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(54) Surface box

(57) A surface box for housing valves, taps etc. in the ground comprises a tubular lower portion (1) and a tubular upper portion (2) which fits as a sleeve around the lower portion and can be seated on the lower portion in any one of a plurality of positions of relative rotational adjustment between the two, determining different heights fora top surface (S) of the box above the lower portion. The upper and lower portions together form an access passage through the box in all positions of rotational adjustment. A removable closure member (3) is received within the upper portion to close the passage. The lower portion (1) of the box has three sets of common-level seating faces (7,8,7,8',7",8") which co-operate with seating faces (15,16) of the upper portion (2) in each position of adjustment to provide different height settings. The upper portion has bearers (12,12',12") on an inside surface (10') to engage the lower portion and to support the removable closure member.

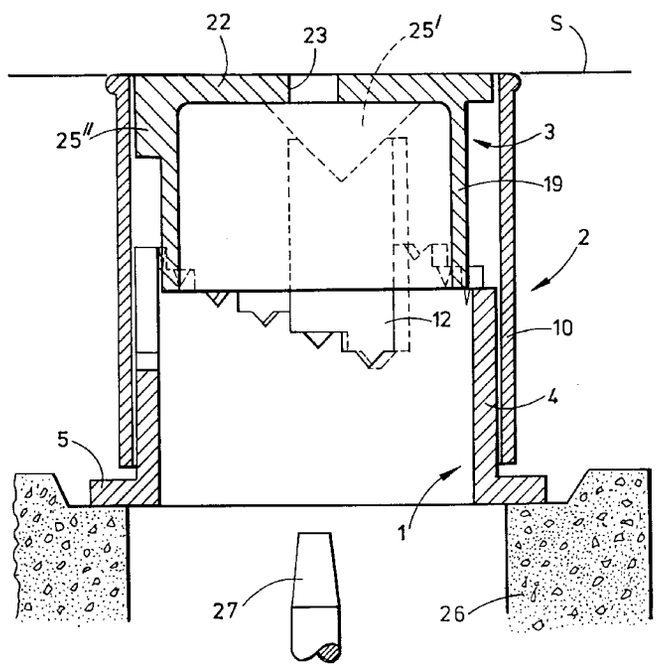

FIG.1

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Description

Surface boxes are lidded housings for installation in the ground to enable access to be gained to, for example, valves, taps and meters of water supply, and other, buried equipment associated with public utilities. They can also provide hydrant and manhole covers. It is commonly desirable that a top surface of the box be maintained flush with the surrounding surface of the ground, so that the installation creates no step or cavity in the ground.

Surface boxes are often situated beneath paved or metalled surfaces of highways and pavements. Particularly upon resurfacing, the surface level may become changed. It is undesirable that a surface box installation as a whole should have to be re-built in order to accommodate such changes in surface level.

It is an object of the present invention to provide an improved surface box which is of variable height in order that it can be adjusted to accommodate variations in ground surface level at the installation.

The invention provides, in one of its aspects, a surface box comprising a tubular lower portion,a tubular upper portion which fits as a sleeve around the lower portion and can be seated on the lower portion in any one of a plurality of positions of relative rotational adjustment between the two, determining different heights for a top surface of the box above the lower portion, the upper and lower portions together forming an access passage through the box in all positions of rotational adjustment, and a removable closure member which is received within the upper portion to close the passage.

In a preferred construction, the lower portion of the box is provided with a plurality of sets of common-level seating faces which co-operate with seating faces of the upper portion in each position of relative rotational adjustment of the portions to provide different height settings. The upper portion may comprise discrete lands raised from an inside surface of a tubular body, the lands being uniformly disposed about the body and forming bearers providing the seating faces arranged to engage those of the lower portion. The lands of the upper portion may also form seating faces for the removable closure member. Most preferably each common-level set comprises three (and only three) seating faces, to ensure stable three-point support of the upper portion on the lower.

There now follows a detailed description, to be read with reference to the accompanying drawings, of a surface box which illustrates the invention by way of example.

Figure 1 is a sectional view in elevation of the installed surface box;

Figure 2 is a diametral section on line II-II of Figure 3 through a lower section of the surface box;

Figure 3 is a top plan view of the lower section;

Figure 4 is a diametral section on line IV-IV of Figure 5 through an upper section of the surface box;

Figure 5 is a top plan view of the upper section;

Figure 6 is a side elevation of a core section of the surface box; and

Figure 7 is a top plan view of the core section.

A surface box, shown installed in Figure 1, comprises three separate sections: a lower section 1 as shown also in Figures 2 and 3, an upper section 2 as shown also in Figures 4 and 5, and a core section 3 as shown also in Figures 6 and 7.

The lower section 1, shown in Figures 2 and 3, comprises a cylindrical tubular body 4 which is arranged to stand on a base by means of an externally projecting ground-engaging flange 5 at a bottom end. The tubular body 4 has a circumferentially-stepped form at its top end, three identical sets of steps 6,6',6" being provided. The sets of steps rise successively from three lower end faces 7,7',7" of the top end of the body which are distributed at 120° intervals about the body axis at a common lower level. Each set of steps represents five equal height rises of 10mm to upper end faces 8,8',8" at a common upper level (and one fall of 50mm back to the lower level) at regular circumferential intervals of twenty degrees of arc about the body axis. There are so provided six sets of three common-level end faces, the sets being at 10mm height intervals; these will be referred to hereinafter as the sets of seating faces of the lower section. V-shaped notches 9,9',9" in the tubular body 4 interrupt the end faces, being positioned centrally in the faces.

Whilst the three seating faces of each set lie generally in a common plane perpendicular to the body axis, the faces may be at least slightly inclined in circumferential and/or radial directions, for purposes of improving interlocking with the upper section 2.

The upper section 2 of the surface box (see Figures 4 and 5) comprises a cylindrical tubular body 10 provided with an external circumferential beading 11 forming a rim at its upper end. The body 10 has an inside diameter slightly greater than the outside diameter of the body 4 of the lower section 1, so as to enable the former to be fitted as a close-fitting sleeve over the latter.

There are three identical lands raised up from a cylindrical inside surface 10' of the tubular body 10; the three lands are distributed at 120° intervals about the body. The lands provide bearers 12,12',12" at a uniform height approximately mid-way up the body 10. Each bearer has a flat upper end face 13,13',13" separated into two equal parts by a central V-shaped rebate 14,14', 14" in the bearer which forms a plug seating (to be referred to hereinafter). At its opposite end each bearer presents two downwardly-facing lower end faces. One

of the lower end faces 15,15',15" is simply flat. The other lower end face 16,16',16" is at a lower level (10mm lower) than the first face and presents a flat face separated into two equal parts by a central downwardly-projecting triangular nib 17,17',17". The two lower end faces are of equal width, each extending for twenty degrees of arc circumferentially of the tubular body. Inner locating surfaces 18,18',18" of the three bearers are of uniform part-cylindrical form centred on the axis of the tubular body.

Whilst the corresponding seating faces of the bearers lie generally in a common plane perpendicular to the body axis, the faces may be inclined to co-operate with inclined seating faces of the lower section 1.

The core section 3 (see Figures 6 and 7) of the surface box is in the general form of a hollow cylinder which is closed at a top end and open at a bottom end, the section standing upright in normal use. It comprises a generally cylindrical tubular body 19 which is closed off at its top end by means of a capping portion 20 of the section. The outside diameter of the body 19, at a cylindrical outer surface 21, is slightly less than the common inside diameter of the three locating surfaces 18, 18', 18" of the upper section 2 and the inside diameter of the body 4 of the lower section (i.e. at a cylindrical inside surface 4'), enabling it to be fitted as a core within those two.

The capping portion 20 of the core section provides a cover 22 for the top end of the body 19. The cover has a small opening providing a lifting keyway 23 formed in its centre. The capping portion forms also a cylindrical rim 24 extending all around a top end portion of the body 19 and being of an outside diameter slightly less than the diameter of the inside surface 10' of the upper section 2. The capping portion of the core section is so arranged to be received as a plug within the upper portion 10. To provide a seating, three uniformly-distributed triangular projections 25,25',25" depend from the underside of the rim 24 for accommodation in the three rebates 14,14',14" of the upper section bearers.

The three sections of the surface box are shown assembled together in Figure 1, the box being installed below the surface S of a highway. The lower section 1 is shown standing on an annular chamber section 26, the box so being mounted in a fixed position over a water supply valve spindle 27 sunk into the ground below the surface of the highway. The three sections are shown assembled with the upper section 2, together with the core section 3, in a lowest position of adjustment. By lifting the upper and core sections, rotating them through 20° anti-clockwise, and dropping them down again, they come to rest at a position 10mm higher, the three lower end faces 16,16',16" of the upper section bearers 12,12',12" now resting on the second set of three seating faces of the lower section 1 with the triangular nibs 17,17',17" located in the associated notches 9,9',9".

The arrangement so provides for six different height settings of the upper and core sections on the lower section, at 10mm intervals, giving a final surface level tolerance of ±5mm without packings. The box design is seen to be based on a three-point support system to prevent rocking. It utilises a deep core section 3 to avoid flip-out by road traffic; the length to diameter ratio of the core section is preferably at least 0.67. All three sections of the box can suitably be cast in spheroidal graphite iron.

Claims

1. A surface box comprising a tubular lower portion (1), a tubular upper portion (2) which fits as a sleeve around the lower portion and can be seated on the lower portion in any one of a plurality of positions of relative rotational adjustment between the two, determining different heights for a top surface of the box above the lower portion, the upper and lower portions together forming an access passage through the box in all positions of rotational adjustment, and a removable closure member (3) which is received within the upper portion to close the passage.

2. A surface box according to claim 1 in which the lower portion (1) of the box is provided with a plurality of sets of common-level seating faces (7,8,7',8',7",8") which co-operate with seating faces (15,16) of the upper portion (2) in each position of relative rotational adjustment of the portions to provide different height settings.

3. A surface box according to claim 2 in which the upper portion (2) comprises discrete lands raised from an inside surface (10') of a tubular body (10), the lands being uniformly disposed about the body and forming bearers (12,12',12") providing the seating faces (15,16) arranged to engage those of the lower portion.

4. A surface box according to claim 3 in which the lands of the upper portion (2) form seating faces (13,14) for the removable closure member (3).

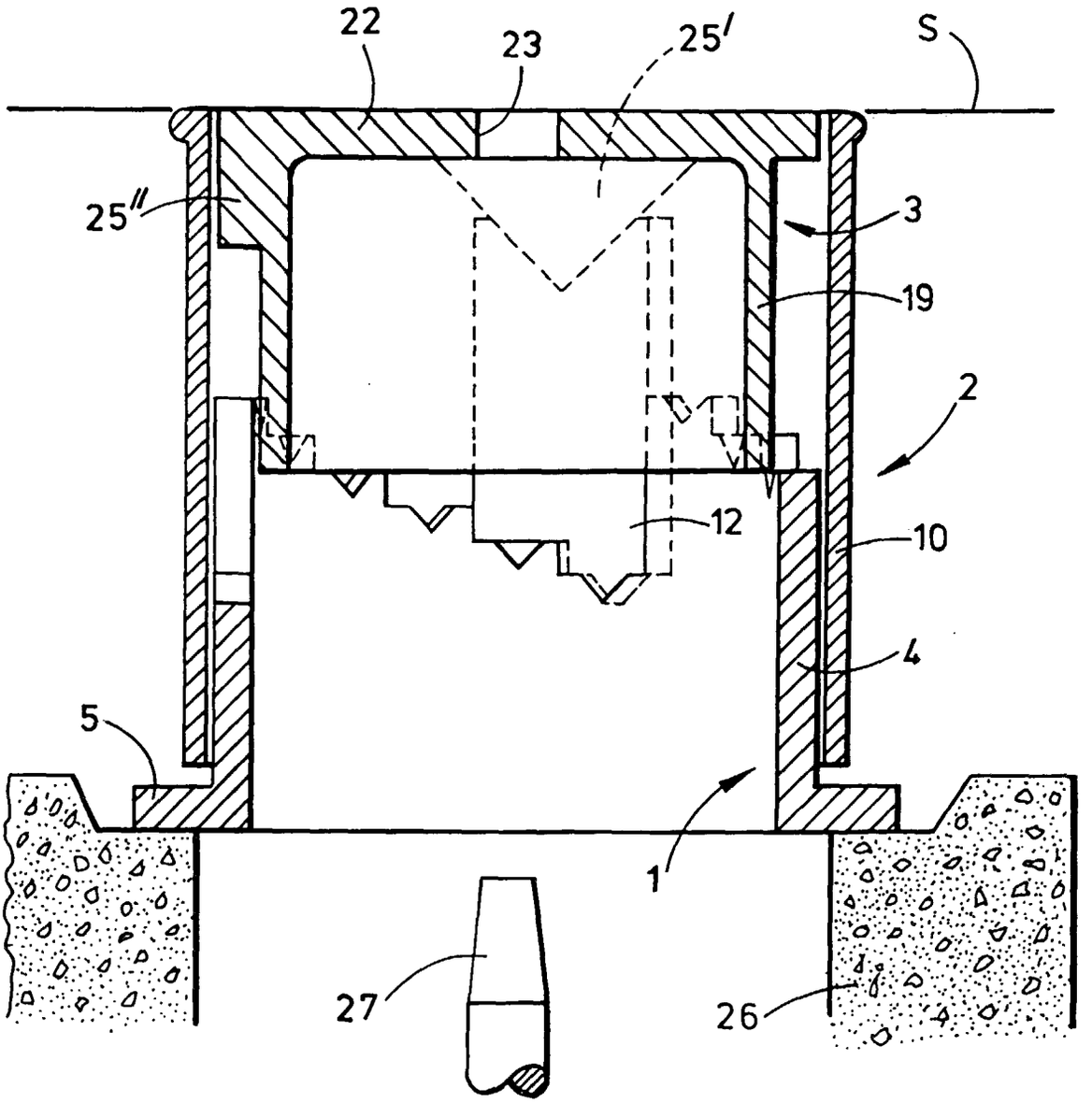

FIG.1

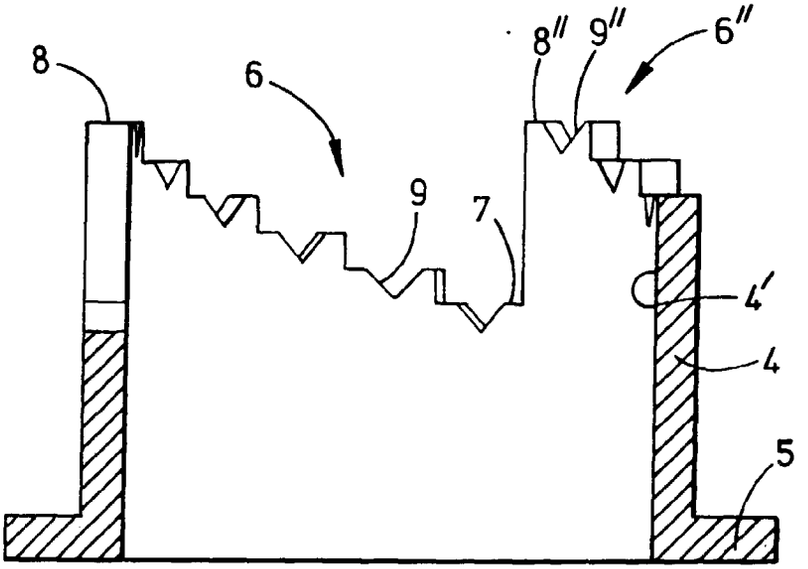

FIG.2

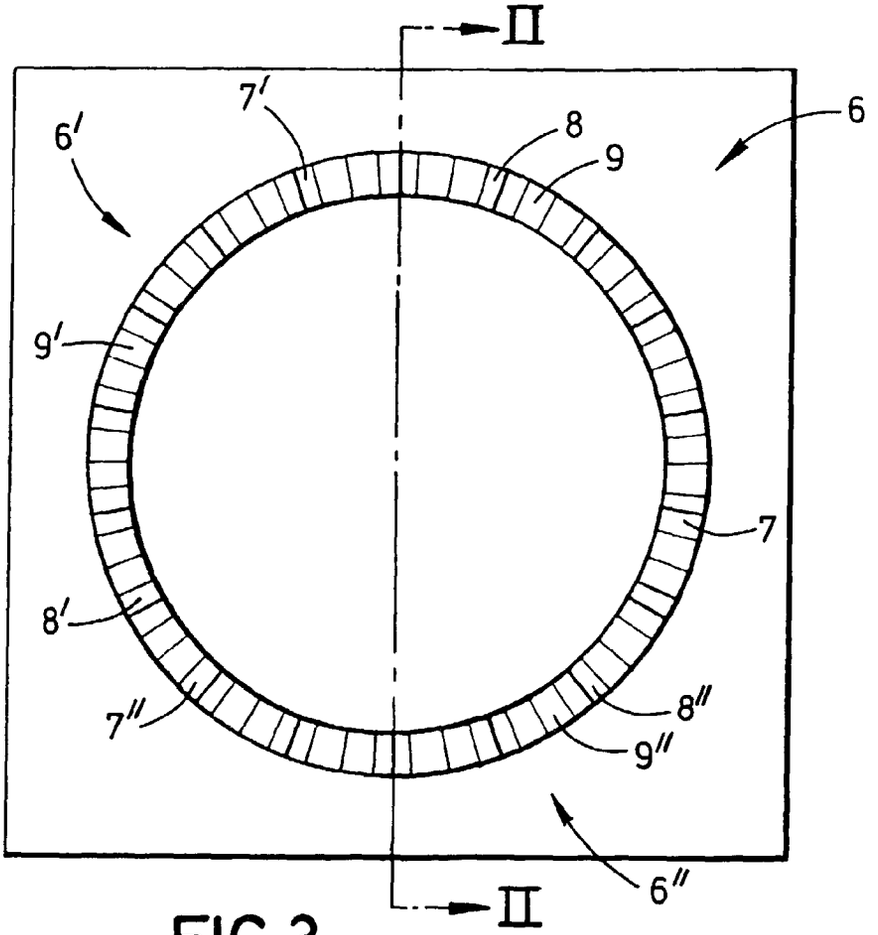

FIG.3

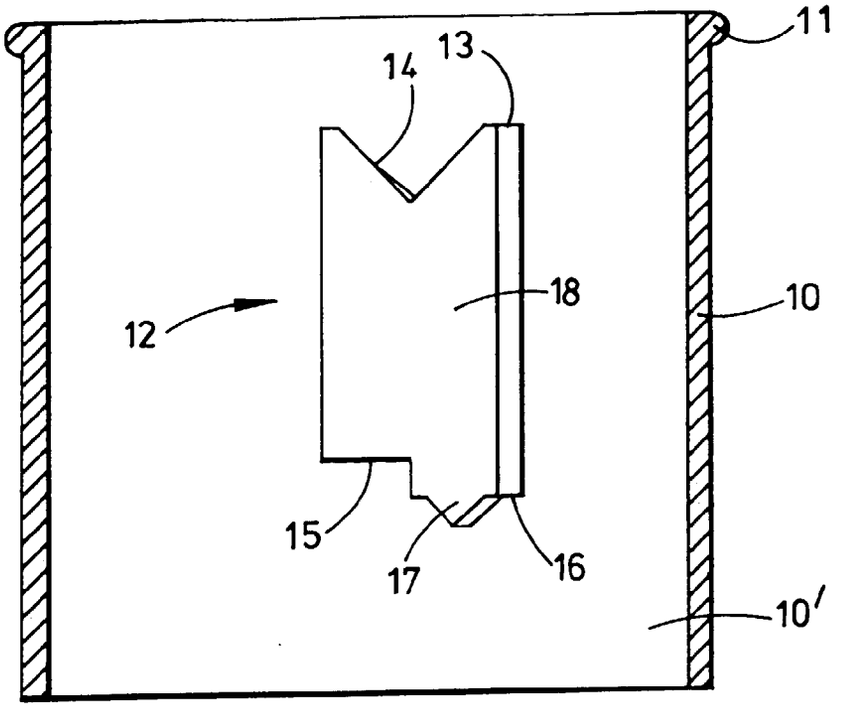
11
14
13
18
12
10
15
17
16
10'

FIG.4

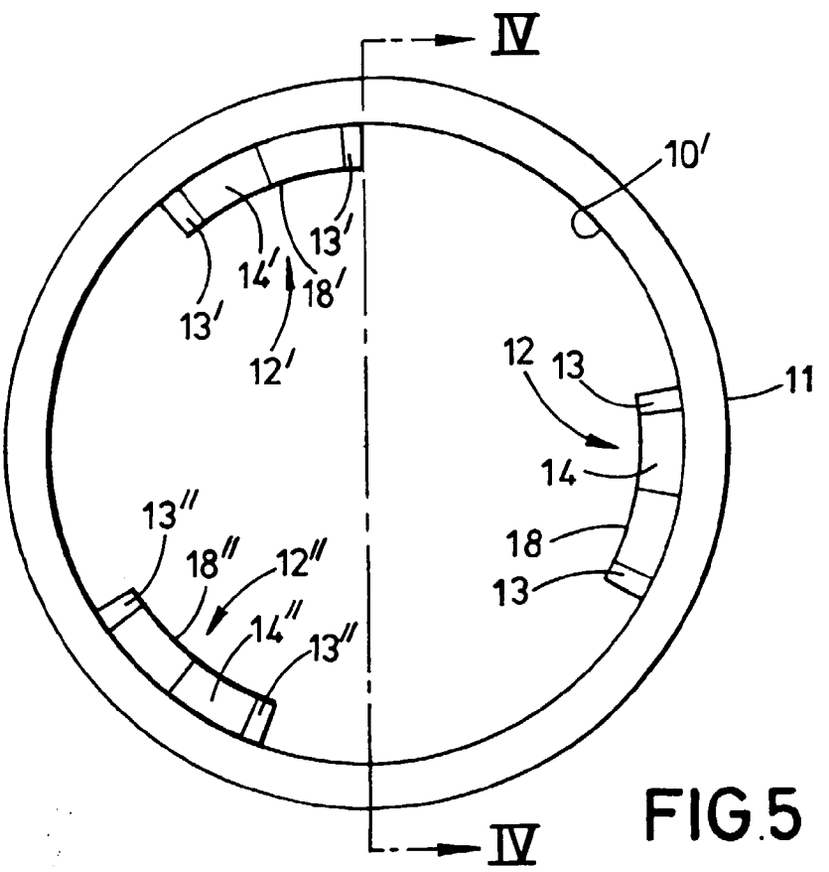
IV
10'
13'
14'
18'
13'
12'
12
13
11
14
18
13
13''
18''
12''
14''
13''
IV

FIG.5

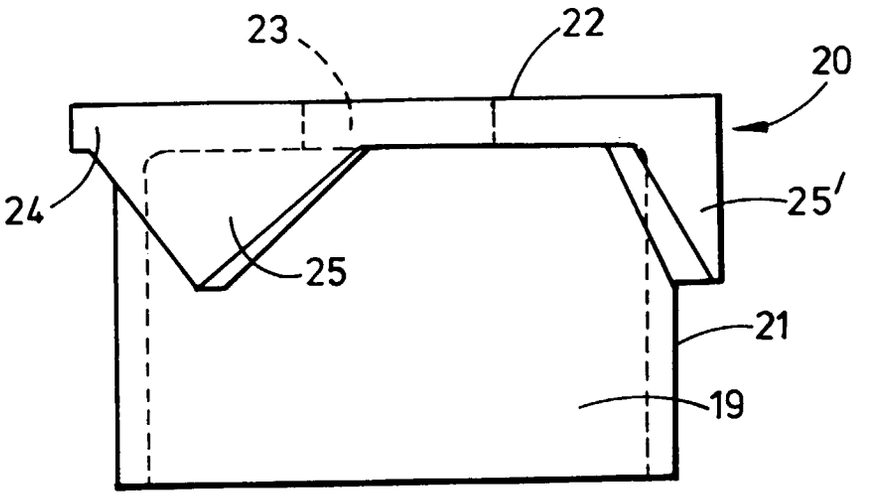

FIG.6

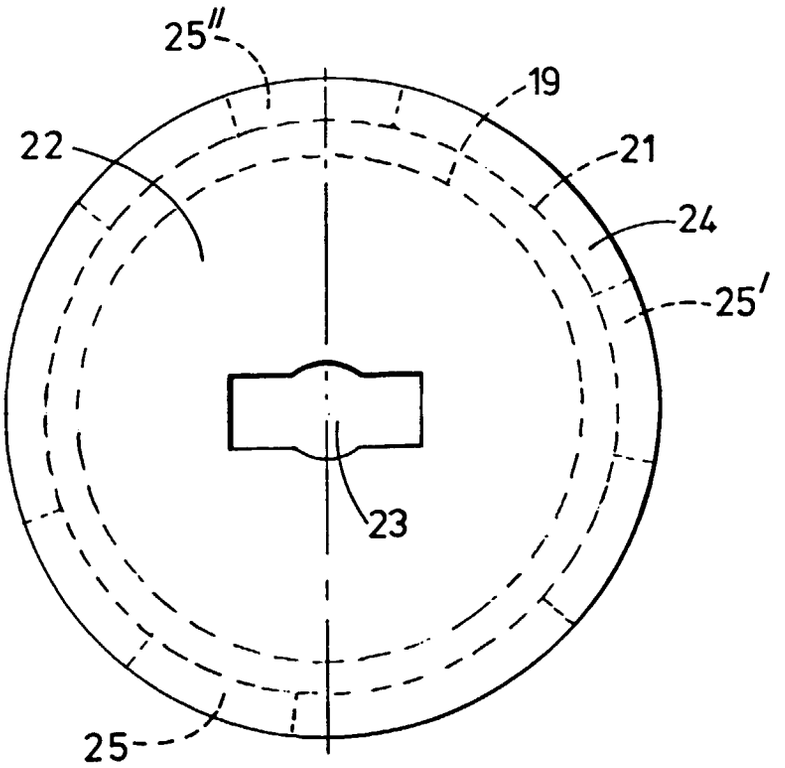

FIG.7

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EUROPEAN SEARCH REPORT

Application Number
EP 96 30 1690

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	AU-A-3 984 372 (ROCLA) * page 3, line 26 - page 5, line 6; claim 1; figures 1-6 *	1	E03B9/10 E02D29/14
Y		2-4	
Y	DE-U-90 04 693 (PLANERT) * whole document *	2-4	
A	GB-A-2 265 174 (PHILMAC) * page 5, line 10 - page 6, line 20; claim 1; figures 2,4,7 *	1-4	
A	CH-A-486 612 (GISLING)		

TECHNICAL FIELDS SEARCHED (Int.Cl.6)

E03B
E02D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	23 May 1996	Hannaart, J

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
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