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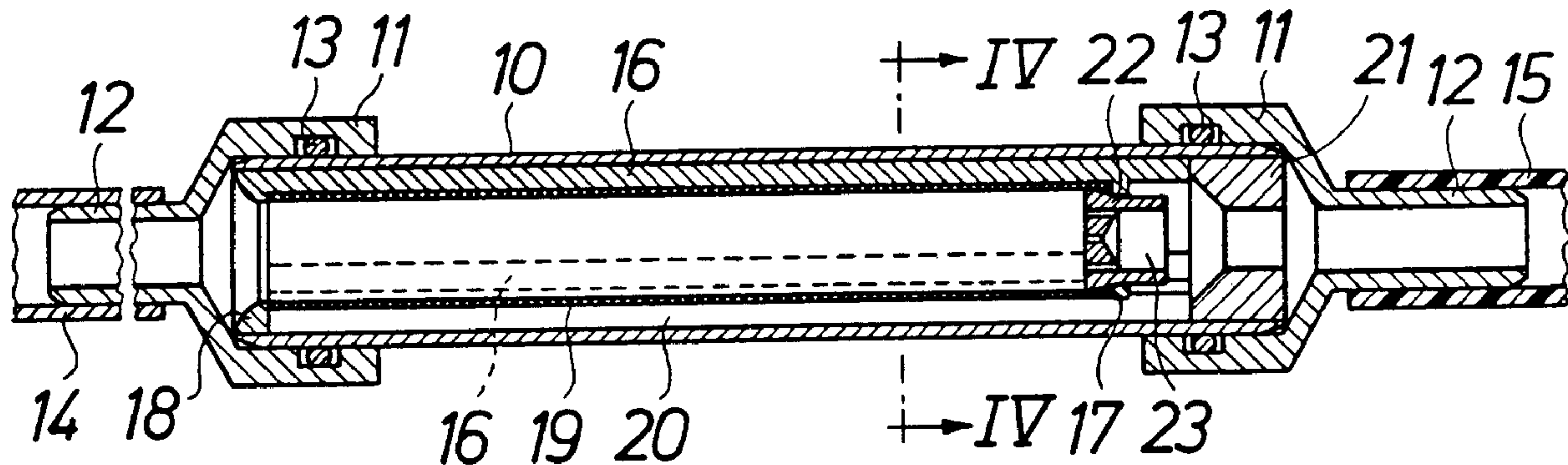
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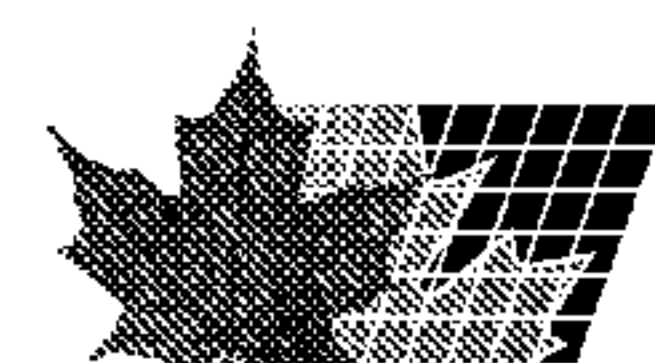
(54) Titre : PROCEDE ET APPAREIL POUR RECUEILLIR DES FRAGMENTS DE TISSU OSSEUX

(54) Title: METHOD AND APPARATUS FOR COLLECTING FRAGMENTS OF BONE TISSUE



(57) Abrégé/Abstract:

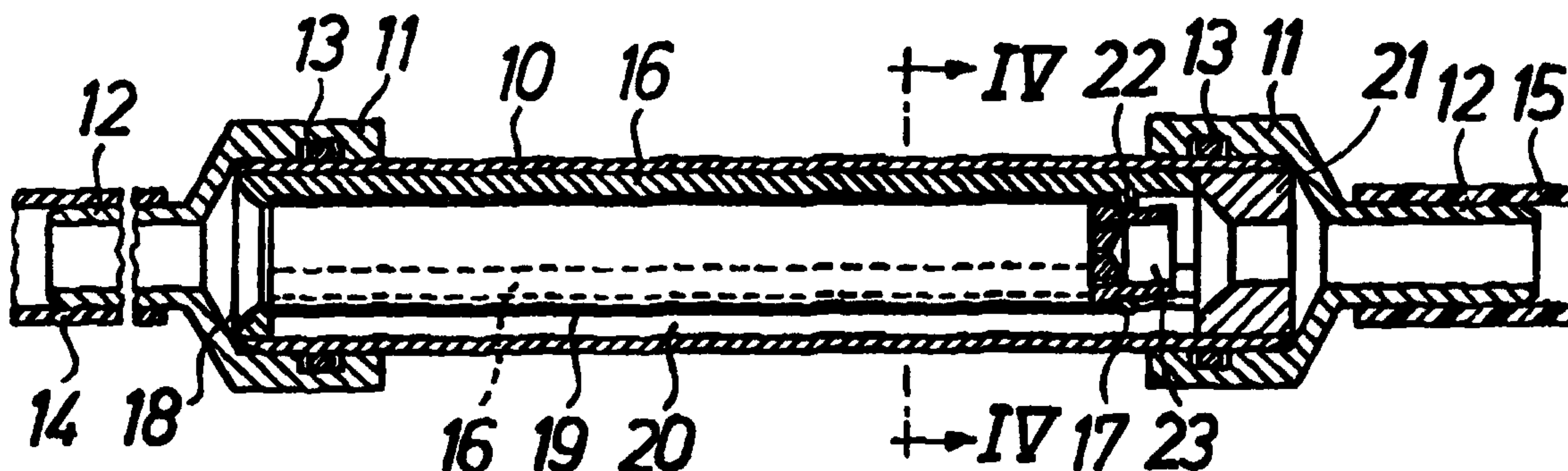
The invention relates to method and device for collecting bone tissue fragments at a surgical operation in bone tissue occurring liquid fluid being evacuated by suction from the operation site. In the method liquid is allowed to pass during evacuation by suction into a cylindrical sieve (19) through one open end thereof and through the sieve wall from the inside to the outside thereof. A displaceable end wall (22) disposed at the other end of the sieve is moved axially through the cylindrical sieve in order that bone tissue fragments collected on the inside surface of the sieve will be scraped off therefrom and deposited outside the sieve from said one, open end thereof. The device comprises a cylinder (10) having an inlet and an outlet at one end and the other, respectively, which can be connected into a suction conduit. The cylindrical sieve is located inside the cylinder, a space being provided between the outside curved surface of the sieve and the inside curved surface of the cylinder. One, open end of the sieve communicates with the inlet of the cylinder while the outlet of the cylinder communicates with said space. The end wall disposed at the other end of the sieve can be displaced as a piston axially through the sieve.



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(21) International Application Number: PCT/SE95/01065 (22) International Filing Date: 20 September 1995 (20.09.95) (30) Priority Data: 9403183-8 20 September 1994 (20.09.94) SE (71)(72) Applicant and Inventor: LUNDGREN, Dan [SE/SE]; Askims Kyrkväg 5, S-436 51 Hovås (SE). (74) Agents: STRÖM, Tore et al.; Ström & Gulliksson AB, P.O. Box 4188, S-203 13 Malmö (SE).		(81) Designated States: AM, AT, AU, BB, BG, BR, BY, CA, CH, CN, CZ, DE, DK, EE, ES, FI, GB, GE, HU, IS, JP, KE, KG, KP, KR, KZ, LK, LR, LT, LU, LV, MD, MG, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, TJ, TM, TT, UA, UG, US, UZ, VN, 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), ARIPO patent (KE, MW, SD, SZ, UG). Published <i>With international search report.</i> <i>With amended claims.</i> <i>In English translation (filed in Swedish).</i>

(54) Title: METHOD AND APPARATUS FOR COLLECTING FRAGMENTS OF BONE TISSUE**(57) Abstract**

The invention relates to method and device for collecting bone tissue fragments at a surgical operation in bone tissue occurring liquid fluid being evacuated by suction from the operation site. In the method liquid is allowed to pass during evacuation by suction into a cylindrical sieve (19) through one open end thereof and through the sieve wall from the inside to the outside thereof. A displaceable end wall (22) disposed at the other end of the sieve is moved axially through the cylindrical sieve in order that bone tissue fragments collected on the inside surface of the sieve will be scraped off therefrom and deposited outside the sieve from said one, open end thereof. The device comprises a cylinder (10) having an inlet and an outlet at one end and the other, respectively, which can be connected into a suction conduit. The cylindrical sieve is located inside the cylinder, a space being provided between the outside curved surface of the sieve and the inside curved surface of the cylinder. One, open end of the sieve communicates with the inlet of the cylinder while the outlet of the cylinder communicates with said space. The end wall disposed at the other end of the sieve can be displaced as a piston axially through the sieve.

Method and apparatus for collecting fragments of bone tissue

The invention relates to method and device for
5 collecting bone tissue fragments at surgical operations in
bone tissue occurring liquid fluid being evacuated by suc-
tion from the site of operation.

At surgical operations in bone tissue, for example
such operations as are carried out in the oral cavity for
10 fixing dental crowns, bridges, and prostheses in a
toothless jaw region, drilling is effected in the jaw bone
for securing titanium screws which are used as anchoring
elements. Often it is in that case desired to recover the
bone tissue fragments formed as bone chips at drilling
15 because these can be used for filling the bone cavities
formed in the jaw due to preceding pathological processes.
By this procedure the jaw bone can be restored in defect
regions. At drilling an aspirator is used for removing
blood from the site of operation and then the bone tissue
20 fragments will be entrained in the evacuated liquid and
will be lost if they are not separated from the liquid flow
in some way or other and are collected.

The purpose of the invention is to make this collec-
tion possible in a simple way which moreover facilitates
25 the deposition of the bone tissue fragments where desired.

This is achieved by the invention which provides
method and device according to claims 1 and 2, respec-
tively.

In order to explain the invention in more detail
30 reference is made to the accompanying drawings in which
FIG. 1 is an axial cross-sectional view of the device
according to the invention applied for evacuation of
liquid by suction and separation of bone tissue frag-
ments from the liquid,

FIG. 2 is a corresponding axial cross-sectional view of the device applied for deposition of separated and collected bone tissue fragments,

FIG. 3 is an end view of the axially displaceable end wall in the sieve, and

FIG. 4 is a cross-sectional view along line IV-IV in FIG. 1.

The device according to the invention comprises a cylinder 10 open at each end thereof. At each end a cover 11 is pushed onto the cylinder externally thereof said cover forming a connection piece 12 and being sealed against the outside surface of the cylinder by means of an O-ring 13. An aspirator nozzle 14 is connected to one connection piece, the left one in FIG. 1, said nozzle being shown fragmentarily only. A suction hose 15 is connected to the other connection piece, the right one in FIG. 1, said hose extending to an aspirator not shown herein. The left connection piece with the nozzle thus forms an inlet of the cylinder while the right connection piece with the hose forms an outlet from the cylinder. A cage comprising three straight bars 16 extending in parallel and equally spaced circumferentially, and two rings 17 and 18 integral with and interconnecting said bars, fits detachably in the cylinder, and a cylindrical sieve 19 is received by the cage. By means of the cage the outside curved surface of the sieve is kept spaced from the inside curved surface of the cylinder such that axially extending spaces 20, FIG. 4, are maintained between the sieve and the cylinder between the bars. These spaces are separated from the inlet of the cylinder by means of ring 18 but communicate with the outlet of the cylinder through an annular plug 21 fixed in the cylinder.

At the end of the sieve adjacent the outlet of the cylinder an end wall 22 is provided which at a thicker portion fits against the inside surface of the sieve and at a

narrower portion forms a hollow stud 23 which fits displaceably in ring 17 when the wall is in the end position shown in FIG. 1. End wall 22 is axially displaceable along the inside surface of the sieve, and in the embodiment disclosed herein the end wall is perforated although this is not necessary. If it is perforated the apertures should be smaller than the apertures of sieve 19. The device according to FIG. 1 preferably is made in its entirety of plastics and is intended to be a disposable product.

10 If the device is connected in a suction conduit between the aspirator nozzle 14 and the suction hose 15 as shown herein and if it is assumed that an underpressure is maintained in the suction conduit and that the aspirator nozzle is used for drawing blood from a site in the oral cavity where drilling in the jaw bone is going on, rinsing liquid and blood will be sucked into the sieve via the inlet of the cylinder and will pass through the wall of the sieve to spaces 20 and will continue to the outlet but will also pass through the perforated end wall 22 directly to the outlet. By the underpressure the end wall will be kept in the end position shown; the thicker portion thereof cannot pass through ring 17. If the liquid contains coagulated blood or bone tissue fragments the perforation of end wall 22 will quickly be clogged and occurring solid particles in the liquid will collect on the inside surface of the sieve. However, the perforation of the end wall promotes a direct continuous flow through the device as long as there are no solid particles in the liquid flow.

In order to recover and deposit the material collected in the sieve, cylinder 10 is disconnected from hoods 11 and is placed in a cylinder 24 of an ordinary disposable syringe, FIG. 2, a piston rod 25 then being connected to end wall 22 by the piston rod being inserted into stud 23. The end wall is displaced by means of the piston rod axially through the cylindrical sieve 19 the collected

material being scraped off from the inside surface of the sieve wall to be deposited through connection piece 26 of the cylinder, which can be constructed as a Luer connection for connecting a suitable mouth piece to the syringe cylinder. However, it is not necessary to shift cylinder 10 to a syringe for deposition. It is also possible to connect the piston rod to the end wall through the right connection piece 12 in FIG. 1 and to deposit the material through the left connection piece 12 in FIG. 1. It may be comfortable, however, to operate a syringe at deposition.

AMENDED CLAIMS

5 1. Device for collecting bone tissue fragments from a liquid fluid flow at surgical operations in bone tissue, comprising a tube (10) having axially aligned inlet and outlet sockets (12) at one end and the other, respectively, to be connected into a suction conduit, a cylindrical sieve
10 (19) in the tube, a space (20) being provided between the outside curved surface of the sieve and the inside surface of the tube, an open end of the sieve communicating with the inlet socket of the tube, and said space communicating with the outlet socket of the tube, **characterized** in that a
15 piston (22) displaceably received in the sieve and engaging the inside curved surface thereof forms an end wall in the sieve at the outlet socket end thereof, and that a piston rod (25) is insertable into the tube through the outlet socket thereof to engage the piston for manual axial
20 displacement thereof through the sieve under deposition of bone fragments trapped by the sieve, through the inlet socket of the tube.

 2. Device as in claim 1 **characterized** in that the piston (22) has a hollow stud (23) for the connection of
25 the piston rod (25).

 3. Device as in claim 1 or 2 **characterized** in that the tube (10) at the ends thereof is provided with end covers (11) forming the inlet and outlet sockets, respectively, for the connection of an aspirator nozzle
30 (14) and a suction hose (15), respectively.

 4. Device as in any of claims 1 to 3 **characterized** in that the piston (22) is perforated the apertures thereof being narrower than the apertures of the sieve.

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5. Device as in any of claims 1 to 4 **characterized** in that the sieve (19) is mounted in a cage fitting in the tube (10) and having axially extending bars (16) which form
5 spacers between the sieve and the tube.

AMENDED SHEET

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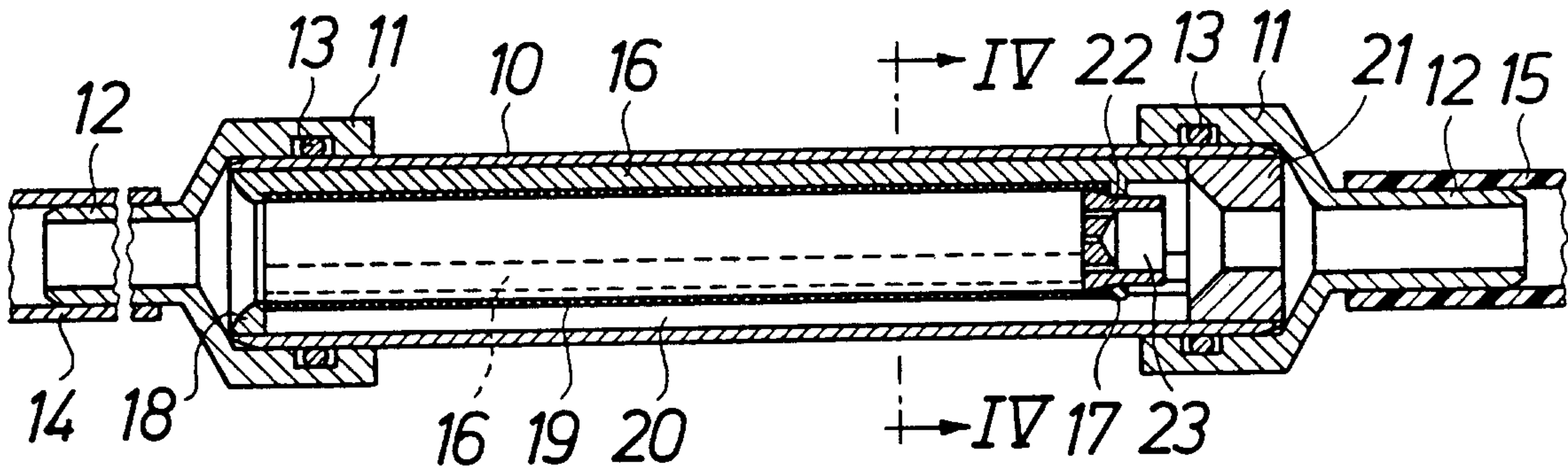


FIG. 1

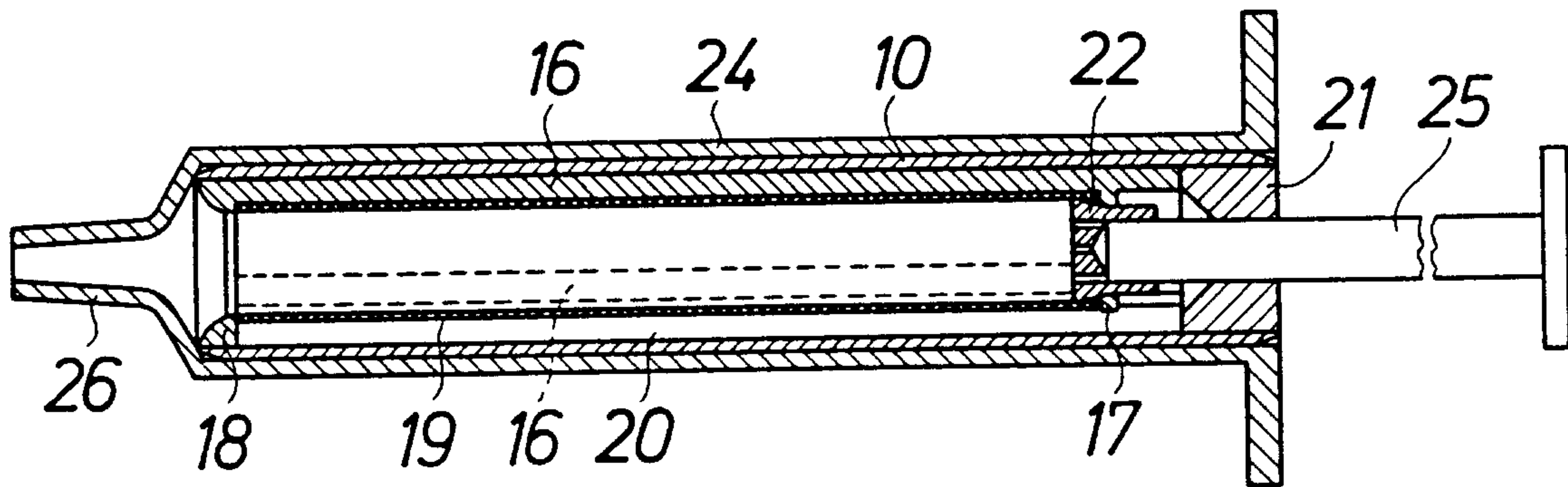


FIG. 2

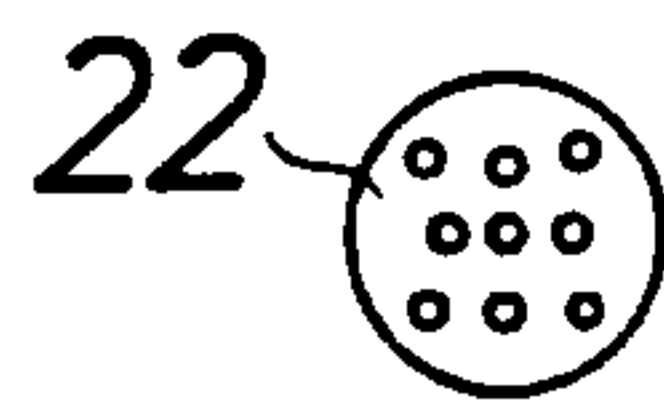


FIG. 3

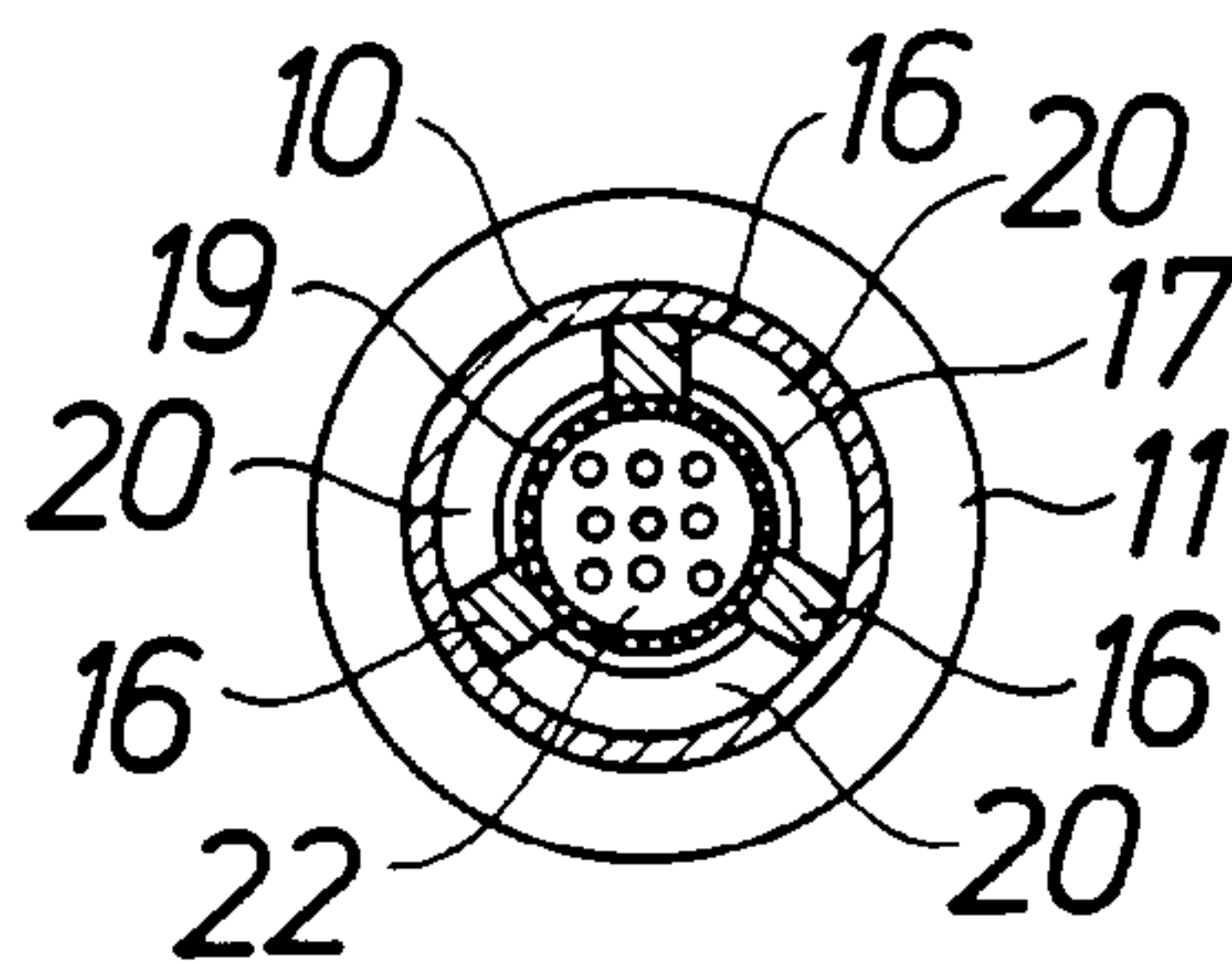


FIG. 4

