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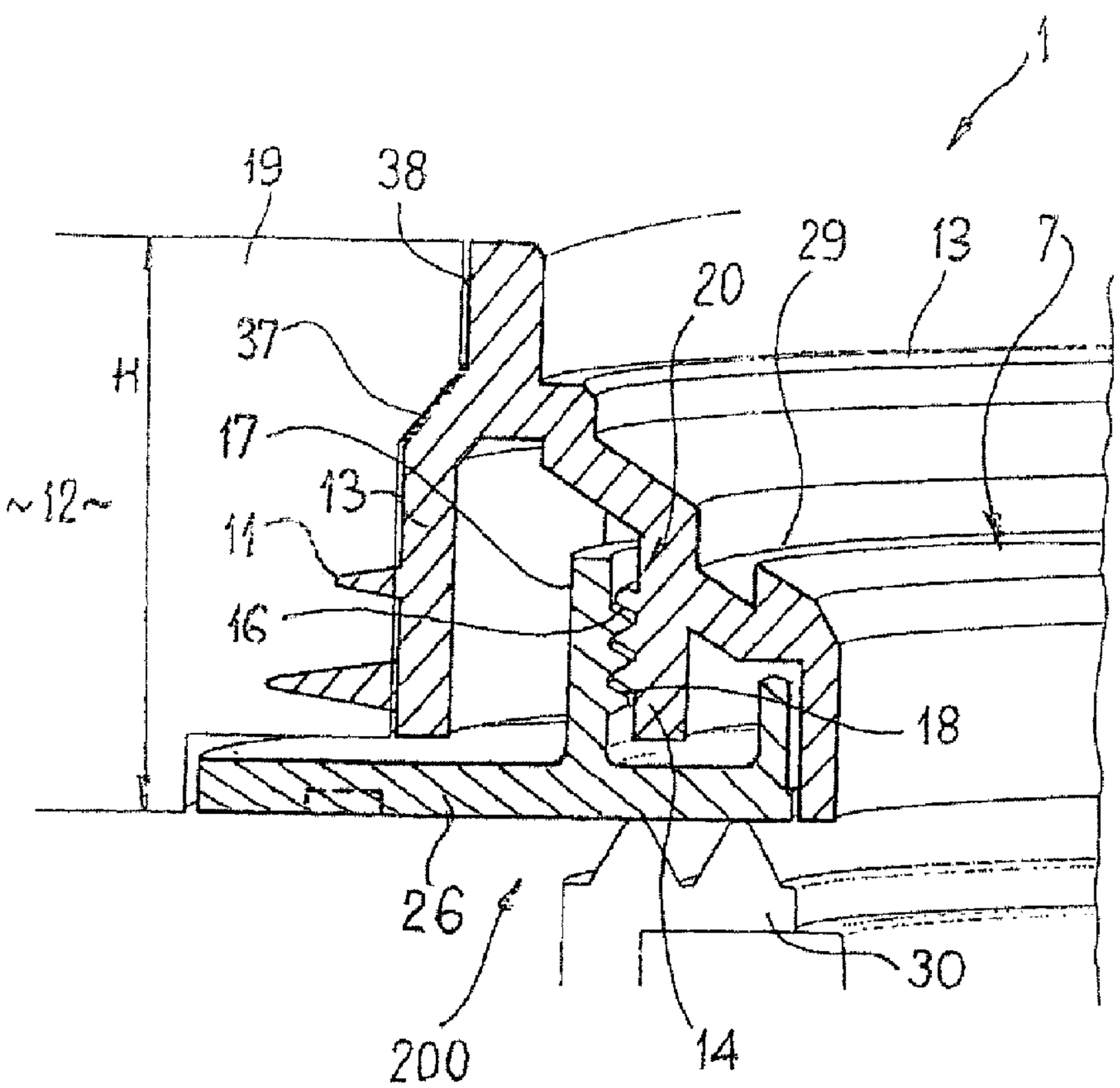
(54) Titre : MODULE DE PLAQUE DE PLANCHER DE DOUCHE DOTE D'UN ELEMENT DE RECEPTACLE DESTINE A UNE VANNE DE FOND DE DOUCHE DE TYPE HELICOIDAL

(54) Title: SHOWER FLOOR PLATE MODULE WITH RECEPTACLE ELEMENT FOR A SCREW-TYPE SHOWER TRAY VALVE



(57) Abrégé/Abstract:
The invention relates to a shower floor plate module (1), comprising: - a floor plate (19) which has a rigid foam layer (12), which is coated with a polymer mortar layer (15), and a circular opening, - a receptacle element (200), placed in the opening, for a screw-

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(57) Abrégé(suite)/Abstract(continued):
type shower tray valve of a water outlet which is to be connected to a drain pipe, - wherein the receptacle element (200) has an inclined inner face (7) for inserting a collar of the screw-type shower tray valve, - wherein said inner face (7) in the assembled state of the receptacle element (200) tapers off in the direction of the drain pipe, - and wherein the receptacle element (200) has a total height (H) which corresponds to approximately a thickness dimension in the region of the opening of the floor plate (19). The receptacle element (200) has a cutting thread (11), the external diameter of which in the inserted state of the receptacle element (200) increases in the direction of the drain pipe. The receptacle element (200) furthermore has a threaded base (13) which by way of a support flange (26) forms a screw connection (20) for compensating a height tolerance. Furthermore, the invention relates to a method for manufacturing a shower floor plate module (1), the method comprising the following method steps: a) providing a blank foam body (rigid foam layer 12 from extruded rigid polystyrene foam) having predetermined dimensions, b) applying thereon a textile or metallic reinforcement and bi-laterally coating the blank foam body with a liquid, polymer mortar layer, c) curing the polymer mortar layer, d) incorporating a continuous cylindrical opening in the completed floor plate (19), e) inserting the annular receptacle element, or the threaded base (13), respectively, into the opening from the lower side of the floor plate (19), by screwing the former into the rigid foam layer (12) of the latter in such a manner that the cutting thread (11) cuts its way in a form-fitting manner into the material of the rigid foam layer (12)

Abstract

The invention relates to a shower floor plate module (1), comprising:

- a floor plate (19) which has a rigid foam layer (12), which is coated with a polymer mortar layer (15), and a circular opening,
- a receptacle element (200), placed in the opening, for a screw-type shower tray valve of a water outlet which is to be connected to a drain pipe,
- wherein the receptacle element (200) has an inclined inner face (7) for inserting a collar of the screw-type shower tray valve,
- wherein said inner face (7) in the assembled state of the receptacle element (200) tapers off in the direction of the drain pipe,
- and wherein the receptacle element (200) has a total height (H) which corresponds to approximately a thickness dimension in the region of the opening of the floor plate (19).

The receptacle element (200) has a cutting thread (11), the external diameter of which in the inserted state of the receptacle element (200) increases in the direction of the drain pipe. The receptacle element (200) furthermore has a threaded base (13) which by way of a support flange (26) forms a screw connection (20) for compensating a height tolerance.

Furthermore, the invention relates to a method for manufacturing a shower floor plate module (1), the method comprising the following method steps:

a) providing a blank foam body (rigid foam layer 12 from extruded rigid polystyrene foam) having predetermined dimensions,
b) applying thereon a textile or metallic reinforcement and bi-laterally coating the blank foam body with a liquid, polymer mortar layer,
c) curing the polymer mortar layer,
d) incorporating a continuous cylindrical opening in the completed floor plate (19),
e) inserting the annular receptacle element, or the threaded base (13), respectively, into the opening from the lower side of the floor plate (19), by screwing the former into the rigid foam layer (12) of the latter in such a manner that the cutting thread (11) cuts its way in a form-fitting manner into the material of the rigid foam layer (12)

SHOWER FLOOR PLATE MODULE WITH RECEPTACLE ELEMENT FOR A SCREW-TYPE SHOWER TRAY VALVE

The invention relates to a shower floor plate module, comprising:

- a floor plate which has at least one rigid foam layer which on at least one of its flat sides is coated with a polymer mortar layer, wherein a continuous opening is incorporated in the floor plate,
- a receptacle element, placed in the opening, for a screw-type shower tray valve of a water outlet which is to be connected to a drain pipe,
- wherein the receptacle element has an inclined inner face for inserting a collar of the screw-type shower tray valve,
- wherein said inner face in the assembled state of the receptacle element tapers off in the direction of the drain pipe,
- and wherein the receptacle element has a total height which corresponds to approximately a thickness dimension of the floor plate.

The invention furthermore relates to a novel method for manufacturing shower floor plate modules.

Shower floor plate modules of the generic type mentioned at the outset comprise a shower board having punctiform dewatering and under the product designation "wedi Fundo Primo" form a component part of the product range of the applicant (wedi GmbH, DE-48282 Emsdetten). The annular receptacle element, which is provided for adapting to the floor outlet cup in the prefabricated shower floor element, here is embodied so as to be bipartite. In order for the two parts to be able to be correctly inserted into the opening and to be able to be correctly interconnected during robot-assisted assembly of the receptacle element, the floor plate has to be simultaneously accessible from two sides, or

turned over, since assembly of the receptacle element has to be performed from two sides of the floor plate. Moreover, the opening has to be correspondingly adapted to the profile of the receptacle element. Profiling the opening requires the employment of various drills or mill cutters, respectively. This is time consuming and labor intensive.

It is the object of the invention to develop a shower floor plate module of the type stated in the preamble, the receptacle element of which is distinguished by a novel construction by way of which simplified assembly on the floor plate can be implemented.

This object is achieved by a shower floor plate module of the generic type, in which the receptacle element has a cutting thread, the external diameter of which in the inserted state of the receptacle element increases in the direction of the drain pipe.

The core of the invention lies in providing a cutting thread which cuts an internal thread into a bore of the floor plate.

In the present case a cutting thread is understood to be a profiled notch which continually runs in a helical manner as a helicoid around the outside of the circular receptacle element. The notch is referred to as a thread pitch.

By way of the cutting thread the receptacle element may be screwed into the material of the floor plate such that a support flange of the receptacle element comes to bear on the lower side of the floor plate. It is only by providing the cutting thread that dispensing with profiling of the continuous opening (bore) is enabled. The opening on the floor plate may be

incorporated as a cylindrical bore, using a simple tool in one operational step.

The bore may thus comprise one or two polymer mortar layers lying on both flat sides and the interdisposed rigid foam core into the porous material structure of which the thread pitch, having the steadily increasing diameter, cuts into the rigid foam in such a manner that the latter is subject to localized compression which forms along the thread pitch and which improves the stability of the connection created.

The cutting thread and thus the entire receptacle element here should be made from a substantially harder material than the rigid foam of the floor plate, for example from thermoplastics or duroplastics, or from metal. Accordingly, the receptacle element together with the support flange may be integrally manufactured from plastics by the injection-molding method or from metal. One possible implementation relates to plastics processing by the laser sintering method or with the aid of a computer-controlled 3-D printer, wherein ABS plastics (acrylonitrile butadiene styrene) or other thermoplastics may be employed as a primary material. A permanent metallic coating may also be applied onto the receptacle element made from plastics. Finally, the receptacle element may be manufactured by way of CNC machining.

The cutting thread may have tooth-like or barb-like structural elements, such as fish scales or tips which are directed counter to a screw-in direction of the receptacle element. This measure additionally improves the stability of the connection created by cutting.

In one further embodiment of the invention the receptacle element for the purpose of adapting to the thickness of the floor plate may be put together from

at least two rotation bodies. By way of the multipartite or bipartite embodiment of the receptacle element, respectively, thickness tolerances of the floor plates may be effectively compensated for. A bipartite receptacle element may be composed of the support flange and of a threaded base, for example, wherein the support flange as a separate component is disposed so as to be readjustable for height in relation to the threaded base.

Readjustability for height may be implemented by rotating the support flange in relation to the threaded base, if and when the support flange has an internal or external thread which forms a screw connection with a counter thread of the threaded base.

The cylindrical bore on the floor plate here may be graded, preferably in such a manner that the grading forms an inclined seat with which in the assembled state an inclination of the threaded base is compatible.

At least part of the internal or external thread, or of the counter thread, respectively, of the support flange and of the threaded base, respectively, may be segmented.

Placing and securing the integral receptacle element in the hole of the floor plate may be facilitated by a simple screw-in aid. For this purpose, troughs into which a driver tool fits may be incorporated in an inner wall of the receptacle element. Similar applies to the bipartite receptacle element: here the support flange may be provided with a few blind holes, for example, in which a driver tool can likewise engage. A robotic arm may be equipped with the driver tool, for example.

It is of great advantage that the shower floor plate module is devised such that it is possible for the receptacle element to be assembled therein from only one side of the floor plate, namely from the lower side of the latter. This simplifies robot-assisted assembly of the receptacle element, since the floor plate no longer has to be turned over during production of the shower floor plate module. A further advantage lies in the reduction of manufacturing costs.

Exemplary embodiments of the invention will be explained in more detail by means of the appended drawing, in which:

fig. 1 shows a shower floor plate module having a floor plate with shower outlet elements, in a simplified, schematic sectional view;

fig. 2 shows the shower floor plate module according to fig. 1 in a perspective and exploded illustration;

fig. 3 shows an integral receptacle element with a support flange, in a perspective view;

fig. 4 shows the receptacle element according to fig. 3 with visible inner clearances, in a perspective view;

fig. 5 shows the receptacle element according to fig. 3 in a side view;

fig. 6 shows the receptacle element according to fig. 3 in a plan view onto the lower side thereof;

fig. 7 shows a threaded base of a bipartite receptacle element in a perspective view;

fig. 8 shows the bipartite receptacle element with the threaded base according to fig. 7, fitted in the floor plate, in a sectional view;

fig. 9 shows an enlarged detail of the receptacle element according to fig. 8, fitted in a graded opening of the floor plate;

fig. 10 shows an enlarged detail of a further receptacle element fitted in a cylindrical opening of the floor plate;

fig. 11 shows the integral receptacle element according to fig. 3, which is placed on an assembly bench, after assembly on the floor plate, in a partial sectional view;

fig. 12 shows the bipartite receptacle element according to fig. 9, likewise placed on an assembly bench, in a partial sectional view;

fig. 13 shows a further embodiment of the integral receptacle element which by way of its cutting thread has been screwed into the material of the floor plate, illustrated in a partial sectional view;

fig. 14 shows the integral receptacle element according to fig. 3, but having an indicated segmentation of the cutting thread and having pointed structural elements, in a plan view from above; and

fig. 15 shows the detail according to fig. 9, but with a differently disposed support flange.

A shower floor plate module 1 which is put together from a floor plate 19 and an annular receptacle element 100 or 200, respectively, for a screw-type shower tray valve 10 is schematically shown in figs. 1 and 2. The screw-type shower tray valve 10 is a component part of a schematically indicated water outlet 5 which is connected to a vertically running drain pipe 25. In a further embodiment (not illustrated) a horizontal water outlet is provided.

The floor plate 19 in the present case in the plan view onto the flat side thereof is rectangular; however other polygonal external contours of the floor plate, such as a trapezoidal, pentagonal or octagonal contour as well as rounded external contours are also conceivable. The latter may be circular, oval, have the shape of a segment of a circle, or be helical, for example.

The floor plate 19 has a slightly concave upper flat side 2 which runs toward a circular opening 4, and a planar lower flat side 3. The terms “upper”, “lower”, “top”, “bottom”, “above”, etc. refer to the typical arrangement of the floor plate in a shower cabin, as may also be derived from figs. 1 and 2.

The floor plate 19 has a rigid foam layer 12 from extruded rigid polystyrene foam, which is HCFC free, water-impermeable and thermally insulating, and which is on both sides adhesively bonded to a reinforced polymer mortar layer 15 (polymer-modified coating mortar).

Furthermore, the following details may be seen in figs. 1 or 2, respectively:

- the floor plate 19 in the region of the opening 4 has a thickness dimension S which is approximately

equal to a total height H of the receptacle element 100; 200, shown in figs. 5 and 9;

- a support flange 6; 26 of the receptacle element 100; 200 in the fitted state presses against a lower side, presently the lower flat side 3 (cf. fig. 2) of the floor plate 19;
- an inclined inner face 7 of the annular receptacle element, for inserting a collar 9 of the screw-type shower tray valve 10, which tapers off in the direction of the support flange 6; 26;
- an elastomeric O-ring 8 for insertion on an encircling duct 29 which is profiled on the inner face 7 (cf. fig. 9); and
- a bush-shaped seal insert 30 having a rubber sleeve 31, which is capable of being screwed into the screw-type shower tray valve 10.

The solid receptacle element 100 which is integrally made by the injection-molding method and which is illustrated in figs. 3 to 6 and 11, has a profiled annular base 32 having said inclined inner face 7, the outwardly protruding support flange 6, and a cutting thread 11. As is demonstrated in particular by figs. 3, 4, and 5, the cutting thread 11 has an external diameter D which increases in the direction of the support flange 6. The cutting thread 11 has a full continuous coiling corresponding to a circumference of approximately 720°, and at the widest point 34 thereof terminates above the support flange 6. Furthermore, fig. 5 shows a profiled and partially conical outer face 35 of the annular base 32 having said cutting thread 11.

According to fig. 4, trough-shaped clearances 23 for inserting a driver tool (not illustrated) are incorporated in a cylindrical inner wall 24 of the receptacle element 100. The clearances 23 are also provided on the cylindrical inner wall 24 of a further

and likewise solid unipartite receptacle element 100 according to fig. 13, the outer face 35 of which up to the recess 33 and with the exception of the cutting thread 11 is cylindrical.

The outer face 35 of the solid receptacle element 100 according to fig. 11 runs in a cylindrical manner up to the outwardly protruding support flange 6, and via an inclination 37 adjoins an upper cylindrical area portion 38.

Fig. 14 shows a deviating embodiment of the receptacle element 100 or 200, respectively, in which the lower part of the cutting thread 11 is subdivided into arcuate and mutually spaced apart segments 36 which taper off in the screw-in direction R. At least the widest segment of the cutting thread 11 is provided with a few barb-like structural elements 21 which in each case have a tip 22 which is directed counter to the screw-in direction R.

The bipartite receptacle element 200 which is illustrated in figs. 7 to 9 is composed of a threaded base 13 and of the support flange 26 which is disposed so as to be readjustable for height in relation to the threaded base 13. For this purpose the support flange 26 has an encircling leg 17 which in the put-together state is directed toward the threaded base 13 (cf. in particular fig. 9) and which has an internal thread 18 which with an external thread 16 of an encircling leg 14 of the threaded base 13 forms a screw connection 20.

In terms of its external shape the threaded base 13 according to fig. 9 is partially similar to the solid receptacle element 100 according to fig. 11 (including the inclination 37). The same applies to the threaded base 13 according to fig. 10 which is similar to the

solid receptacle element 100 according to fig. 13 (cylindrical outer face 35).

According to figs. 10 and 13, the opening 4 on the floor plate 19 is continuously cylindrical, except for a circular and coaxial recess 33 for receiving the support flange 26 or 6, respectively. The threaded base 13, which is screwed into the material of the floor plate 19, and correspondingly the solid receptacle element 100 according to fig. 13 fit into the opening 4.

According to figs. 9 and 11, the opening 4 on the floor plate 19 is graded. Three different internal diameters d1, d2, d3 can thus be seen in fig. 11, the internal diameter d1 of which corresponds to a part of the opening 4 which tightly surrounds the cylindrical area portion 38 of the receptacle element 100. Accordingly, the central internal diameter d2 of the opening 4 is adapted to the central cylindrical part of the outer face 35 of the receptacle element 100. The internal diameter d3 refers to the abovementioned recess 33 for receiving the support flange 6 or 26, respectively.

The method for manufacturing the shower floor plate module 1 comprises the following method steps:

a) providing a blank foam body having predetermined dimensions, in the present case a rectangular blank foam body which is composed of a rigid foam layer 12 from extruded rigid polystyrene foam;

b) applying thereon a textile or metal reinforcement and bi-laterally coating the blank foam body (rigid foam layer 12) with a polymer-modified coating mortar;

c) curing the coating mortar until a solidified polymer mortar layer 15 is created;

d) incorporating a continuous cylindrical or graded opening 4, respectively, in the completed floor plate 19;

e) inserting the annular receptacle element 100, or the threaded base 13, respectively, into the opening 4, only from the lower flat side 3 of the floor plate 19, by screwing the former into the rigid foam layer 12 of the latter in such a manner that the cutting thread 11 cuts its way in a form-fitting manner into the material of the rigid foam layer 12.

The last point "e" of the method may be clarified by means of figs. 11 to 13. The figures in each case show a floor plate 19 which is placed so as to be flat on a planar assembly bench 39, the cutting thread 11 of the receptacle element 100 or of the threaded base 13, respectively, being screwed into the opening 4 of said floor plate 19 from the lower side (flat side 3) of the floor plate 19. The lower flat side 3 of the floor plate 19 is now on the top, whereas the upper flat side 2 at the bottom bears on the plane of the assembly bench 39.

This assembly arrangement of the floor plate 19 enables the receptacle element 100 or 200, respectively, to be screwed in from the lower flat side 3 of the floor plate 19 with the aid of a driver tool (not illustrated) with which a robotic arm is equipped. The driver tool engages in the clearances 23 (cf. fig. 13) on the cylindrical inner wall 24, or in the blind-hole shaped clearances 27 which are incorporated in a lower side 28 of the support flange 26 (cf. fig. 12). Screwing-in is performed up to the stop, that is to say up to the plane of the assembly bench 39, such that the receptacle element 100; 200 is basically aligned so as to be flush with the two flat sides 2, 3 of the floor plate 19.

Since the floor plates 19 have a thickness tolerance due to the manufacturing technology, the screwed-in and integral receptacle element 100 may stand slightly proud of the flat side 3 and form a differential value X1 (cf. fig. 13). On the other hand, the screwed-in receptacle element 100 may lie somewhat below the flat side 3 (cf. differential value X2; fig. 11).

These discrepancies are addressed by way of the bipartite embodiment according to figs. 8, 9, 10, and 12, since the support flange 26 by way of its leg 17 can be adjusted in a sufficiently exact manner in terms of height after the threaded base 13 has been secured in the opening 4. As is shown in fig. 12, the support flange 26 is aligned so as to be flush with the flat side 3 of the floor plate 19.

According to fig. 15, the support flange 26 bears on the polymer mortar layer 15 of the lower flat side 3 of the floor plate 19.

List of reference signs:

1. Shower floor plate module
2. Flat side (upper)
3. Flat side (lower)
4. Opening (bore)
5. Water outlet
6. Support flange
7. Inner face
8. O-ring
9. Collar
10. Screw-type shower tray valve
11. Cutting thread
12. Rigid foam layer
13. Threaded base
14. Leg
15. Polymer mortar layer
16. External thread
17. Leg
18. Internal thread
19. Floor plate
20. Screw connection
21. Structural element
22. Tip
23. Clearance
24. Inner wall
25. Drain pipe
26. Support flange
27. Clearance (blind hole)
28. Lower side (of 26)
29. Duct
30. Seal insert
31. Rubber sleeve
32. Annular base
33. Recess
34. Widest point (of 11)
35. Outer face (of 100)
36. Segment (of 11)

37. Inclination (of 100)

38. Area portion

39. Assembly bench

100; 200 Receptacle element

d1, d2, d3 Internal diameter (of 4)

D External diameter

H Total height

R Screw-in direction

S Thickness dimension

X1, X2 Differential value

Patent claims

1. Shower floor plate module (1), comprising:
   - a floor plate (19) which has at least one rigid foam layer (12) which on at least one of its flat sides (2; 3) is coated with a polymer-modified coating mortar (15), wherein a continuous opening (4) is incorporated in the floor plate (19),
   - a receptacle element (100; 200), placed in the opening (4), for a screw-type shower tray valve (10) of a water outlet (5) which is to be connected to a drain pipe (25),
   - wherein the receptacle element (100; 200) has an inclined inner face (7) for inserting a collar (9) of the screw-type shower tray valve (10),
   - wherein said inner face (7) in the assembled state of the receptacle element (100; 200) tapers off in the direction of the drain pipe (25),
   - and wherein the receptacle element (100; 200) has a total height (H) which corresponds to approximately a thickness dimension (S) in the region of the opening (4) of the floor plate (19),

   characterized in that the receptacle element (100; 200) has a cutting thread (11), the external diameter (D) of which in the inserted state of the receptacle element (100; 200) increases in the direction of the drain pipe (25).

2. Shower floor plate module (1) according to Claim 1, characterized in that the floor plate (19) on

the flat side (3) thereof which faces the drain pipe (25) is underlaid by an outwardly protruding support flange (6; 26) of the receptacle element (100; 200).

3. Shower floor plate module (1) according to Claim 1, characterized in that the opening (4) on the floor plate (19) is continuously cylindrical.

4. Shower floor plate module (1) according to Claim 3, characterized in that the cylindrical opening (4) is graded in such a manner that it has at least two different internal diameters (d1, d2, d3).

5. Shower floor plate module (1) according to Claim 1, characterized in that the cutting thread (11) has at least one tooth-like or barb-like structural element (21) which by way of its tip (22) is directed counter to a screw-in direction (R) of the receptacle element (100; 200).

6. Shower floor plate module (1) according to Claim 1, characterized in that the receptacle element (100) together with the support flange (6) is integrally made from plastics or metal.

7. Shower floor plate module (1) according to Claim 1, characterized in that the receptacle element (200) is composed of a threaded base (13) and the support flange (26), wherein the support flange (26) as a separate component is disposed so as to be readjustable for height in relation to the threaded base (13).

8. Shower floor plate module (1) according to Claim 7, characterized in that

- the threaded base (13) has a central and at least partially encircling leg (14) on which an external thread (16) is incorporated,
- the support flange (26) has an at least partially encircling leg (17) on which an internal thread (18) is disposed, and
- the external thread (16) and the internal thread (18) form a screw connection (20).

9. Shower floor plate module (1) according to one of the preceding claims, characterized in that the cutting thread (11) and/or the external thread (16) and/or the internal thread (18) are segmentable.

10. Shower floor plate module (1) according to one of the preceding claims, characterized in that the receptacle element (100; 200) is provided as an injection-molded part.

11. Shower floor plate module (1) according to one of the preceding claims, characterized in that the receptacle element (100; 200) has been created by plastics processing in a computer-controlled 3-D printer or by the laser sintering method.

12. Shower floor plate module (1) according to one of the preceding claims, characterized in that at least one trough-shaped clearance (23; 27) for inserting a driver tool is provided on the receptacle element (100; 200).

13. Shower floor plate module (1) according to Claim 12, characterized in that the clearance (23) is disposed on a cylindrical inner wall (24) of the receptacle element (100).

14. Shower floor plate module (1) according to Claim 12, characterized in that the clearance (27) is disposed on a lower side (28) of the support flange (26) of the receptacle element (200).

15. Method for manufacturing a shower floor plate module (1) according to one of Claims 1 to 14, the method comprising the following method steps:

a) providing a blank foam body (rigid foam layer 12) from extruded rigid polystyrene foam (XPS) or expanded rigid polystyrene foam (EPS) having predetermined dimensions,

b) applying thereon a textile or metallic reinforcement and bi-laterally coating the blank foam body with a liquid, polymer-modified coating mortar (15),

c) curing the coating mortar (15),

d) incorporating a continuous cylindrical opening (4) in the completed floor plate (19),

e) inserting the receptacle element (100), or the threaded base (13), respectively, into the opening (4) from the lower side (3) of the floor plate (19), by screwing the former into the rigid foam layer (12) of the latter in such a manner that the cutting thread (11) cuts its way in a form-fitting manner into the material of the rigid foam layer (12).

16. Method according to Claim 15, characterized in that after securing the threaded base (13) in the opening (4), the support flange (26) by way of the leg (17) thereof is screwed into the threaded base (13) while considering the tolerance in terms of height, and is adjusted therein.

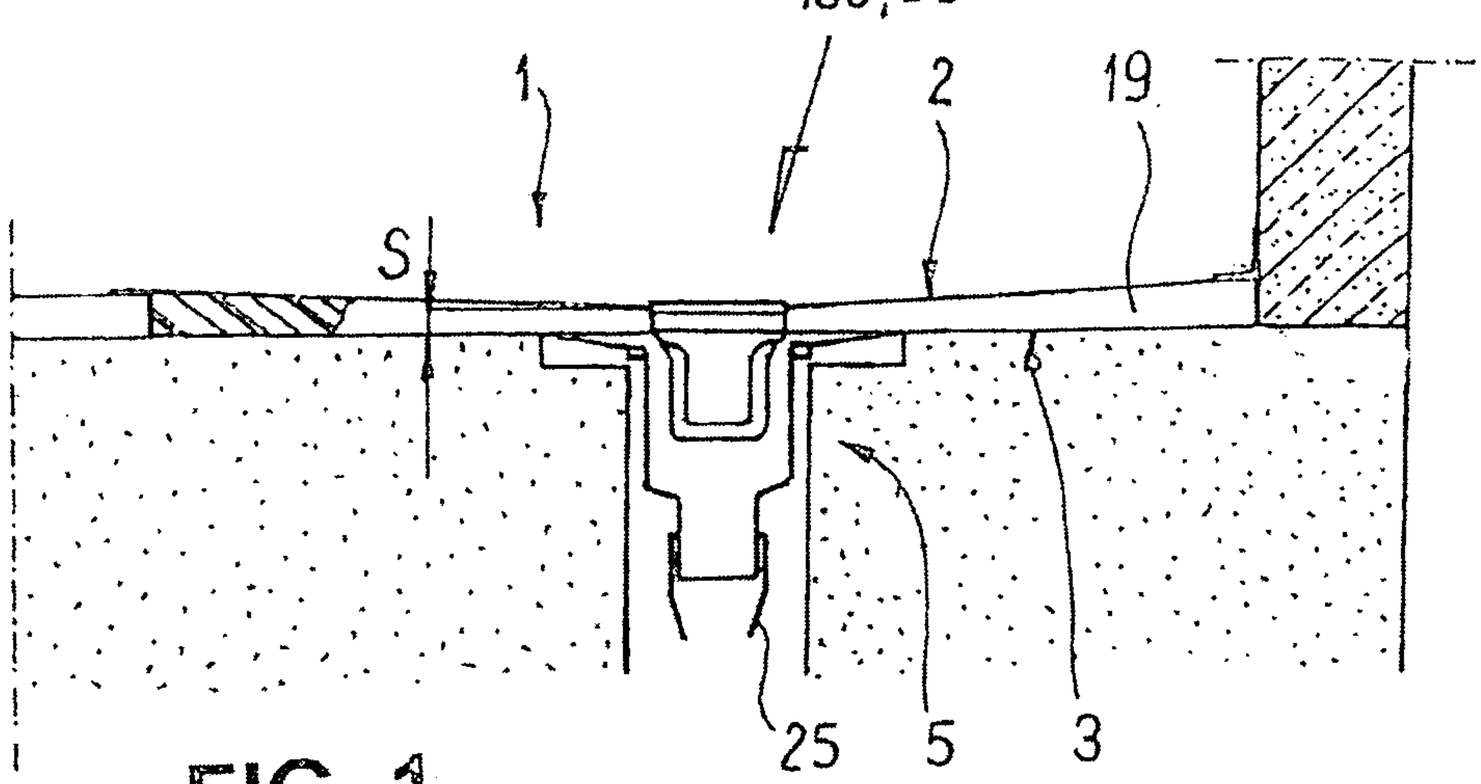

FIG. 1

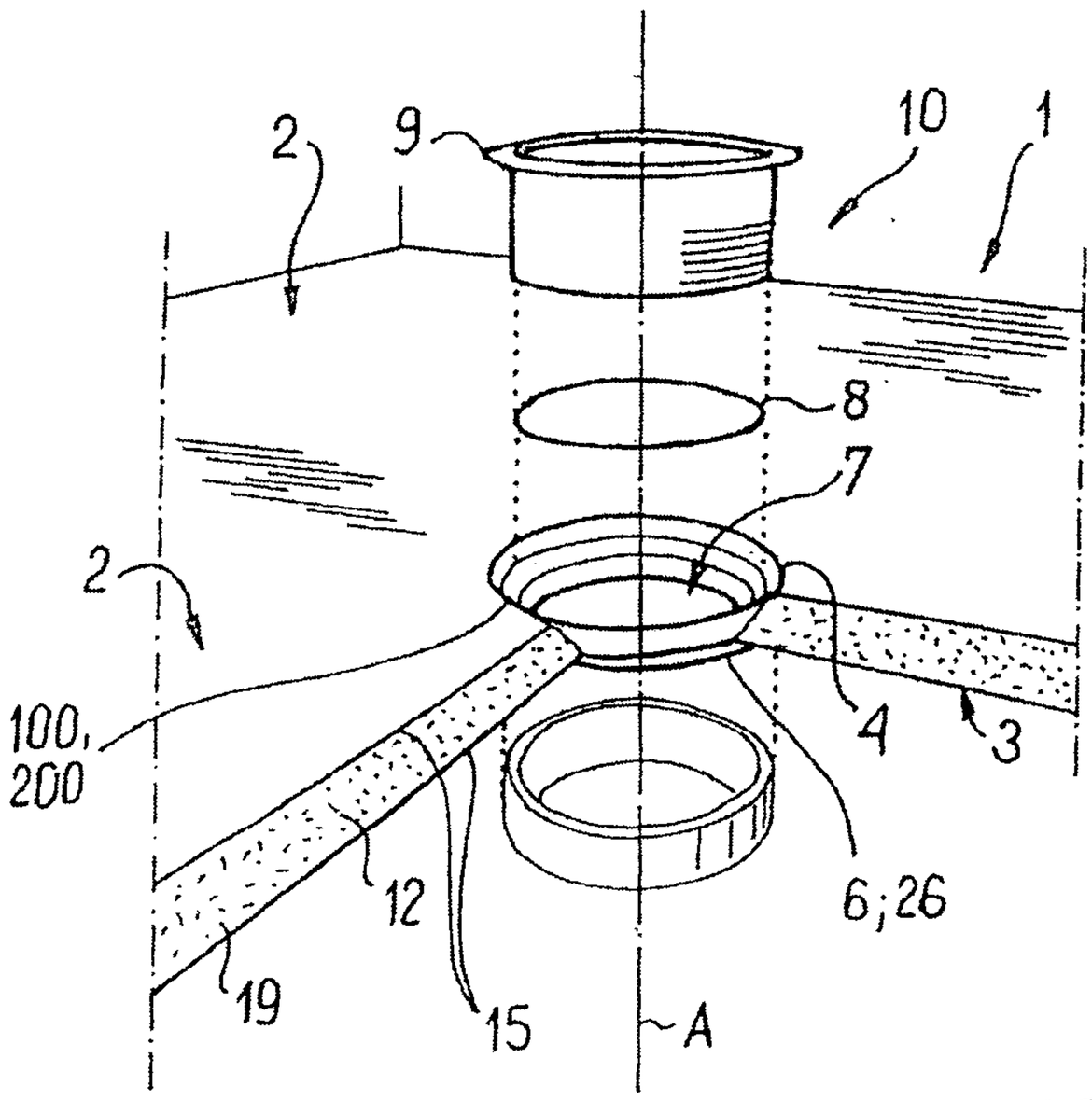

FIG. 2

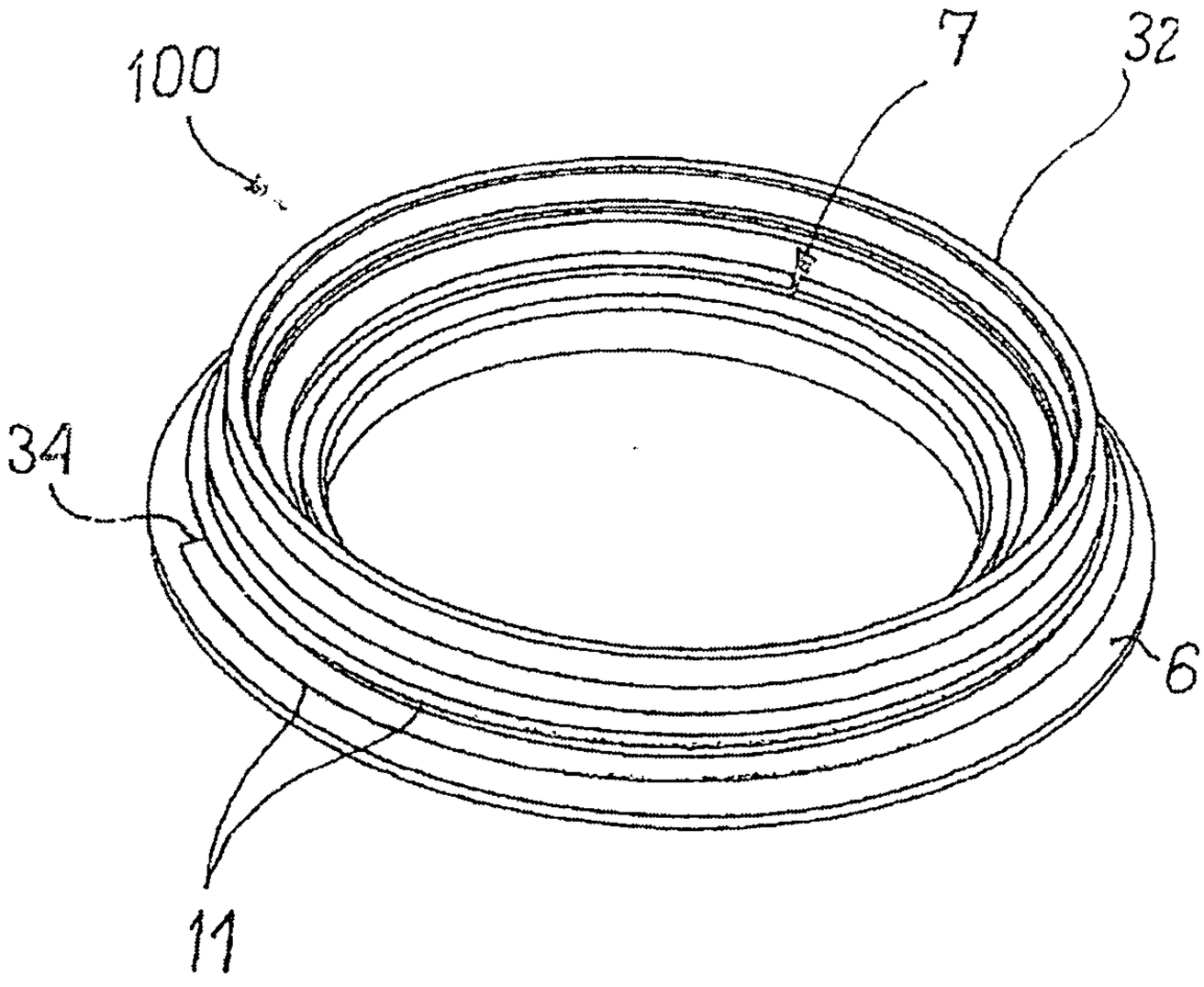

FIG. 3

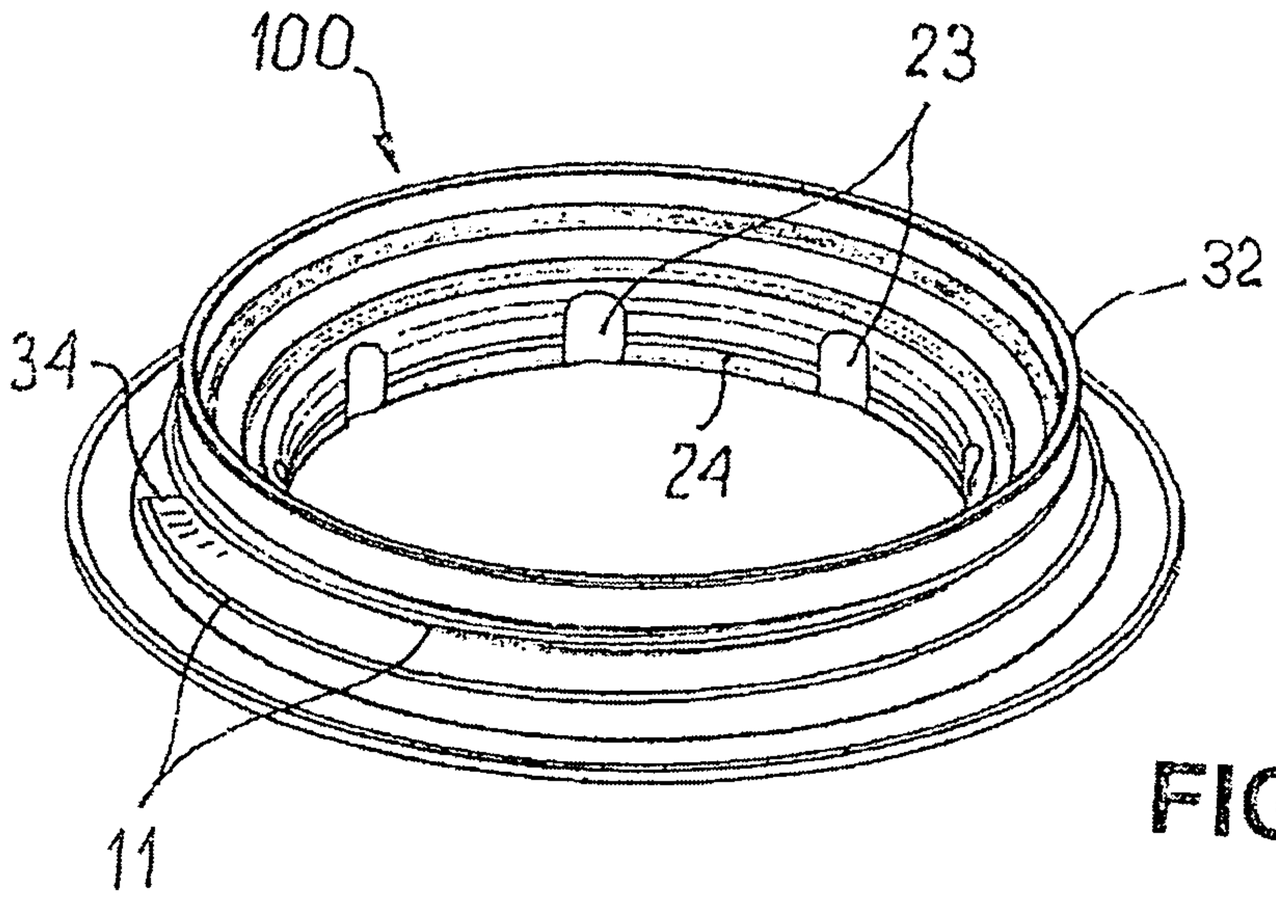

FIG. 4

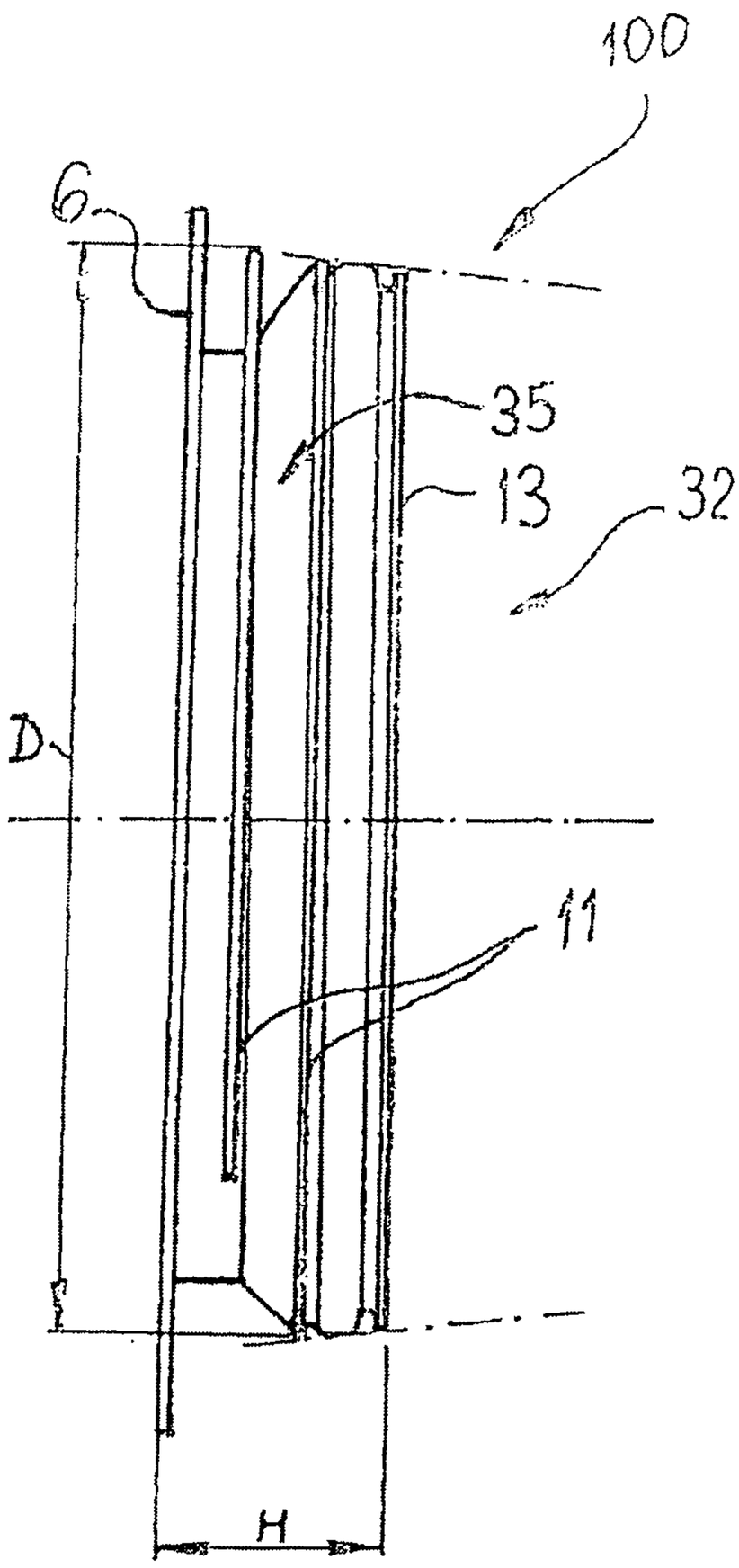

FIG. 5

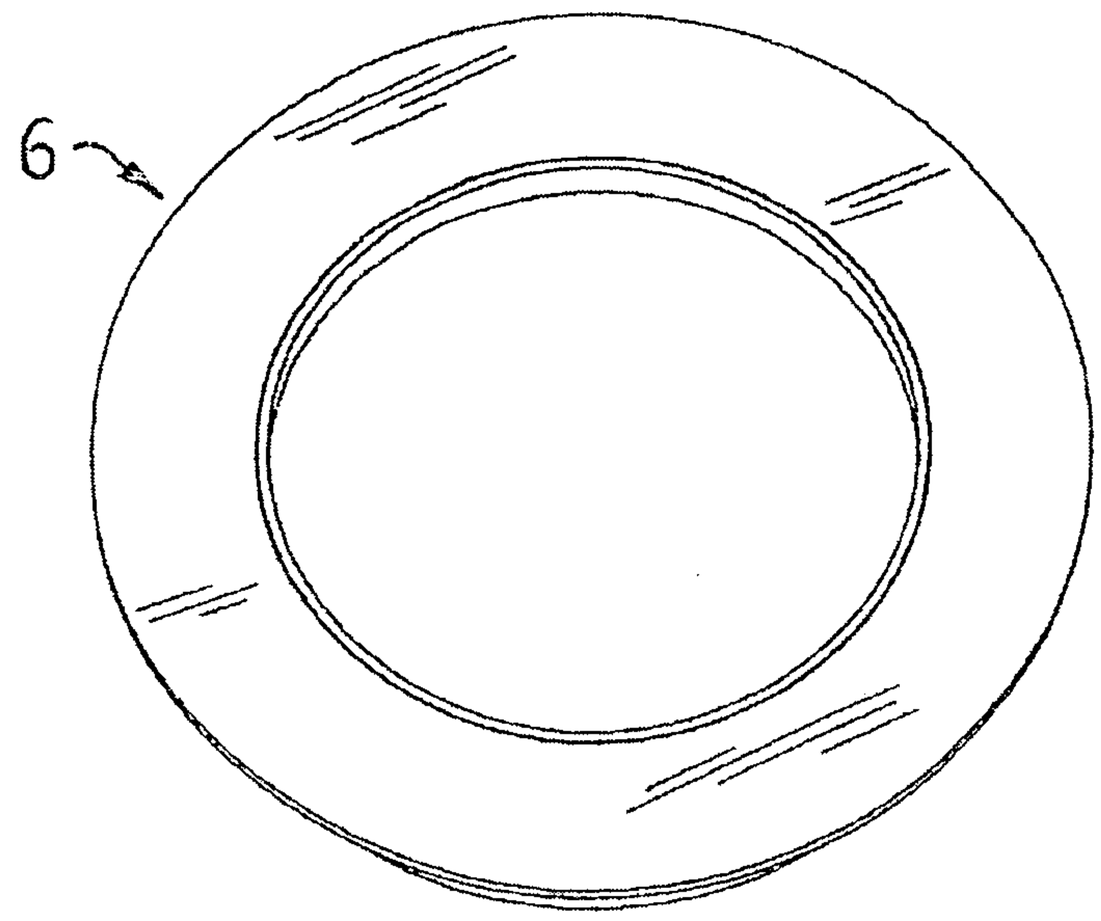

FIG. 6

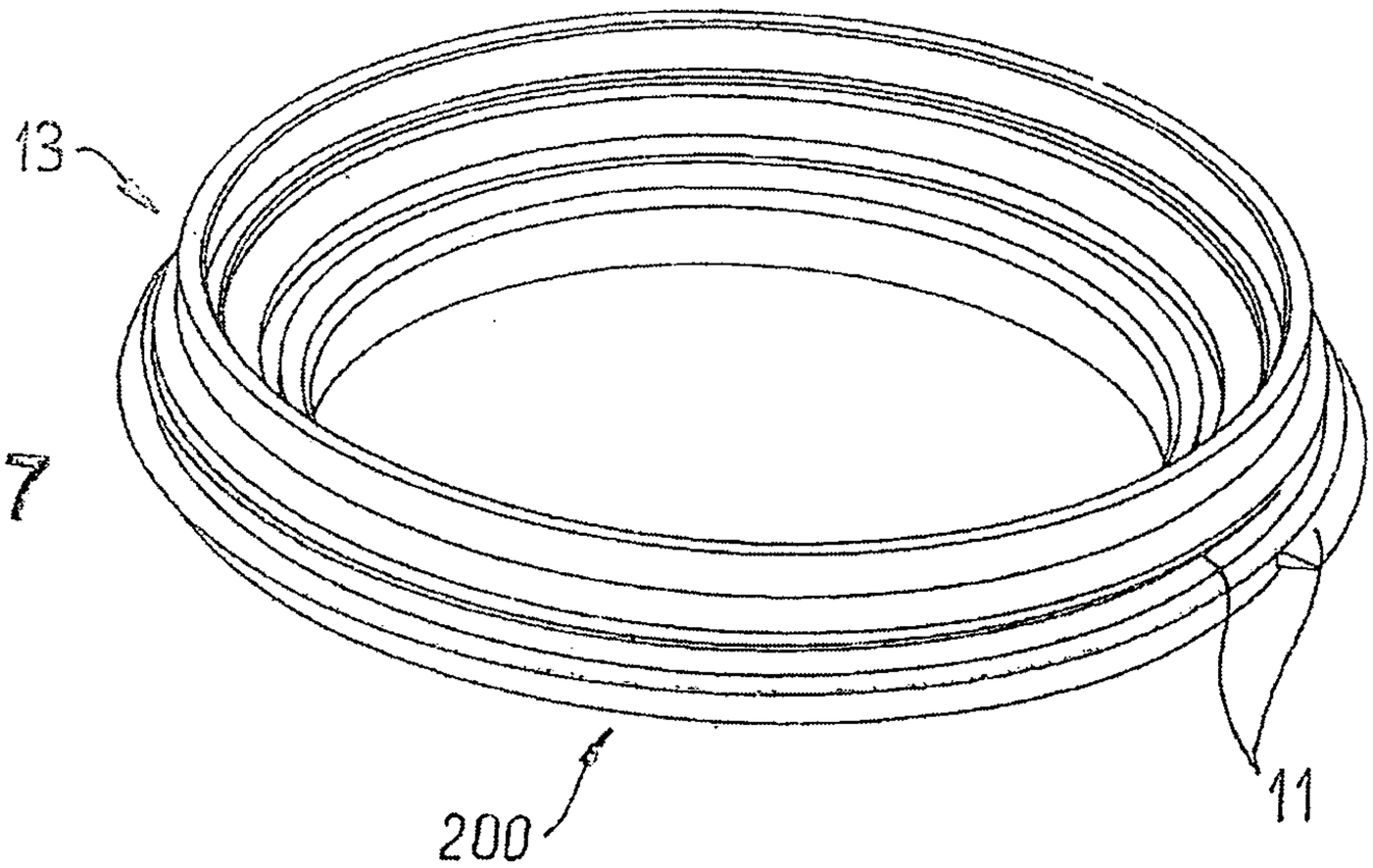

FIG. 7

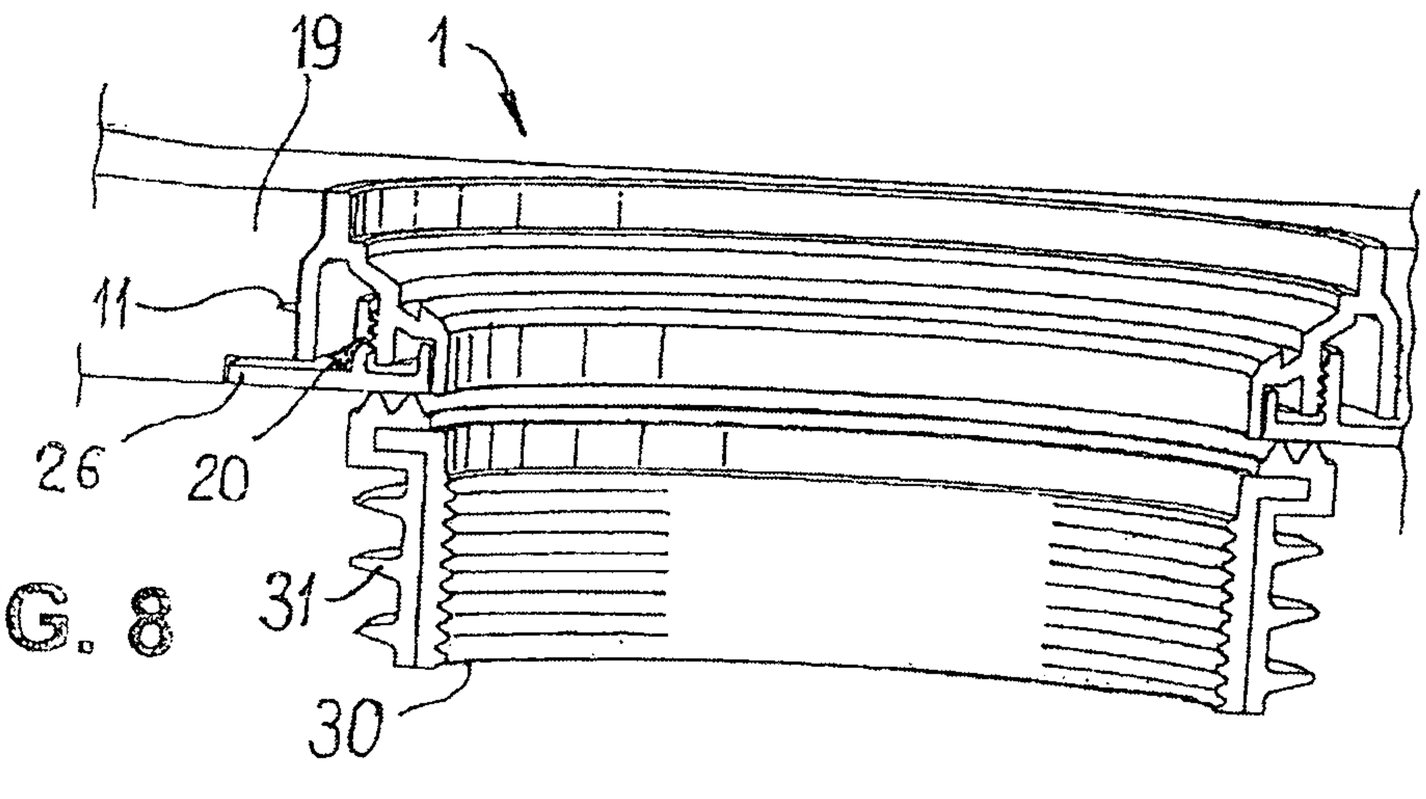

FIG. 8

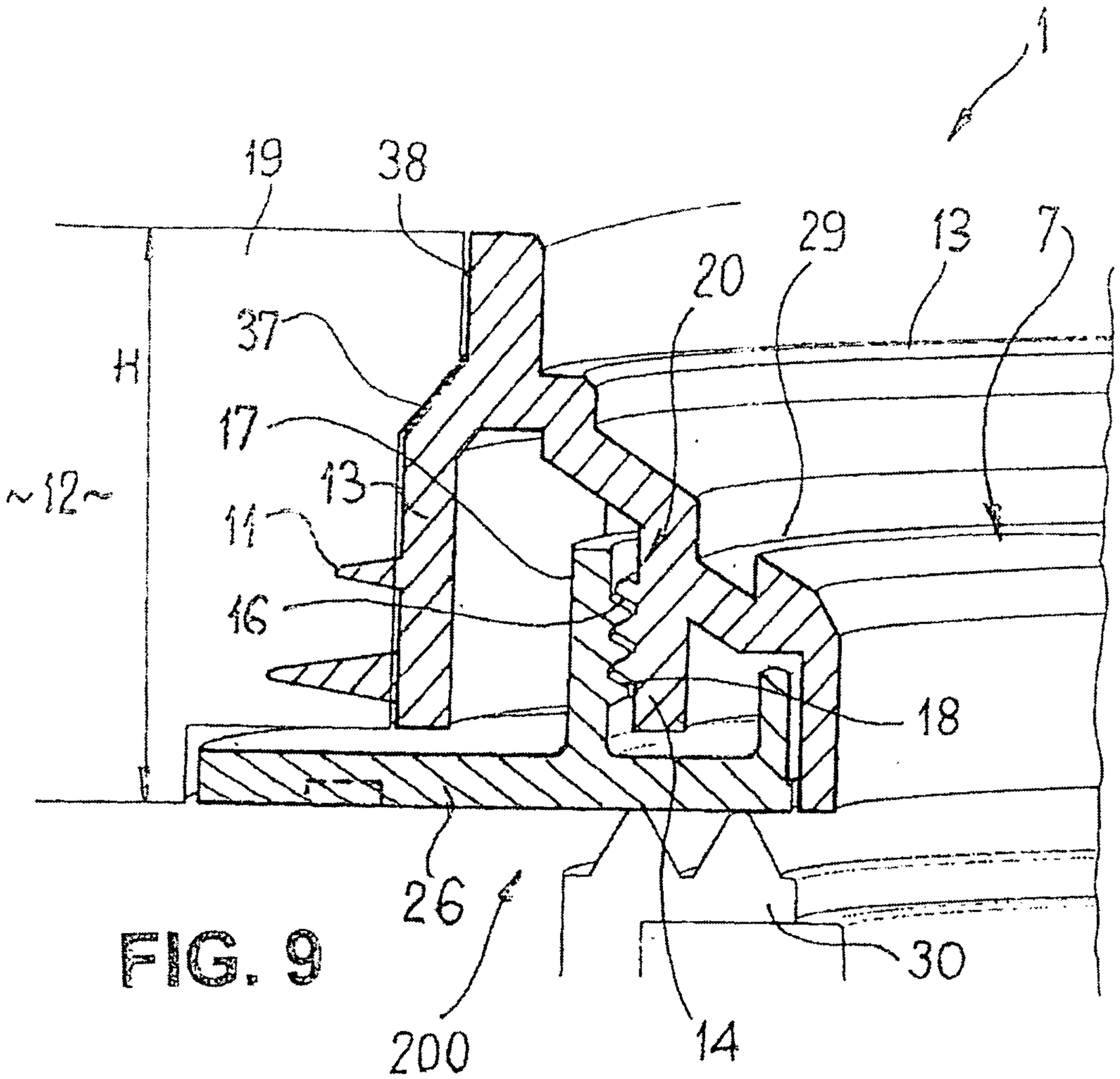
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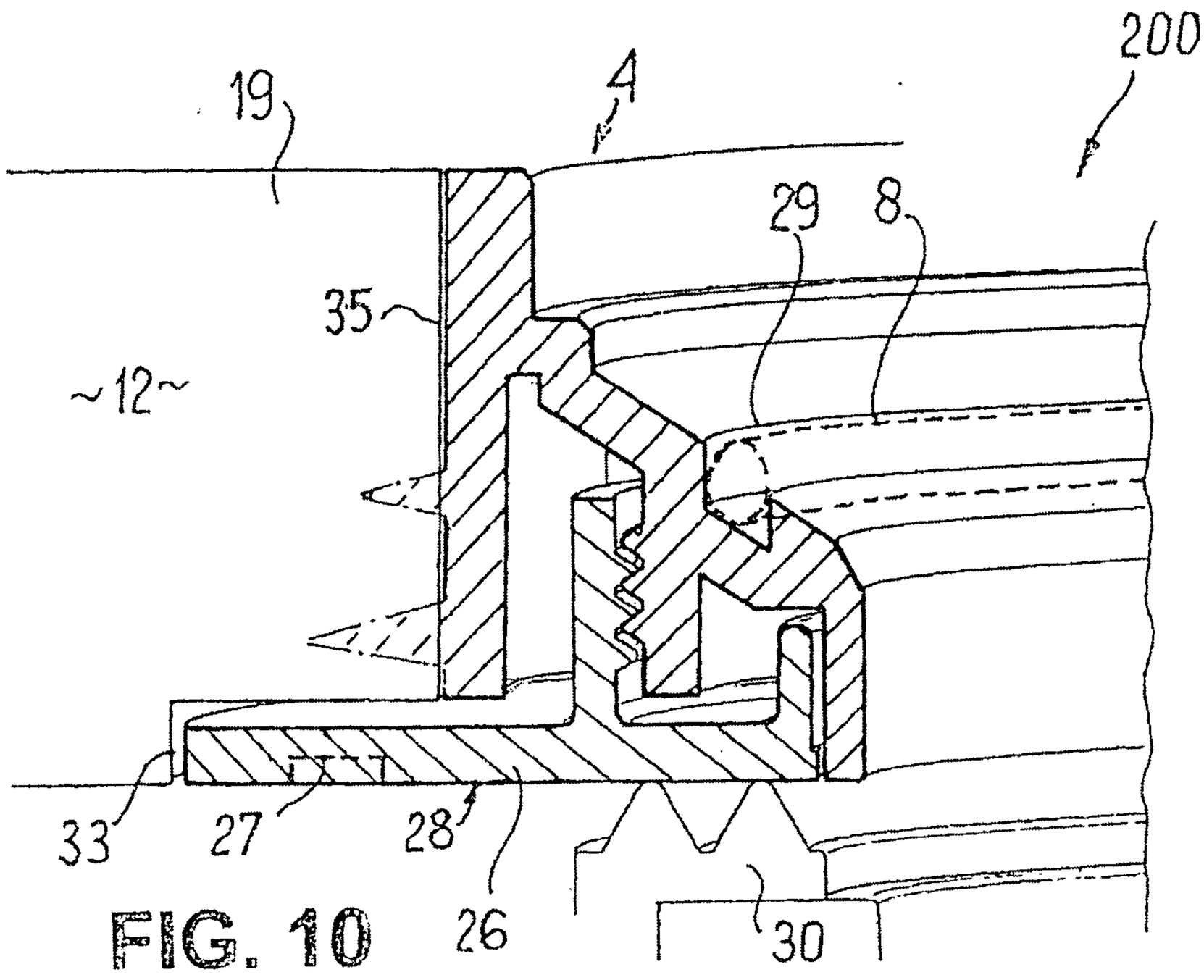
FIG. 9


200
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~12~
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FIG. 10

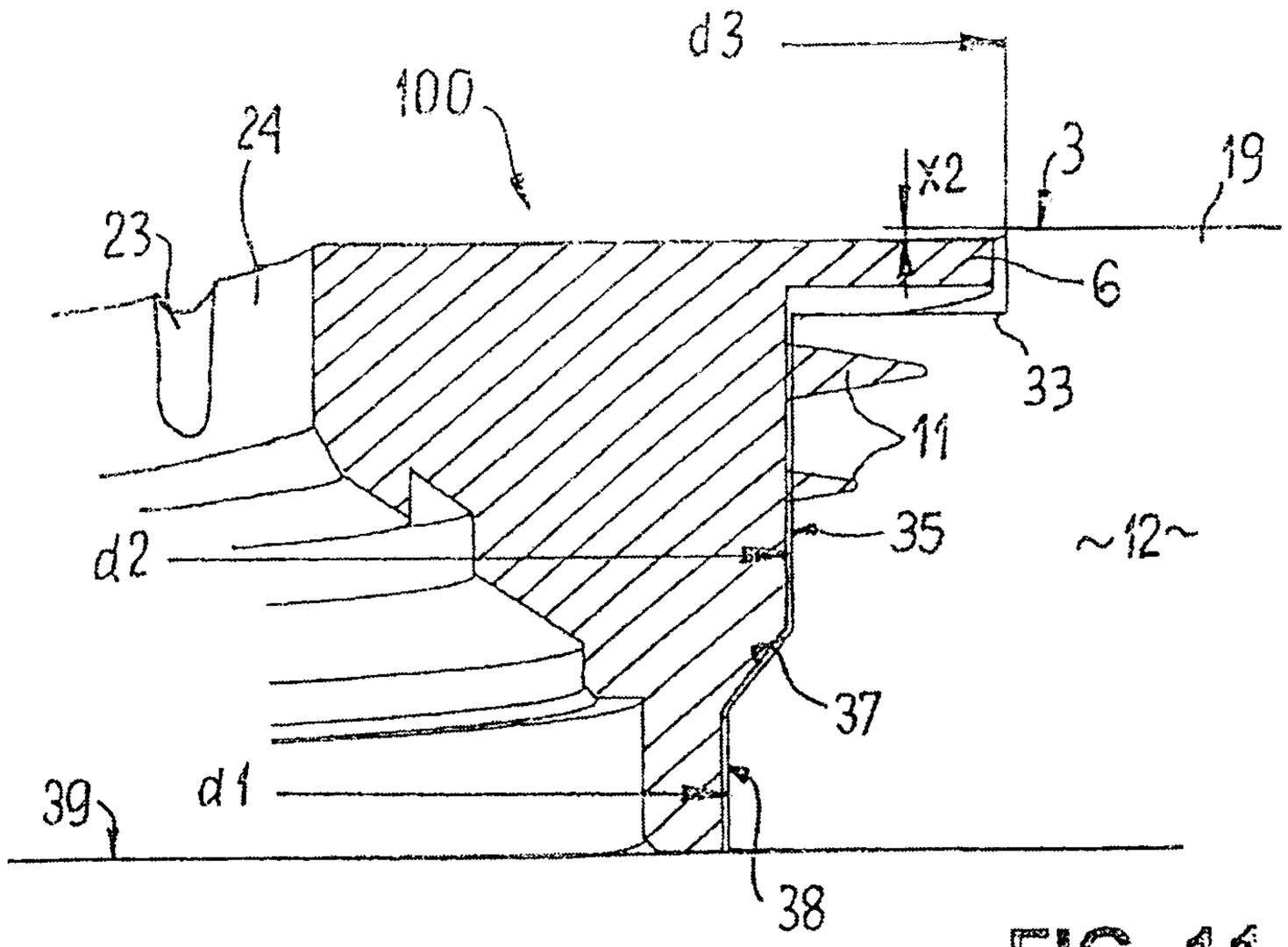
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FIG. 11

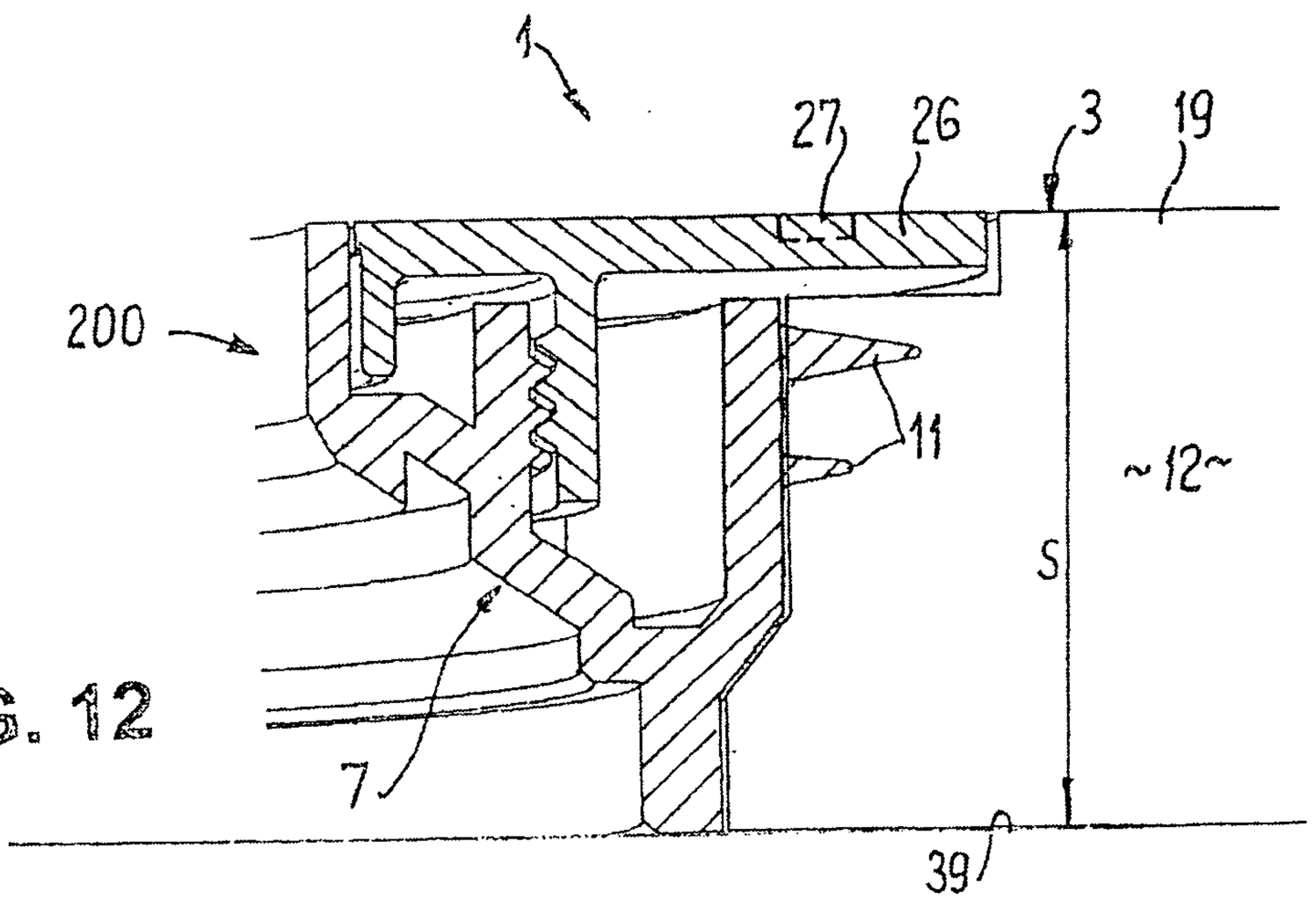
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FIG. 12

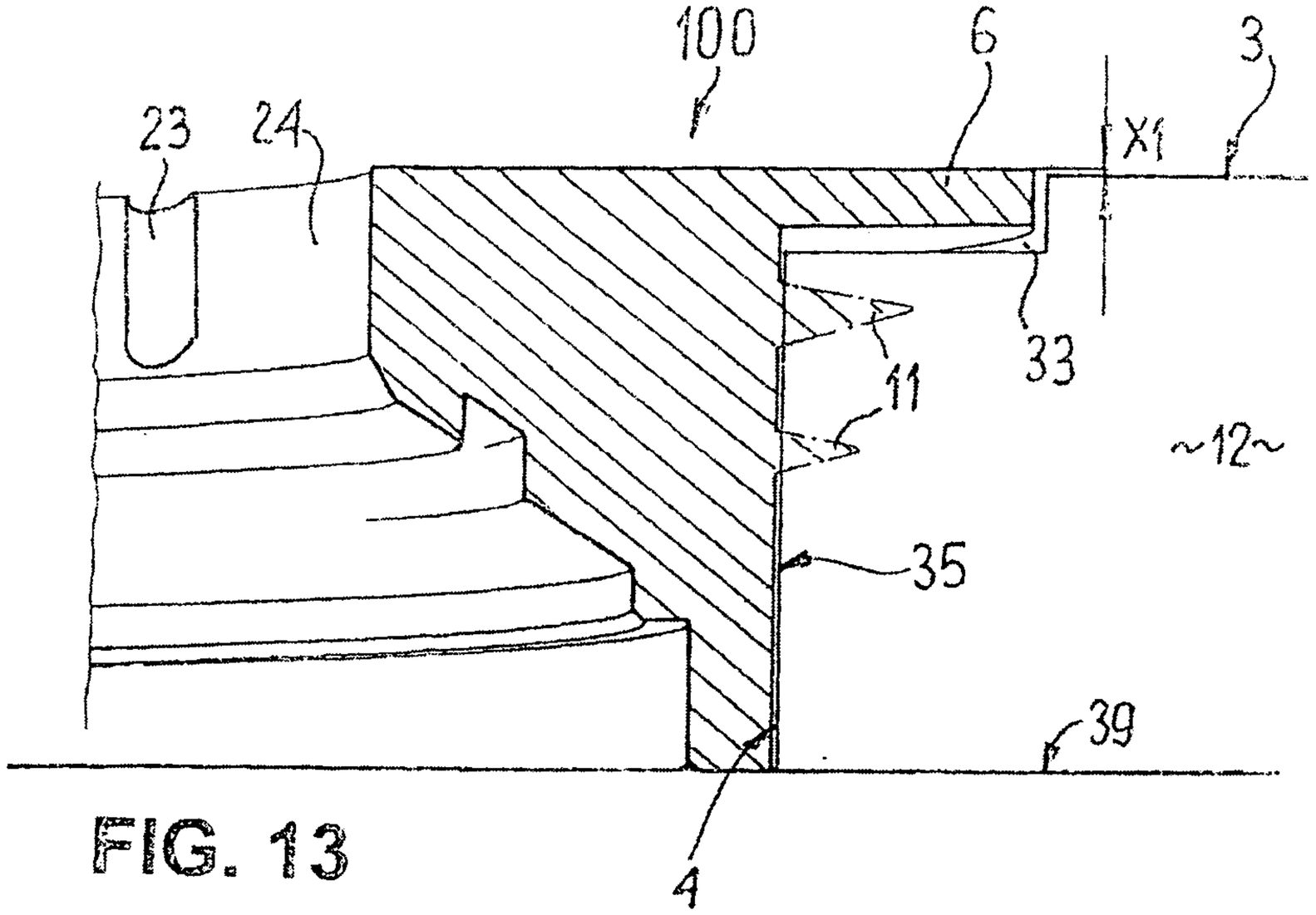


FIG. 13

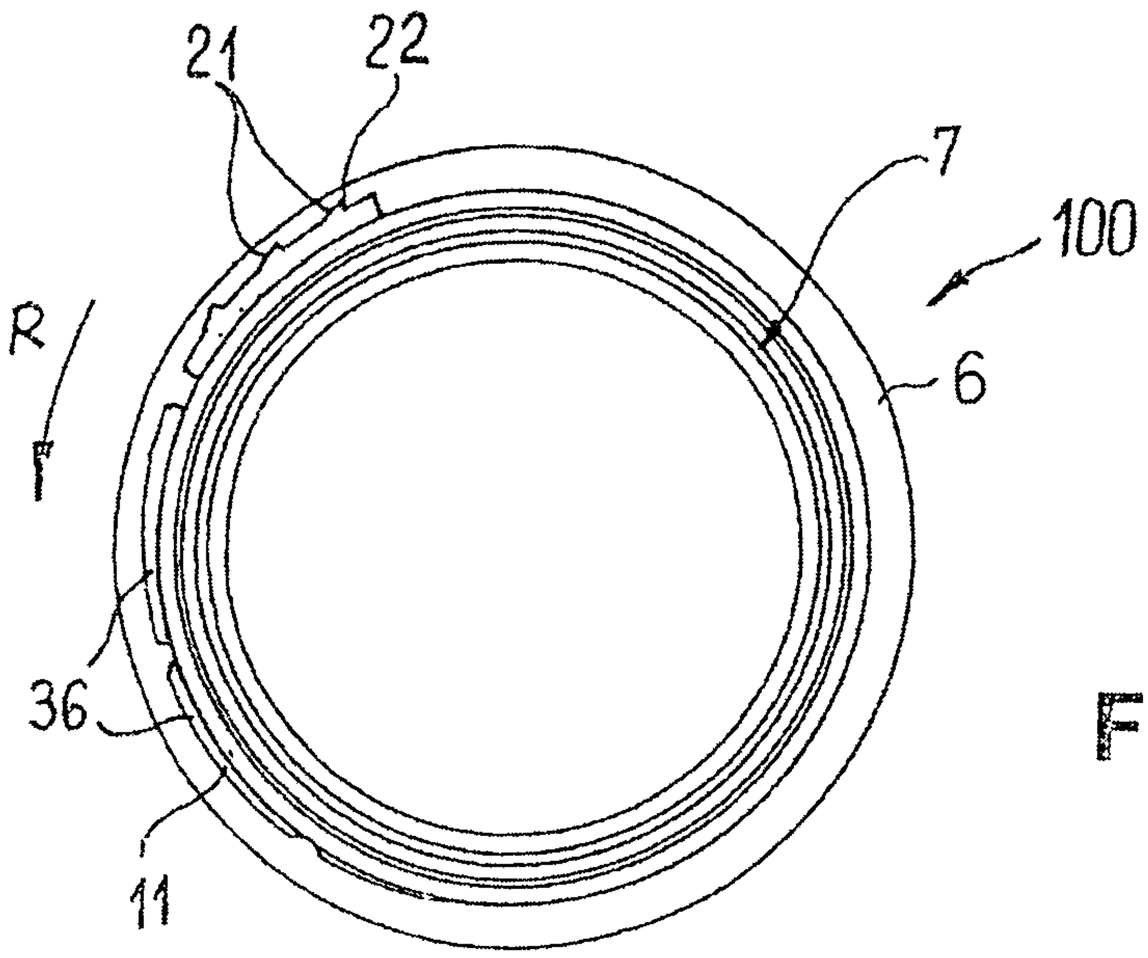


FIG. 14

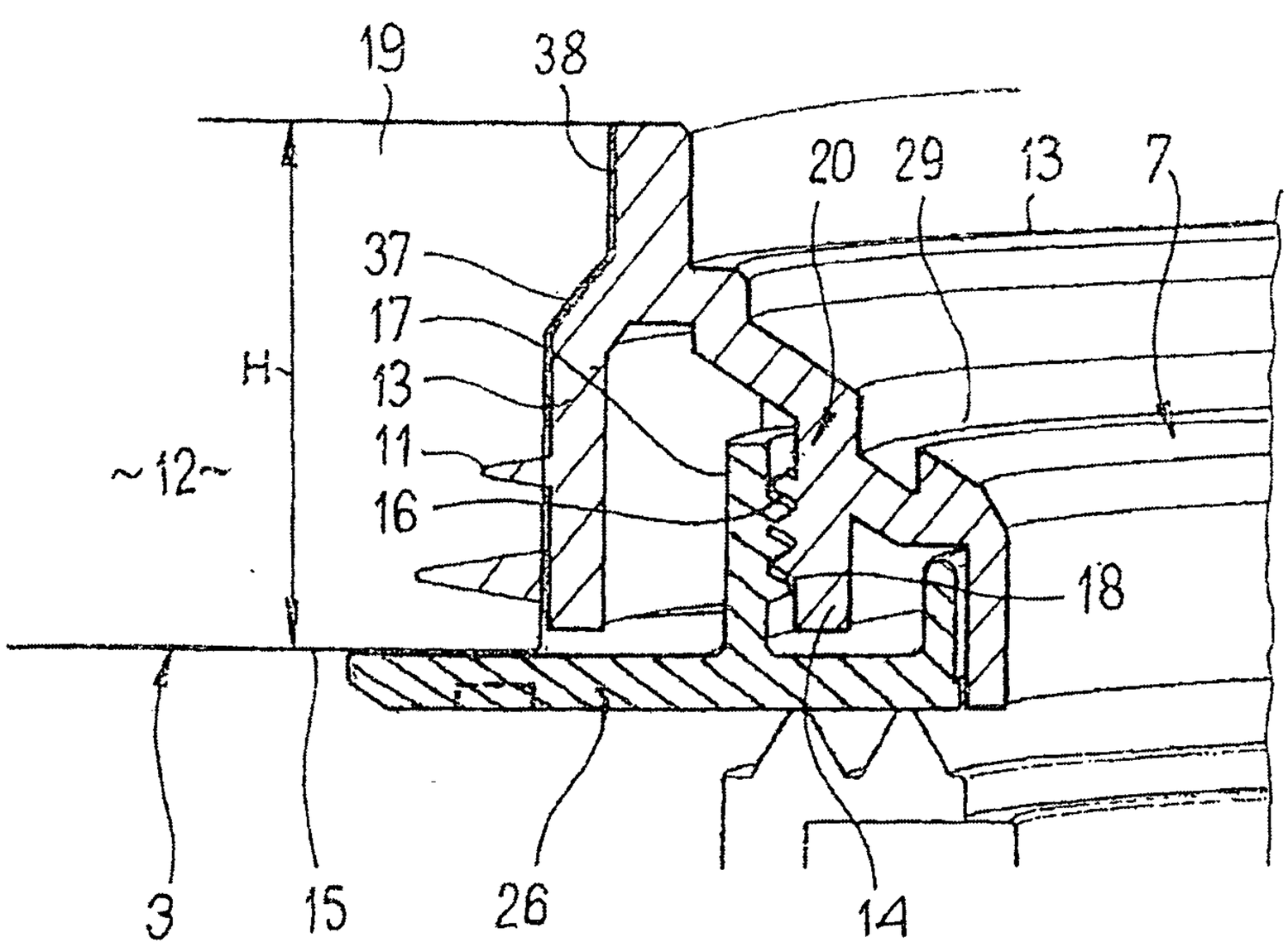
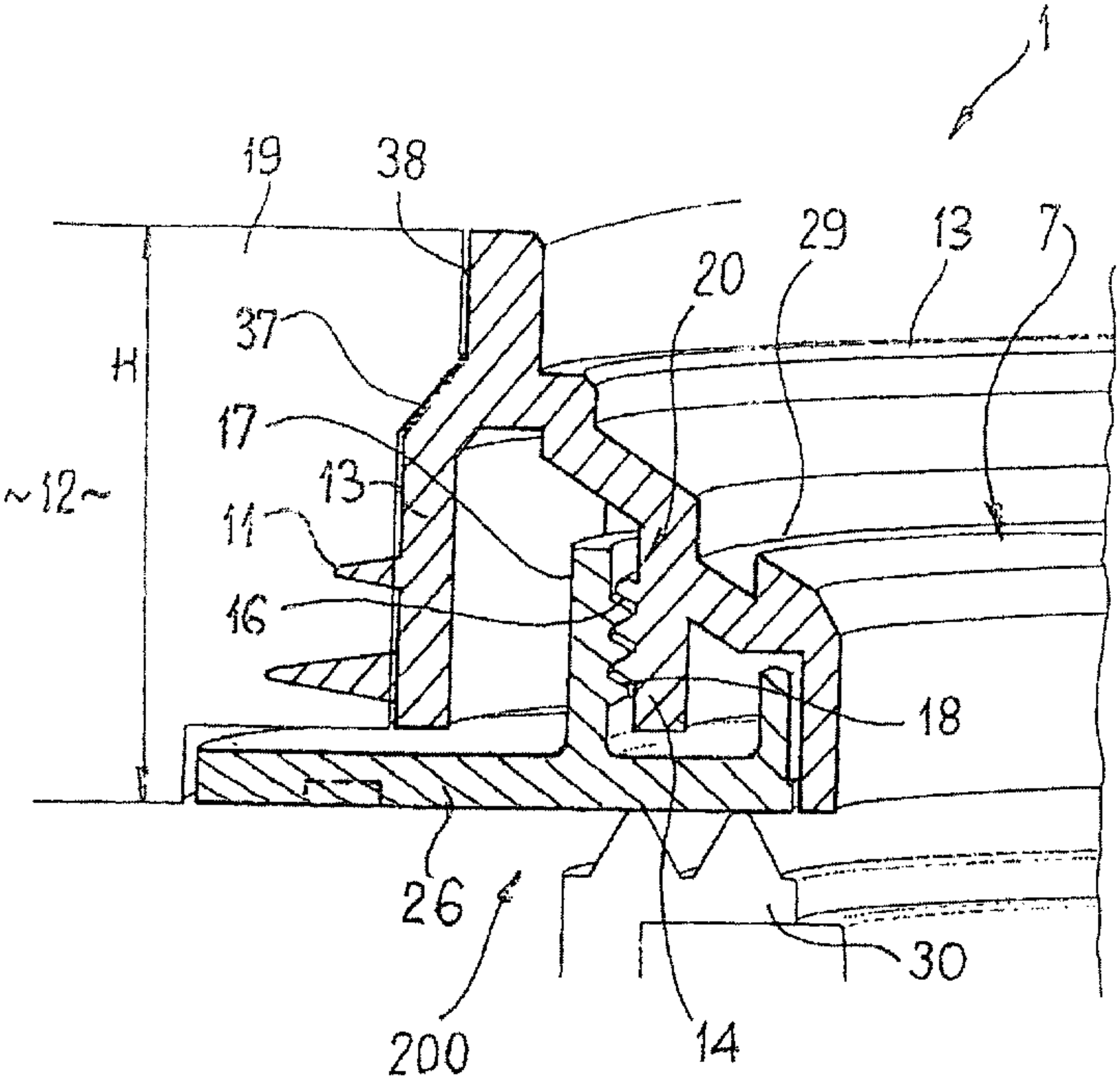


FIG. 15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