle state.

Fig. 14 is a longitudinal cross-section of the apparatus in turbulence state.

Fig. 15 is a transversal cross-section showing the non-interference of the obstruction float (4).

Fig. 16 is a longitudinal cross-section of the apparatus in idle state.

Fig. 17 is a transversal B-B' cross-section of the apparatus in idle state.

The shape of the components, the materials etc. may be subject to change as required for specific applications.

Claims

1) A system to prevent the rise of insects and other animals in drainpipes of hydraulic installations in building industry and roads, characterised in that it comprises a siphon apparatus in which wastewater goes through an inlet (1) and a water stagnation seat (2), causing the rising, in a chamber (3) above, of the obstruction float (4) that closes the access to the stagnation seat (2) on the drain side, and exits through an outlet (5), bringing the obstruction float (4) back in closed position to prevent the passage of insects and other animals from the bottom of the drainpipe through the immersed section of the stagnation seat (2).

2) A system to prevent the rise of insects and other animals in drainpipes of hydraulic installations in building industry and roads, according to claim 1, characterised in that the lower annular section (6) of the cylindrical obstruction float (4) is provided with a parallel equidistant series of slots (7) for the passage of air bubbles.

3) A system to prevent the rise of insects and other animals in drainpipes of hydraulic installations in building industry and roads, according to claim 1, characterised in that, in an embodiment for building industry application, the obstruction float with chamber (3) is formed by a coaxial cylindrical body (8) with flat end (9) in which the obstruction float (4) moves along the vertical direction.

4) A system to prevent the rise of insects and other animals in drainpipes of hydraulic installations in building industry and roads, according to claim 1, characterised in that, in an embodiment for building industry application, the retaining body (10) with chamber (3) comprises opposite sloping tapered ends (11 and 12) leading to the upper ascending limit (13) and lower descending limit (14) of a spherical obstruction float (4).

5) A system to prevent the rise of insects and other animals in drainpipes of hydraulic installations in building industry and roads, according to claim 1, characterised in that, in order to allow for maintenance operations inside

the apparatus, the siphon bottom is provided with an inspection plug (15) with ring.

6) A system to prevent the rise of insects and other animals in drainpipes of hydraulic installations in building industry and roads, according to claim 1, characterised in that, in the embodiment for road installations, a manhole is provided with a siphon apparatus with retaining body (16), grid (17) stagnation tank (18), tank supports (19) and obstruction float (4) with square base with central opening for the vertical movement of the central structure (20) in order to close the access to the stagnation tank (18).

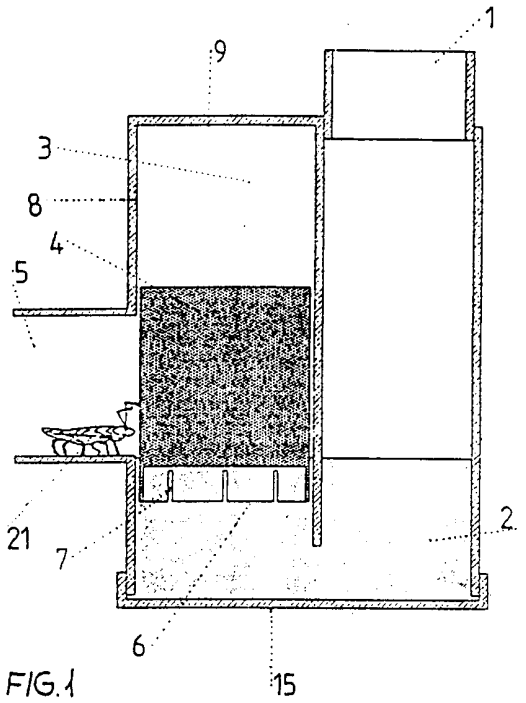


FIG.1

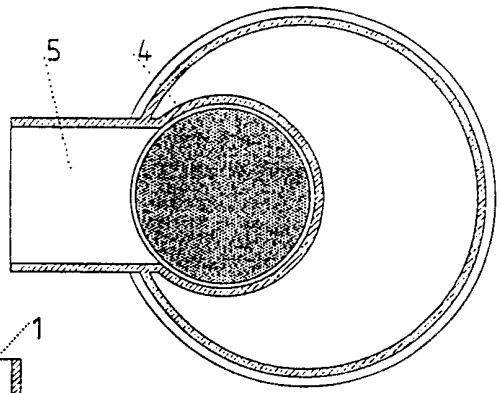


FIG.2

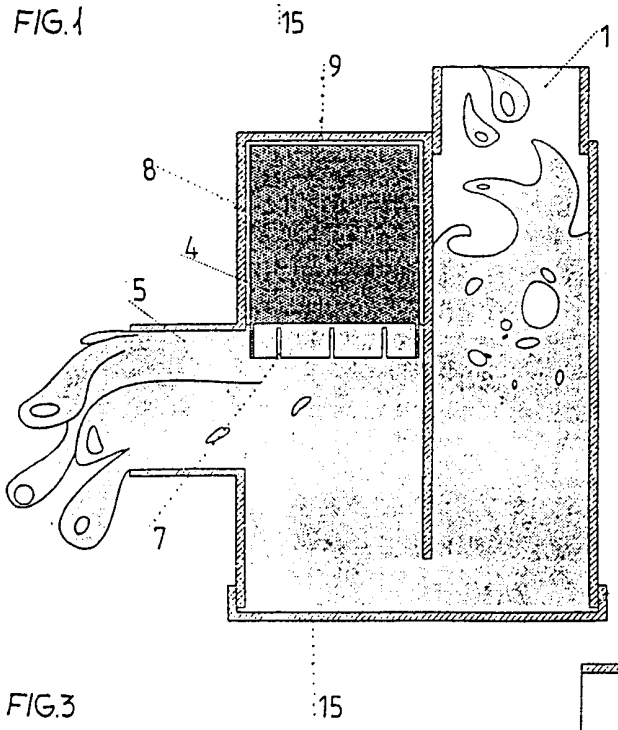


FIG.3

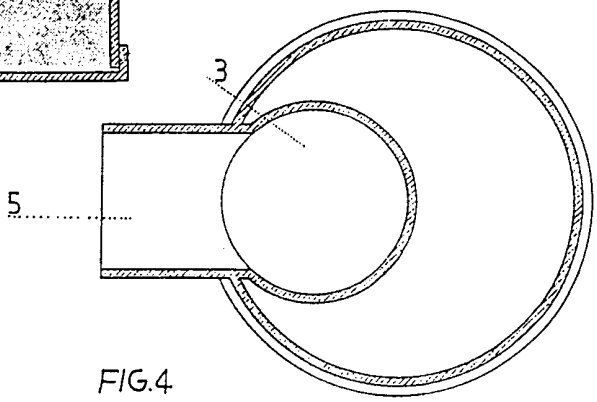


FIG.4

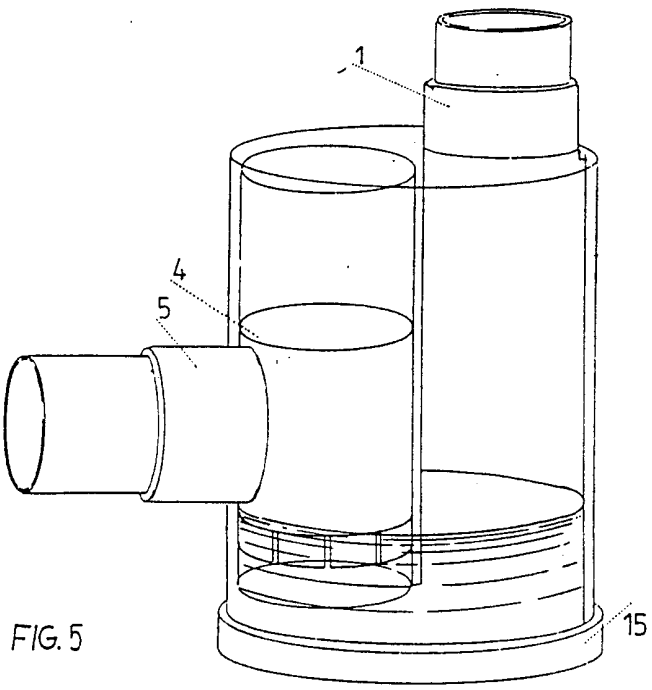


FIG. 5

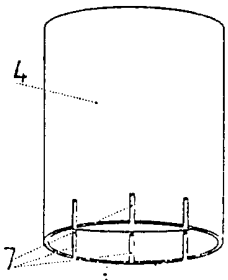


FIG.6

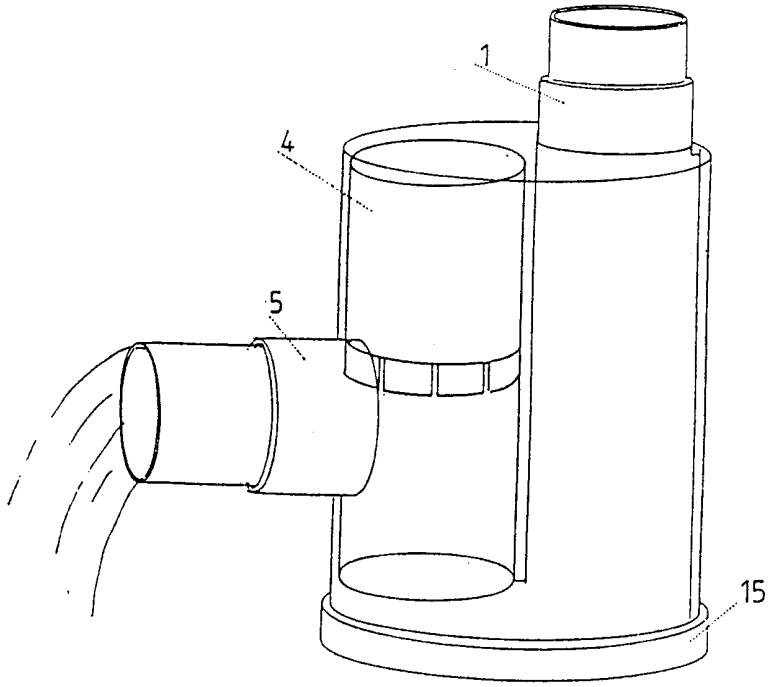


FIG. 7

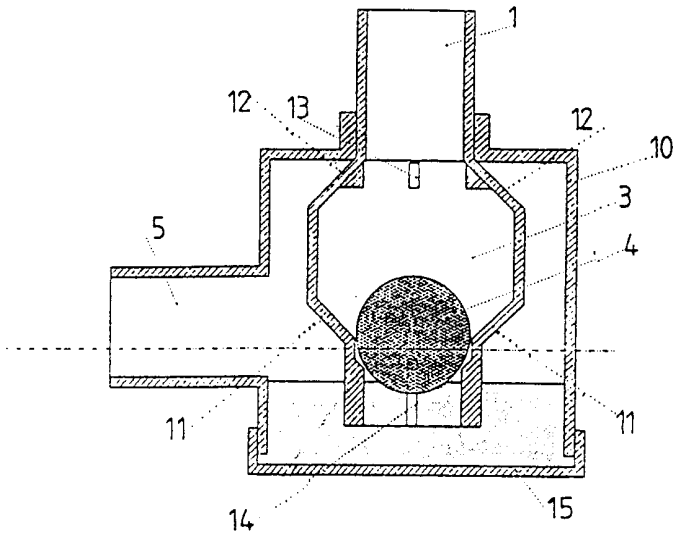


FIG.8

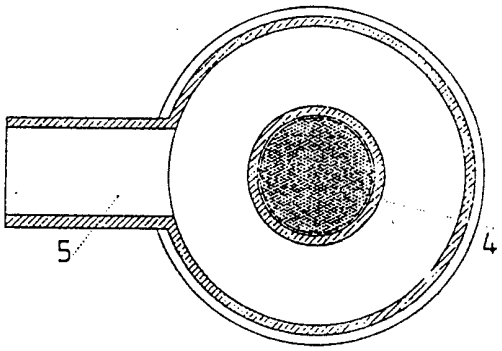


FIG.9

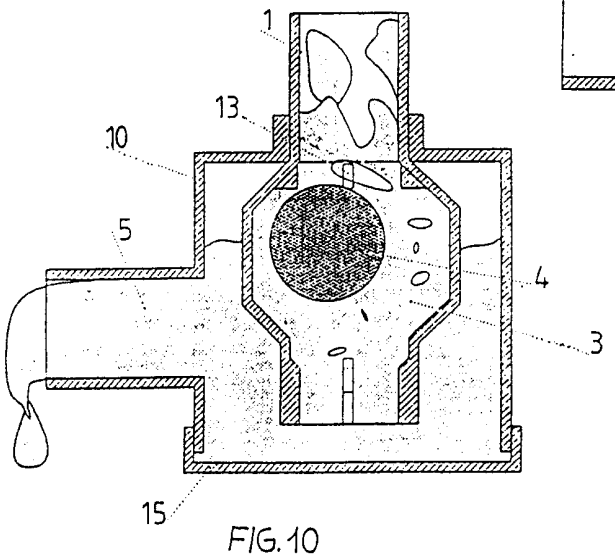


FIG.10

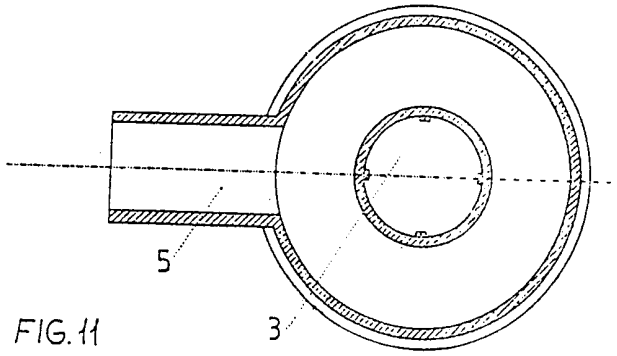


FIG.11

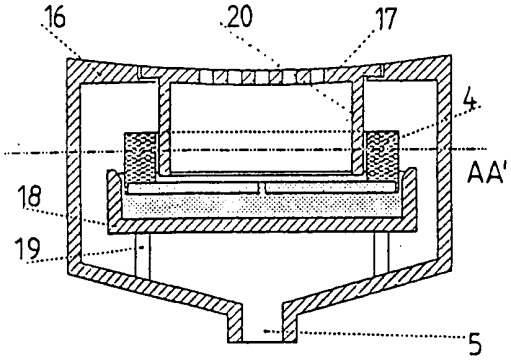


FIG. 12

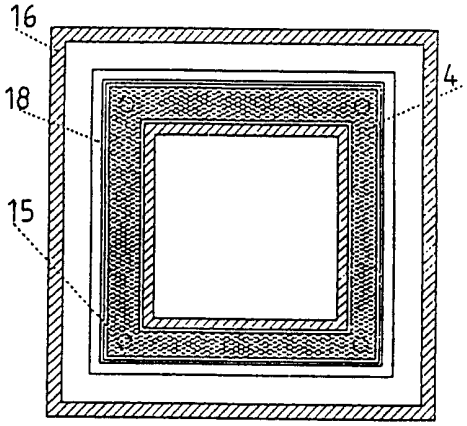


FIG. 13

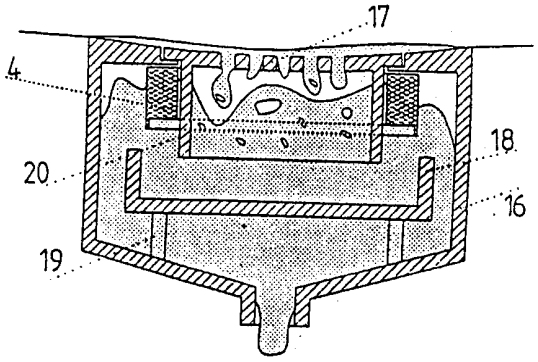


FIG. 14

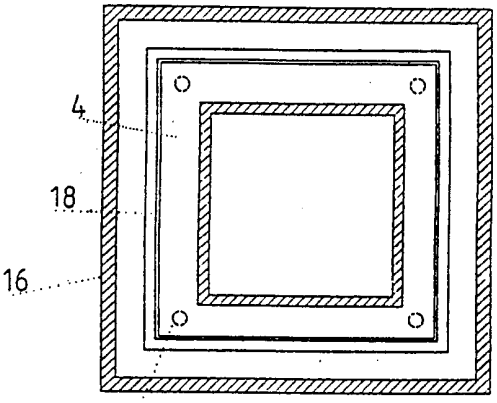


FIG. 15

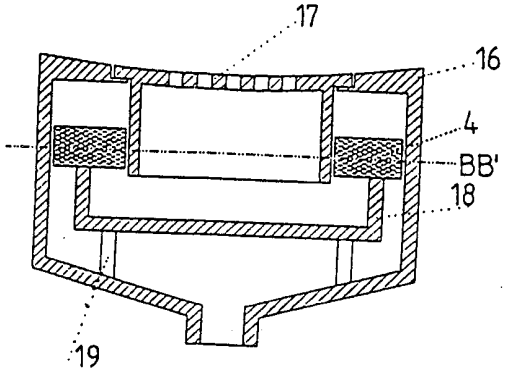


FIG. 16

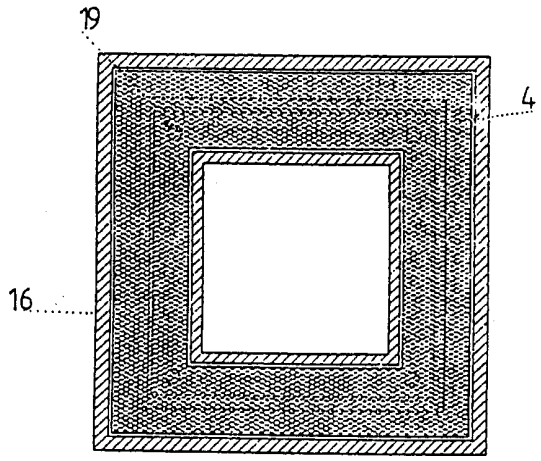


FIG. 17

INTERNATIONAL SEARCH REPORT

Interr nal Application No
PCT/IT 00/00322

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 E03F7/06 E03F5/04

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 E03F E03C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE 299 00 436 U (STEINLE DETLEV) 8 April 1999 (1999-04-08) page 2, paragraph 2; figure 2	1,3
Y	---	5
X	DE 67 538 C (COUZENS) the whole document	1,4
Y	---	5
	DE 895 278 C (HIRTE ET AL.) page 2, line 103 - line 105; figure 1	
A	---	1,4
	US 5 662 138 A (WANG WEN-HSING) 2 September 1997 (1997-09-02) figures	
A	---	1,4
	US 1 488 597 A (GLEASON) 1 April 1924 (1924-04-01) figure	

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
18 October 2000	27/10/2000

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	De Coene, P

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INTERNATIONAL SEARCH REPORT

...ormation on patent family members

Interr ...nal Application No
PCT/IT 00/00322

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 29900436 U	08-04-1999	NONE	
DE 67538 C		NONE	
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US 1488597 A	01-04-1924	NONE	