



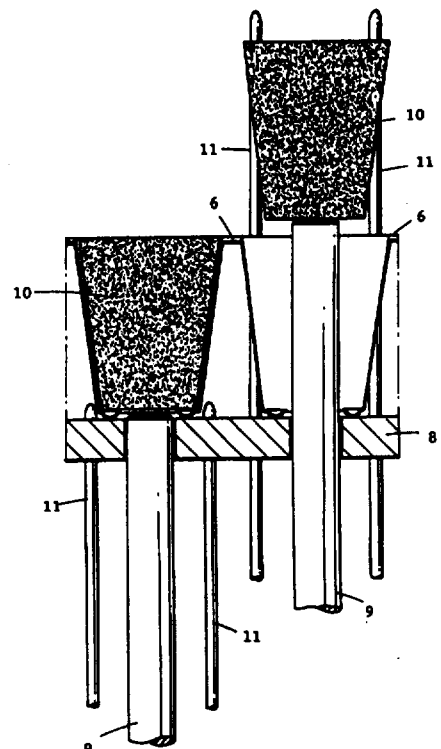
INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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<p>(21) International Application Number: PCT/NL96/00016 (22) International Filing Date: 9 January 1996 (09.01.96) (30) Priority Data: 95870001.5 10 January 1995 (10.01.95) EP (34) Countries for which the regional or international application was filed: AT et al. (71) Applicant (for all designated States except US): SYNBRA B.V. [NL/NL]; Nieuweweg 235, NL-6603 BM Wijchen (NL). (72) Inventor; and (75) Inventor/Applicant (for US only): VISSER, Cees, F., T. [NL/NL]; Vlietstraat 42, NL-3295 GN 'S-Gravendeel (NL). (74) Agent: VAN KAN, Johan, Joseph, Hubert; Algemeen Octrooibureau, P.O. Box 645, NL-5600 AP Eindhoven (NL).</p>		<p>(81) Designated States: AM, AT, AU, BB, BG, BR, BY, CA, CH, CN, CZ, DE, DK, EE, ES, FI, GB, GE, HU, JP, KE, KG, KP, KR, KZ, LK, LR, LT, LU, LV, MD, MG, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SI, SK, TJ, TT, UA, US, UZ, VN, ARIPO patent (KE, LS, MW, SD, SZ, UG), European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG).</p> <p>Published <i>With international search report.</i></p>

(54) Title: METHOD, DEVICE AND SET OF SEVERAL HOLLOW BODIES FOR EXTRACTING A PLUG OUT OF A HOLLOW BODY

(57) Abstract

The invention relates to a method, a device and a set of several hollow bodies for extracting a plug out of a hollow body, which hollow body (4) shows an open end and at the other end an opening (5) through which an ejecting pin (9) can push said plug (10) out of the respective hollow bodies, characterized in that use is made of a number of rods (11) which are synchronously displaced with said ejecting pin (9) around each hollow body (4) so as to catch the plug (10) with the plant during or after having removed said plug (10) from the hollow body (1, 2, 3).



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**"Method, device and set of several hollow bodies
for extracting a plug out of a hollow body"**

This invention relates to a method for
extracting a plug, having a plant cultivated therein,
5 out of a hollow body, which hollow body shows an open
end and at the other end an opening through which an
ejecting pin can push said plug the hollow body.

When cultivating seedlings or cuttings use is
made on a large scale of hollow bodies arranged in the
10 shape of blocks or sheets and comprising an amount of
seedling or cutting soil.

Depending on the plant species, roots are
developed more or less quickly forming a plug together
with the soil.

15 Removing the plugs out of these holders or
hollow bodies together with plants cultivated therein is
more and more performed through mechanical means. The
plug is pushed hereby out of the hollow body by means of
a pushing bar and the plug is protected against
20 disintegrating or canting by needles or fingers which
are displaced together with the pushing bar. The
needles or fingers are displaced always through the
plug, in the boundary portion thereof, as it can be
deduced from the following documents : NL 8902261 or
25 EP 0 323 674.

A drawback of this arrangement of the needles
or fingers according to these patents or patent
applications has to be seen in the fact that these parts
are displaced through the humid seedling or cutting soil
30 which causes rust phenomenon, whilst pushing needles or

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fingers in the soil full of roots damages both the plug and the root system.

A further drawback can be seen in the fact that a certain adhesion can be observed between the soil
5 plug and the needles or fingers, which can also cause problems for removing the plug.

The invention has now as object to obviate the drawbacks of the here described devices, such as i.a. described in the documents mentioned hereinabove, and to
10 provide a method, a device and a set of several hollow bodies which permit to extract the soil plugs undamaged out of the hollow bodies described in the introduction and to make them available for further mechanical or manual treatment.

In order to enable this in conformity with the invention, use is made of a number of rods which are
15 synchronously displaced with said ejecting pin around the hollow body, i.e. at the outside thereof, so as to catch the plug with the plant during or after having removed said plug out of the hollow body.
20

According to a possible embodiment and when said hollow body shows a collar around its open end, said rods are led through openings provided therein.

The device for ejecting and receiving a plug
25 in conformity with the method according to the invention is characterised in that said rods displace each time according to a path which is situated entirely at the outside of the hollow body.

Other details and advantages of the invention
30 will become apparent from the following description of a method, a device and a set of several hollow bodies according to the invention.

This description is only given by way of example and is in no way limitative for the invention.
35 The reference numerals relate to the figures annexed hereto.

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Figure 1 is a plan view of a first possible embodiment of the bottom sheet according to the invention.

5 Figure 2 is a plan view of a second possible embodiment of a bottom sheet according to the invention.

Figure 3 is a plan view of a third possible embodiment of a bottom sheet according to the invention.

Figure 4 is a cross section according to line IV-IV from Figure 1.

10 Figures 5, 6 and 7 relate to possible variants of the embodiments according to Figures 1, 2 and 3, respectively.

The method according to the invention is clarified by these different figures.

15 According to the spirit of the invention, use is always made of a plastic foil which is deep-drawn in a usual manner and according to known techniques. The hollow bodies can also be produced by an injection moulding process. It is clear that the invention also
20 extends to the application field wherein separate hollow bodies would be treated in the form of flowerpots.

When cultivating seedlings or cuttings on an industrial scale, use is however made more and more of sheet shaped structures which are deep-drawn or deformed
25 by making use of the techniques mentioned hereinabove so that a very large number of hollow bodies are formed.

In the Figures 1, 2 and 3, the bottom material of the hollow bodies is indicated with reference numeral 1, whilst the different hollow bodies are referred to
30 with the references 2, 3, and 4, respectively.

The bottom material forms thus the respective bottoms of the hollow bodies 2 - 4 shown here in plan view.

35 In the middle of each of the bottoms of the hollow bodies, there is a central opening 5. The shape and possibly the number of these central openings is

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determined by the irrigation problematic of the plants cultivated in these hollow bodies. This aspect of the problem does not belong here to the invention. It is to be noted that in the embodiment according to Figures 1 and 4 a number of circular feet (v) are provided in the bottom material 1. These feet (v) also do not pertain to the invention.

In the different figures, the synthetic material connecting the plurality of hollow bodies 2 - 4 with one another after being deep-drawn, is clarified with reference numerals. This material connects the different hollow bodies 2 - 4 at the top and is indicated in Figure 1 by reference numeral 6, in Figure 2 by reference numeral 7, in Figure 3 by reference numeral 8. Also in Figure 4 this material forming an actual connecting edge between the different hollow bodies 2 is indicated by reference 6. By means of i.a. this Figure, the method according to the invention is clarified. The method is indeed characterised by the technique described herein by way of example.

The hollow bodies, by which the actual flowerpots are meant, rest onto a supporting plate 8 through which an ejecting pin 9 can be displaced vertically for each hollow body. The soil plugs 10 pushed upwardly out of the respective hollow bodies are caught between four rods 11 passing through openings 12 disposed at the outside of the hollow bodies. For each hollow body, four openings 12 are provided but use could each time also be made of a bigger opening 12' (Figures 5 and 6) or 12" (Figure 7) through which four rods 11, respectively two rods 11 can then be displaced. In certain cases, three of such rods could be sufficient.

Characterising for the method according to the invention is the fact that these rods 11 are always located at the outside of the hollow bodies. In this

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way, the rods 11 are thus prevented from being pressed through the cultivated material.

Preferably, openings are provided in the material 6 connecting the different hollow bodies 2 - 4 at the top and forming as it were a collar around each hollow body, through which the rods 11 are led during the upward displacement of the ejecting pins 9.

Although the hollow bodies according to the figures show different cross sections, the openings 12, 12' and 12" are always situated at the outside. The soil plugs 10 are therefore always caught between the four rods 11. These rods do not pass through the soil plugs and therefore do not disturb neither the roots, nor the structure of the soil plugs. The rods 11 do not penetrate into the humid material of the soil plugs 10 and remain therefore clean or are not going to rust in case they do not consist of stainless steel.

In case the material 6 - 8 forming a collar around each hollow body and connecting them mutually is thin enough, the rods 11 could then, still in conformity with the method according to the invention, be pushed through this material. This could be done by providing the rods 11 with a heatable head.

The method according to the invention is thus distinguished from the known techniques to which reference is made in the introduction by the fact that for each embodiment of the hollow bodies or flowerpots the rods 11 are always displaced at the outside thereof.

The invention is not limited to the embodiment described herein by way of example and a lot of modifications could be applied thereto, provided they fall within the scope of the claims annexed hereto.

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CLAIMS

1. A method for extracting a plug (10), having a plant cultivated therein, out of a hollow body (4), which hollow body (4) shows an open end and at the other end an opening (5) through which an ejecting pin (9) can push said plug (10) out of the respective hollow bodies, characterised in that use is made of a number of rods (11) which are synchronously displaced with said ejecting pin (9) around each hollow body (4), i.e. at the outside thereof, so as to catch the plug (10) with the plant during or after having removed said plug (10) from the hollow body (1, 2, 3).

2. A method according to claim 1, characterised in that, when said hollow bodies (4) show a collar around their open end, said rods (11) are led through openings (12, 12', 12'') provided therein.

3. A method according to claim 1, characterised in that, when said hollow bodies (4) show a collar around their open end, said rods (11) are pressed through said collar.

4. A device for in conformity with the method according to any one of the claims 1 to 3 from hollow bodies with an open end and at the other end an opening (4) through which an ejecting pin (9) can push out said plug (10), characterised in that said rods (11) displace each time according to a path situated entirely at the outside of the hollow bodies.

5. A set of several hollow bodies for cultivating plants in plugs and extracting said plugs out of these hollow bodies by means of a device according to claim 4 in conformity with the method according to any one of the claims 1 to 3, characterised in that at least one opening (12) is provided between each of said hollow bodies (1, 2, 3) for the passage of rods displacing synchronously with said ejecting pin.

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6. A set of several hollow bodies according to claim 5, characterised in that four openings 12 are provided for each hollow body arranged at the outside thereof.

5 7. A set of several hollow bodies according to claim 5, characterised in that a common opening (12' respectively 12") is provided for each hollow body arranged between said hollow bodies in such a manner that four, respectively two, rods (11) can be displaced
10 through these openings.

8. A set of several hollow bodies for cultivating plants in plugs and extracting said plugs out of these hollow bodies by means of a device according to claim 4 in conformity with the method
15 according to any one of the claims 1 to 3, characterised in that the thickness of the material of which said set is made, is chosen in such a manner that said rods (11) can be pushed through this material.

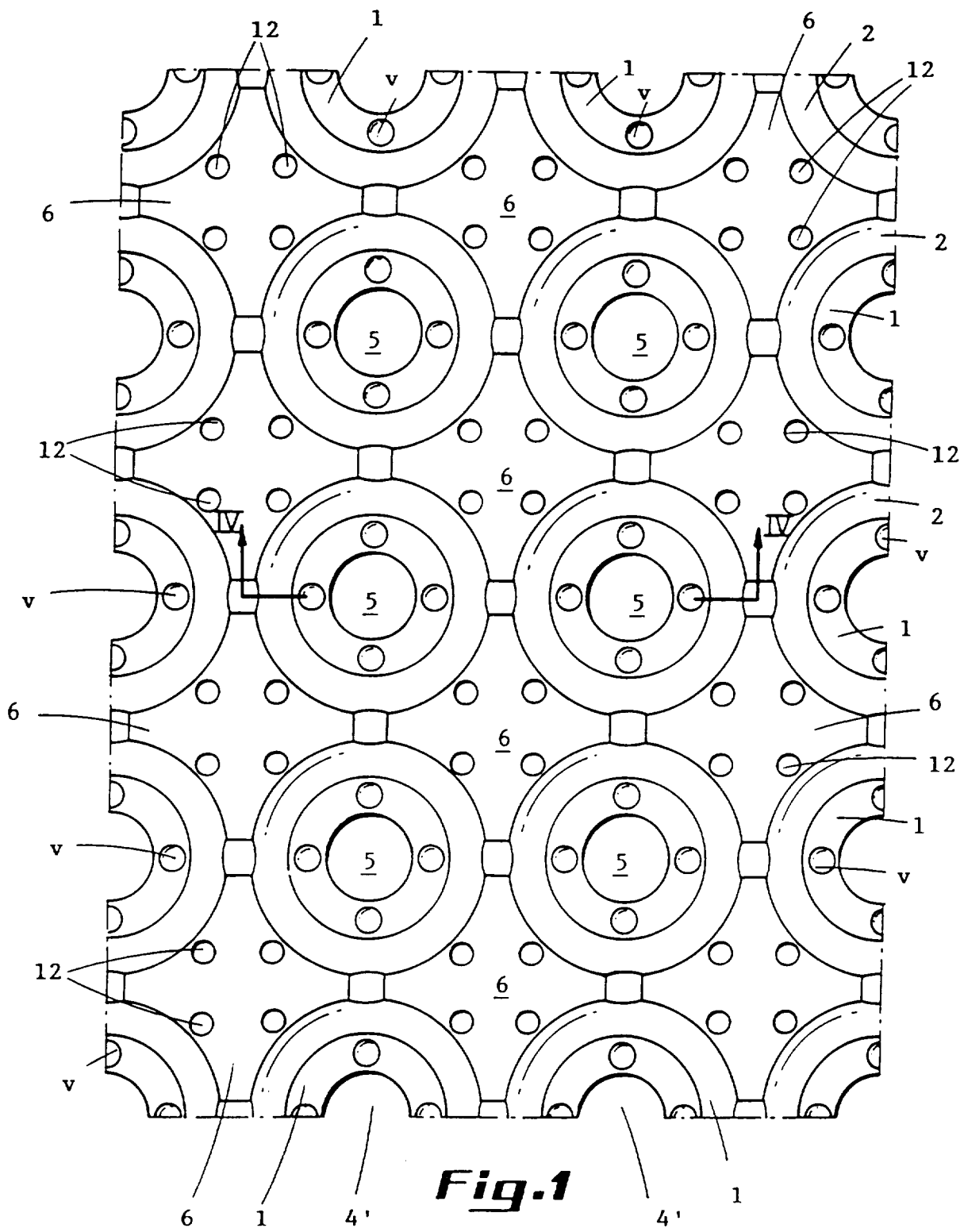


Fig. 1

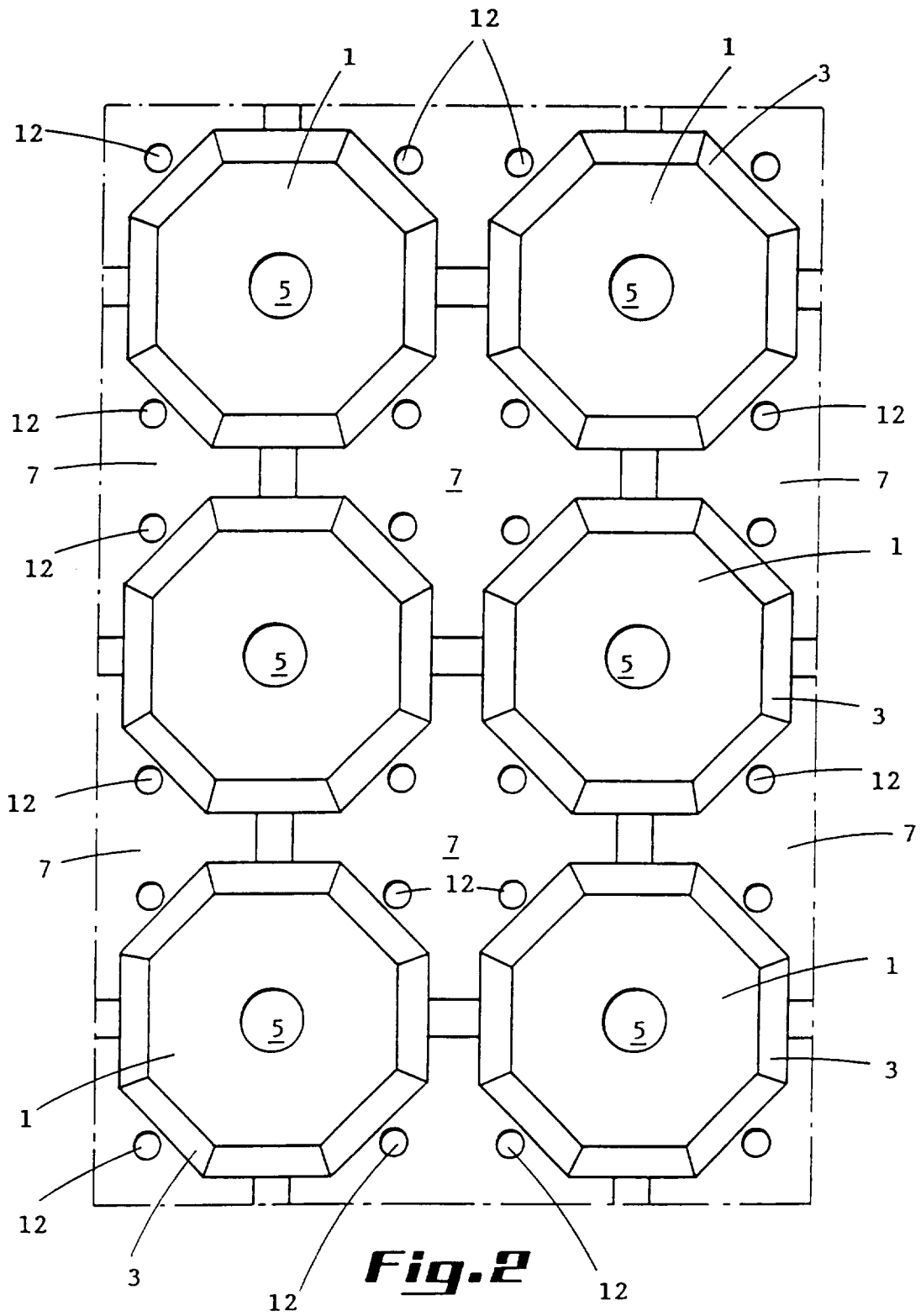


Fig. 2

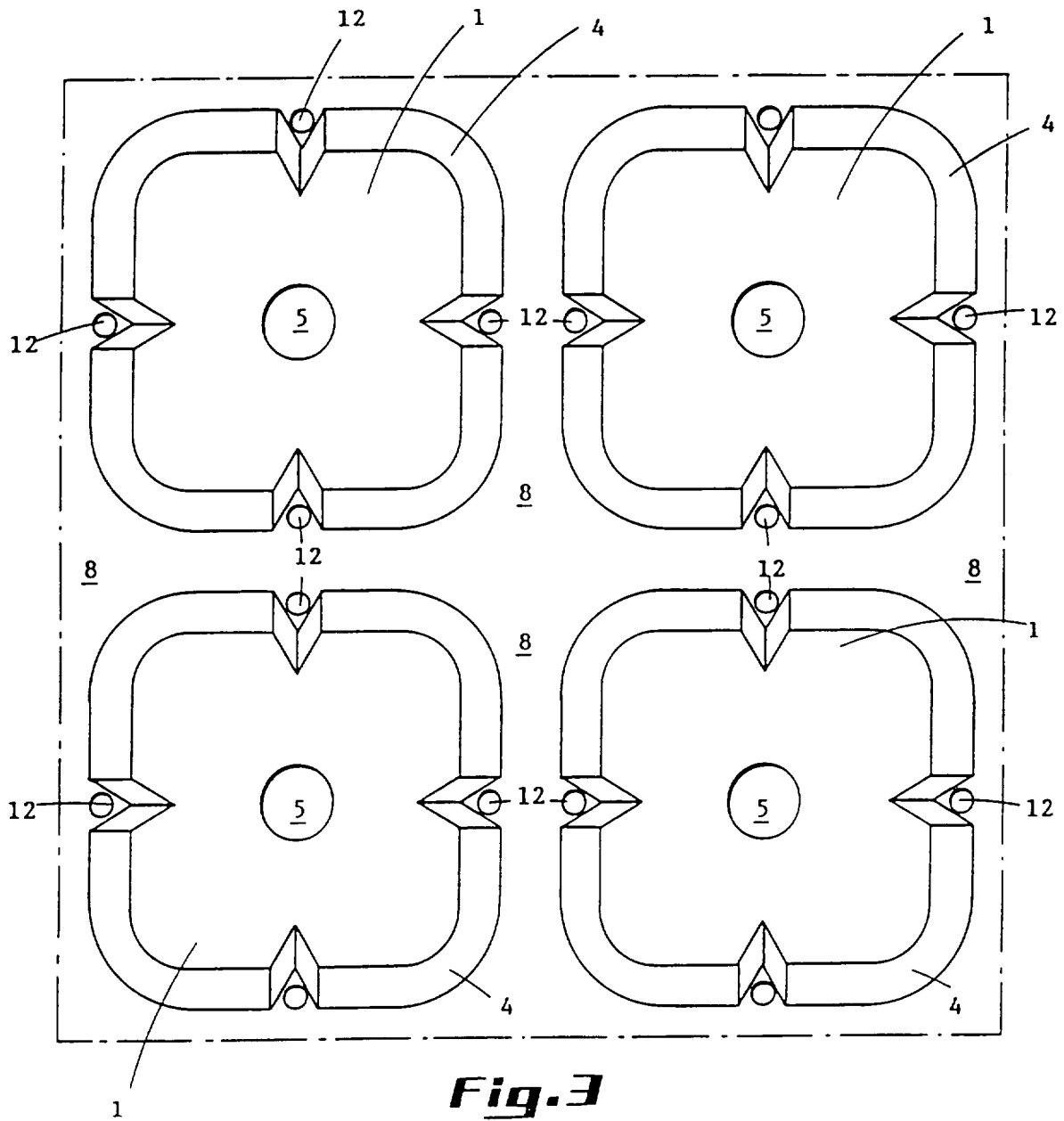


Fig. 3

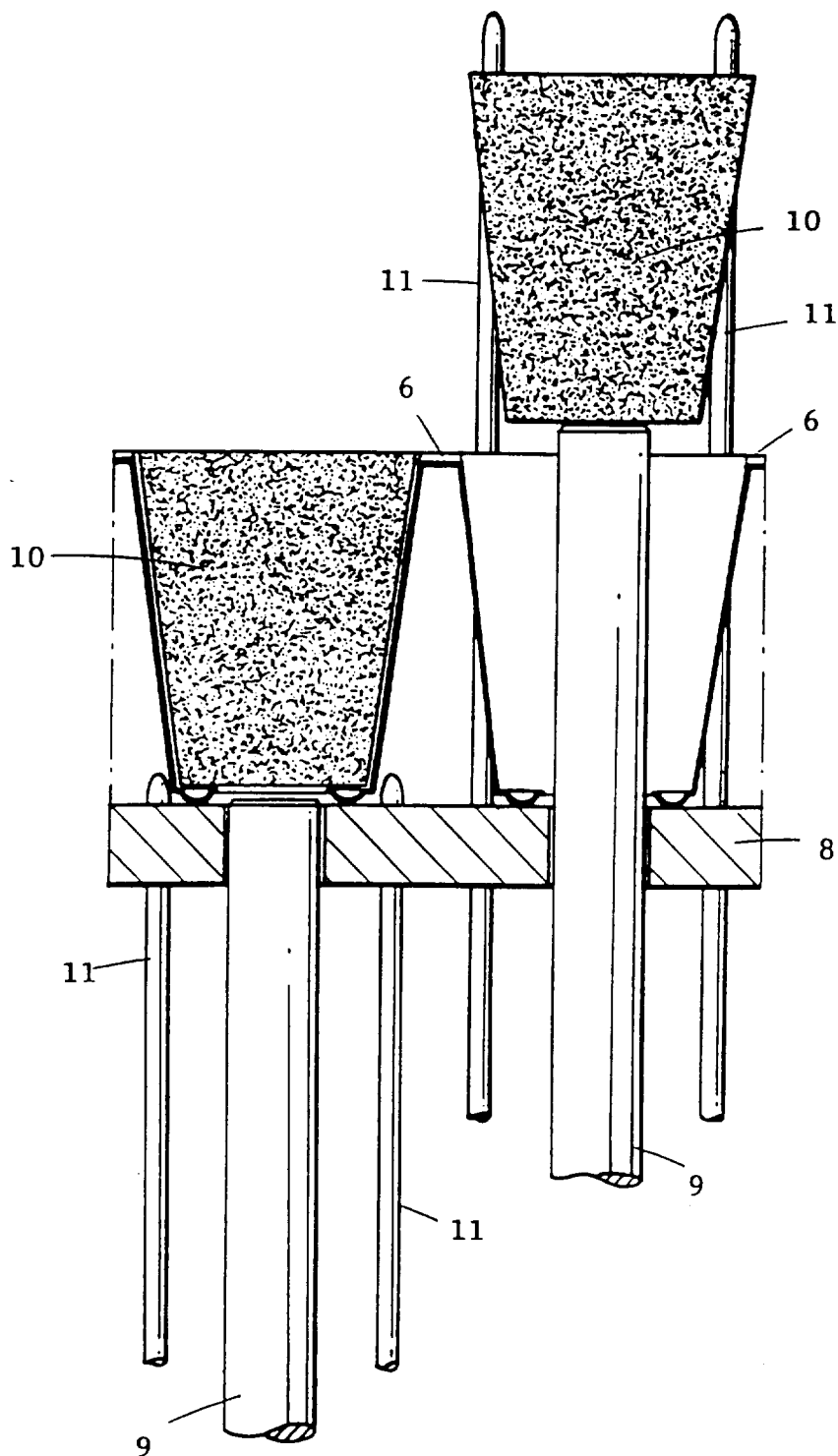
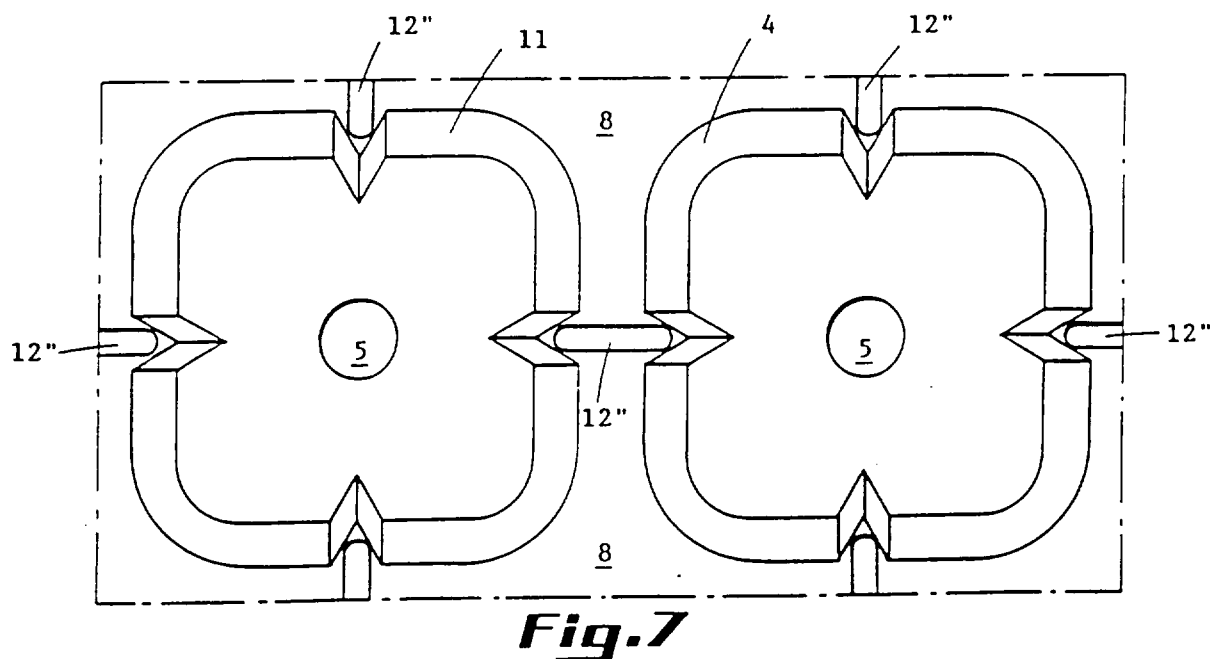
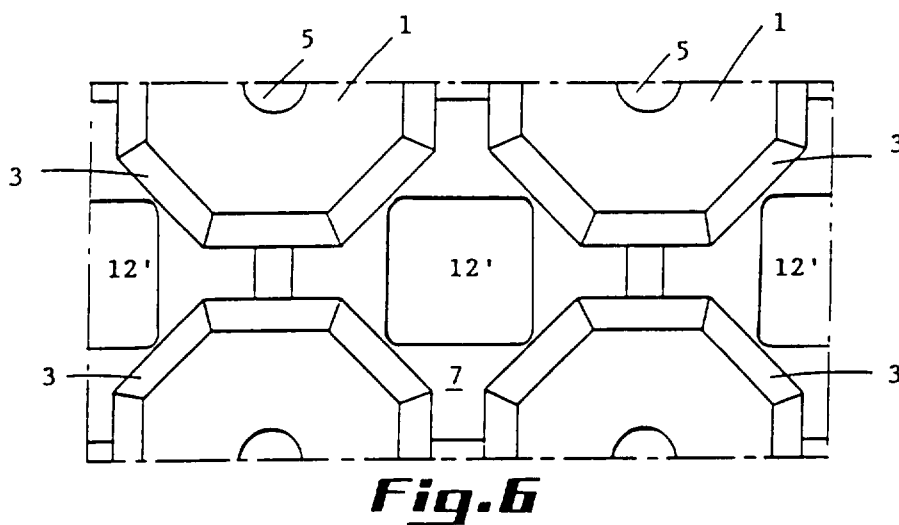
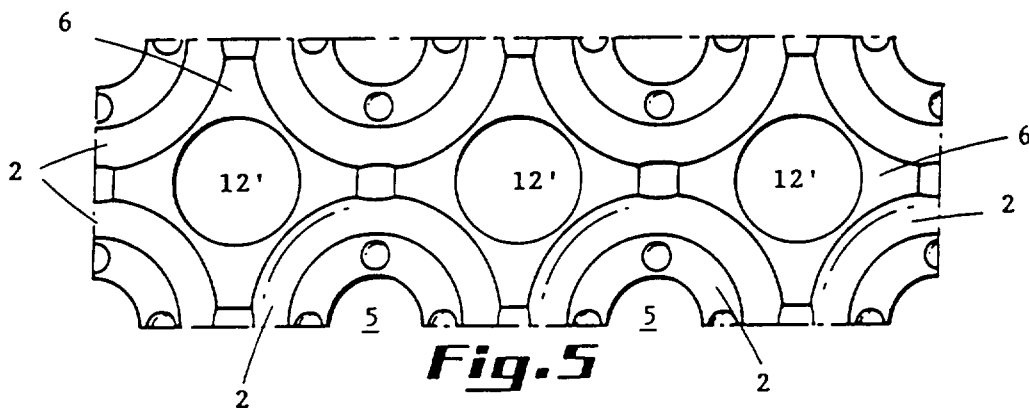


Fig.4



INTERNATIONAL SEARCH REPORT

Intern al Application No
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A. CLASSIFICATION OF SUBJECT MATTER IPC 6 A01G9/10				
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 6 A01G				
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Electronic data base consulted during the international search (name of data base and, where practical, search terms used)				
C. DOCUMENTS CONSIDERED TO BE RELEVANT				
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.		
A	EP,A,0 323 674 (VISSER 'S-GRAVENDEEL HOLDING) 12 July 1989 cited in the application see column 2, line 26 - column 5, line 34; figures	1,4-6		
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Name and mailing address of the ISA 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	Authorized officer <p style="text-align: center;">Merckx, A</p>			

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	NL,A,9 000 803 (VISSER 'S-GRAVENDEEL HOLDING) 1 November 1991 & DATABASE WPI Week 9147 Derwent Publications Ltd., London, GB; AN 91-344827 [47] ---	
A	NL,A,9 201 107 (VISSER 'S-GRAVENDEEL HOLDING) 17 January 1994 & DATABASE WPI Week 9406 Derwent Publications Ltd., London, GB; AN 94-046135 [06] -----	

INTERNATIONAL SEARCH REPORT

International Application No
PCT/NL 96/00016

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP-A-0323674	12-07-89	NL-A- 8800040	01-08-89
		AU-B- 2770489	13-07-89
		CA-A- 1297925	24-03-92
		DE-D- 3851640	27-10-94
		DE-T- 3851640	09-02-95
		DE-D- 3884175	21-10-93
		DE-T- 3884175	13-01-94
		EP-A- 0486481	20-05-92
		ES-T- 2043795	01-01-94
		ES-T- 2060448	16-11-94
		FI-C- 90814	11-04-94
		JP-A- 1262734	19-10-89
		JP-C- 1814989	18-01-94
		JP-B- 5022487	29-03-93
		US-A- 4970824	20-11-90
US-A- 5121955	16-06-92		
EP-A-0422704	17-04-91	NL-A- 8902261	02-04-91
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		AT-T- 120333	15-04-95
		AU-B- 5994490	14-03-91
		CA-A- 2022011	12-03-91
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		DE-T- 69018188	10-08-95
		JP-A- 3164113	16-07-91
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NL-A-9201107	17-01-94	NONE	