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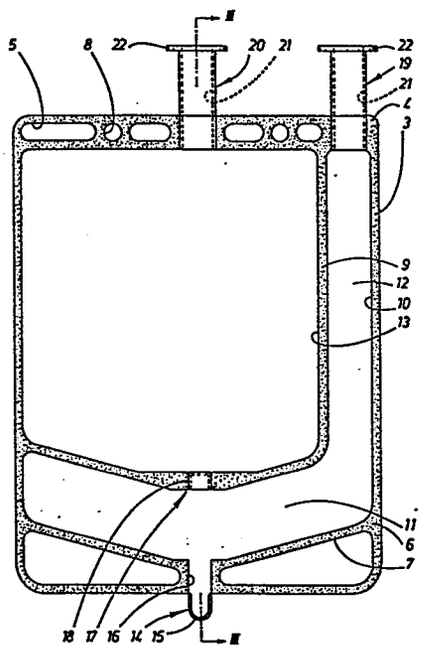
(54) Arrangement for infusion bags.

(57) Arrangement for infusion bags such as are executed from double layers of a soft, flexible film. Two separate chambers (10, 13) are formed between the films by joining these together in areas (3, 4, 6) around the chambers. The chambers are provided with connections (14, 17) via which an infusion liquid can be removed by means of a tubular organ passing through the connection. The intention is that the chambers shall be emptied in a pre-determined sequence. The connection (14) to the chamber (10) which is intended to be emptied first is directly accessible for the introduction of said organ. The connection (17) to the chamber (13) which is intended to be emptied next is located inside the first chamber in such a way that the first chamber in a full and distended state will prevent direct access by the organ to the connection (17).



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TITLE OF THE INVENTION:

Arrangement for infusion bags

TECHNICAL FIELD:

The present invention relates to an arrangement for infusion bags such as are executed from double layers of a soft, flexible film and which exhibit at least two separate chambers formed between the layers of film by being joined together in areas around the chambers, said chambers being provided with connections through which an infusion liquid, intended to be enclosed inside the chambers, can be removed by means of a tubular organ, preferably a cannula, passing through the connection, whereby the intention is that the chambers shall be emptied in a pre-determined sequence.

DESCRIPTION OF THE PRIOR ART:

For the supply of certain substances to the body use is made for the purpose of direct introduction into the blood circulation system of the method known as infusion, whereby the liquid substance is supplied enclosed inside a container to which is connected a tube, through which the substance can be administered to the patient in question. In the method specified here, the container is in the form of a plastic film bag. A bag of such a kind must be provided with a connection point to which the tube can be connected. In the type of bag specified here, the intention is that a number of infusion liquids shall be administered in a pre-determined sequence and in specific proportions. This can be achieved, of course, by supplying the different liquids in separate containers, which are connected in turn so as to permit each substance to be introduced into the body. Alternatively, it is possible to conceive the use of a double container, for example a bag with two enclosed spaces situated next to each other. Irrespective of whether separate or combined containers are used, it has been known for the substances to be administered in the wrong sequence by connecting up the containers in the wrong order, which does not provide the intended effect from the treatment, and which may cause the patient's condition to worsen.

TECHNICAL PROBLEM:

The object of the present invention is to propose an arrangement for infusion bags which will prevent the substances from being administered in the wrong sequence, thereby eliminating the aforementioned mistakes and preventing damage.

SOLUTION:

The object of the invention is achieved by executing the arrangement for infusion bags in such a way that the connection to the chamber which is intended to be emptied first is directly accessible for the introduction of said organ , whilst the connection to the chamber which is intended to be emptied next is located inside the first chamber in such a way that the first chamber in a full and distended state will prevent direct access by the organ to the connection.

DESCRIPTION OF THE DRAWINGS:

In the accompanying drawings are illustrated two embodiments of the invention. Fig. 1 shows the first embodiment in front view; Fig. 2 shows the second embodiment in front view; Fig. 3 shows the first embodiment as a section along the line III—III in Fig. 1; and Fig. 4 shows the second embodiment in a (shortened) section along the line IV—IV in Fig. 2.

DESCRIPTION OF THE PREFERERED EMBODIMENTS:

Both embodiments relate to infusion bags comprising two pieces of plastic film welded together and with plastic components welded into them. Previously disclosed is a method of executing infusion bags in this manner, usually making use of vinyl plastic which is easily welded together by the use of a high-frequency electrical field. Consequently, the method will not be described in any greater detail here. The bags are essentially identical in both embodiments, and the immediately following part of the specification including the reference designations relates to both embodiments.

According to Figs. 3 and 4 the bag is formed from two pieces of plastic film 1 and 2 which are joined together by means of welded areas around the edges. The welded area along the side edges is designated by the number 3 . On an upper, wide welded area 4 are omitted for manufacturing reasons certain unwelded areas 5 and in a similar fashion two unwelded parts 7 have been omitted from a wide, lower welded area 6 . The unwelded areas 5, 7 are not, however, essential to the function of the bag, but have been introduced for manufacturing reasons. In the welded area 4 have also been provided two holes 8 which can be used for hanging up the bag during infusion.

Above the bag extends between the upper welded area 4 and one of the side edges 3 an angular welded area 9 . By means of the aforementioned two welded areas the bag is divided up into two chambers in which the plastic films 1 and 2 are not connected to each other. These chambers are on the one hand a first chamber 10 which extends together with a transverse lower part 11 over the bag and includes additionally a rising part 12 , and on the other hand a second chamber 13 which is essentially rectangular.

The first chamber 10 is provided in the middle of the welded area 6 with a connection 14 which is formed from a projecting part of the two pieces of plastic film, along the edge of which the films are welded together in a narrow welded area 15 . The welded area 6 is interrupted directly in line with the connection 14 , so as to form a passageway 16 .

Directly in line with the connection 14 the second chamber 13 exhibits a connection 17 which consists of a plastic component 18 welded into the welded area 9 . The inner edges of the welded fields 6 and 9 are inclined towards the respective connections 14 and 17 so that drainage surfaces running downwards towards the connectors are formed when the bag is suspended by its holes 8 .

In the welded area 4 two further plastic components 19, 20 are welded. The plastic component 19 connects to the first chamber and the plastic component 20 to the second chamber. The two plastic components have a tubular shape and exhibit a passage 21, which is open inwards to-

wards the respective chamber 10, 13 but which is outwards closed by a base 22. This base is intended to be penetrated by means of a cannula if any medicine is intended to be brought into any of the chambers. As a rubber elastic plastic, preferably vinyl plastic, is used for the plastic components, penetration will be possible at the same time as the hole is sealed by means of the elasticity of the material after the withdrawal of the cannula.

In Figs. 3 and 4 the plastic films 1 are shown to be well separated in those parts where they are not welded together or welded securely to the plastic components 18, 20 . The state illustrated corresponds approximately to the state of the bag when it is full, although no liquid is shown in Figs. 3 and 4 in order to make the Figures more clear.

Since the bag is to be supplied containing two sorts of infusion liquid, it is necessary to provide two filling openings. These are welded up after filling and accordingly are of no significance to the function of the present arrangement. It must be pointed out, however, that the plastic components 19, 20 may be so executed that they are open in an outward sense after the welding of the bag, so that filling may take place after which they are closed for instance by welding up the bases 22 .

In the embodiment in accordance with Figs. 1 and 3, the plastic films 1 and 2 are separate from each other for the entire distance between the connections 14 and 17 , and also over the entire width of the component 11 of the chamber 10 . In the embodiment in accordance with Figs. 2 and 4, on the other hand, is present a further welded area 23 , which is isolated from the other welded areas and extends straight across the line between the two connections 14 and 17 a short distance away from the plastic component 18 . Furthermore, the bag in accordance with this embodiment is provided with a tear-off line 24 which extends along the middle of the angular welded area 9 and out to the edge of the bag.

When the bag is supplied ready for use, it is as already stated filled with two infusion liquids. These liquids are to be administered to the body in a specified sequence, and the liquid which is to be administered first is present in the first chamber

10 , and the infusion liquid which is to be administered next is present in the chamber 13 . It is assumed in this respect that at least the chamber 10 will be sufficiently well-filled for the plastic films to be distended away from each other, thereby preventing them from being forced together to any appreciable degree.

When infusion is to begin, the connection 14 is penetrated by means of a cannula which is introduced into the duct 16 and which thus makes a connection with the chamber 10 . The width of the part 11 of the chamber 10 is selected in such a way that the length of the infusion needle is insufficient for its tip to reach the far wall of the chamber 10 and thus the welded area 9 and the connection 17 when the shoulder of the cannula comes up against the outer part of the connection 14 . Since the body formed by the pieces of plastic film distended by the liquid cannot be compressed to any appreciable degree for so long as the bag is full, this will ensure that the cannula will be connected only to the first chamber 10 . It should, in fact, be obvious to anyone who has been involved with infusion that connection must be made to the connection 14 at the bottom of the bag when the bag is suspended. Furthermore, infusion cannulae are of a standardized length which practically excludes any possibility of initiating the infusion operation by introducing the cannula into the wrong chamber.

Once infusion has progressed to the point at which the chamber 10 has been emptied or is to all intents and purposes empty, the infusion operation is continued by starting to administer the liquid contained in the chamber 13 . Once the chamber 10 is empty, there will no longer be any resistance to advancing the cannula. It may now be moved upwards and introduced through the base of the plastic component 18 into the chamber 13 . The plastic film in the part 11 will now fold ahead of the shoulder of the cannula.

It is certainly possible for the cannula to be moved upwards and to penetrate the connection 17 before the chamber 10 is completely empty, although this would scarcely occur by mistake. It may be assumed that the direct action of pushing the cannula

further up into the bag will be undertaken only after the specific indication that the chamber 10 has been emptied of the infusion liquid to the intended degree.

If, however, the situation were to arise in which the bag is used by to all intents and purposes untrained staff, the embodiment in accordance with Figs. 2 and 4 will offer additional protection against the premature connection of the chamber 13 . It is, in fact, necessary in this case, before connection can be made to the second chamber 13 , for the even more positive act to be performed of tearing off that part which contains the chamber 10 by tearing along the tear-off line 24 . The welded area 23 will, in fact, prevent the tip of the cannula from being pushed up as far as the connection 17 for so long as the bag remains intact. Any attempt to force the welded area 23 will result in the plastic films 1 and 2 being penetrated and in the bag being punctured, with the result that no connection will be made with the chamber 13 . Consequently much greater attention must be paid than in the case of the bag in accordance with the first embodiment to ensure that the first chamber is empty before connection to the second chamber takes place.

The underlying idea behind the invention is thus that the first chamber which is to be emptied shall be positioned ahead of the connection to the next chamber to be emptied. This requires the design and the degree of filling in the delivery state to be such that penetration of the connection for the second chamber will be prevented when the bag is full. The design of the chambers may differ within the scope of this principle, and the holding capacities of the chambers must, of course, agree with the desired quantities of the different infusion liquids to be administered. It is also possible to apply this principle to a greater number of infusion liquids than two, whereby the different chambers are arranged one ahead of the other in sequence depending on the point at which they are to be used for the purpose of administering the infusion.

PATENT CLAIMS:

1. Arrangement for infusion bags such as are executed from double layers of a soft, flexible film (1, 2) and which exhibit at least two separate chambers (10, 13) formed between the layers of film by being joined together in areas (3, 4, 6) around the chambers, said chambers being provided with connections (14, 17) through which an infusion liquid, intended to be enclosed inside the chambers, can be removed by means of a tubular organ, preferably a cannula, passing through the connection, whereby the intention is that the chambers shall be emptied in a pre-determined sequence, c h a r a c t e r i z e d in that the connection (14) to the chamber (10) which is intended to be emptied first is directly accessible for the introduction of said organ, whilst the connection (17) to the chamber (13) which is intended to be emptied next is located inside the first chamber in such a way that the first chamber in a full and distended state will prevent direct access by the organ to the connection (17).

2. Arrangement in accordance with Patent Claim 1 in which the infusion bag is so arranged as to exhibit a number of chambers greater than two, c h a r a c t e r i z e d in that each chamber is so arranged that, when it is in its full and distended state, it will cover the connection of the chamber immediately following in the emptying sequence so that, when said first chamber is in its full and distended state, said connection will not be directly accessible to the organ.

3. Arrangement in accordance with Patent Claims 1 or 2, c h a r a c t e r i z e d in that the connection (17) to a subsequent chamber (13) which is intended to be emptied after an immediately preceding chamber (10) in the emptying sequence can be made accessible for the introduction of the organ by compressing the film material of the last-mentioned chamber after it has been emptied so as to permit the organ to be inserted further.

4. Arrangement in accordance with Patent Claims 1 or 2, c h a r a c t e r i z e d in that inside the one or more chambers

(10) which are intended to be emptied before the following chamber (13) are arranged blocking elements (23) to prevent the introduction of the organ through the chamber as far as the connection (17) of the following chamber, whereby that part which forms the preceding chamber (10) is so arranged as to be torn off after the emptying of the chamber in question, so that the connection (17) of the following chamber (13) is made directly accessible to the organ.

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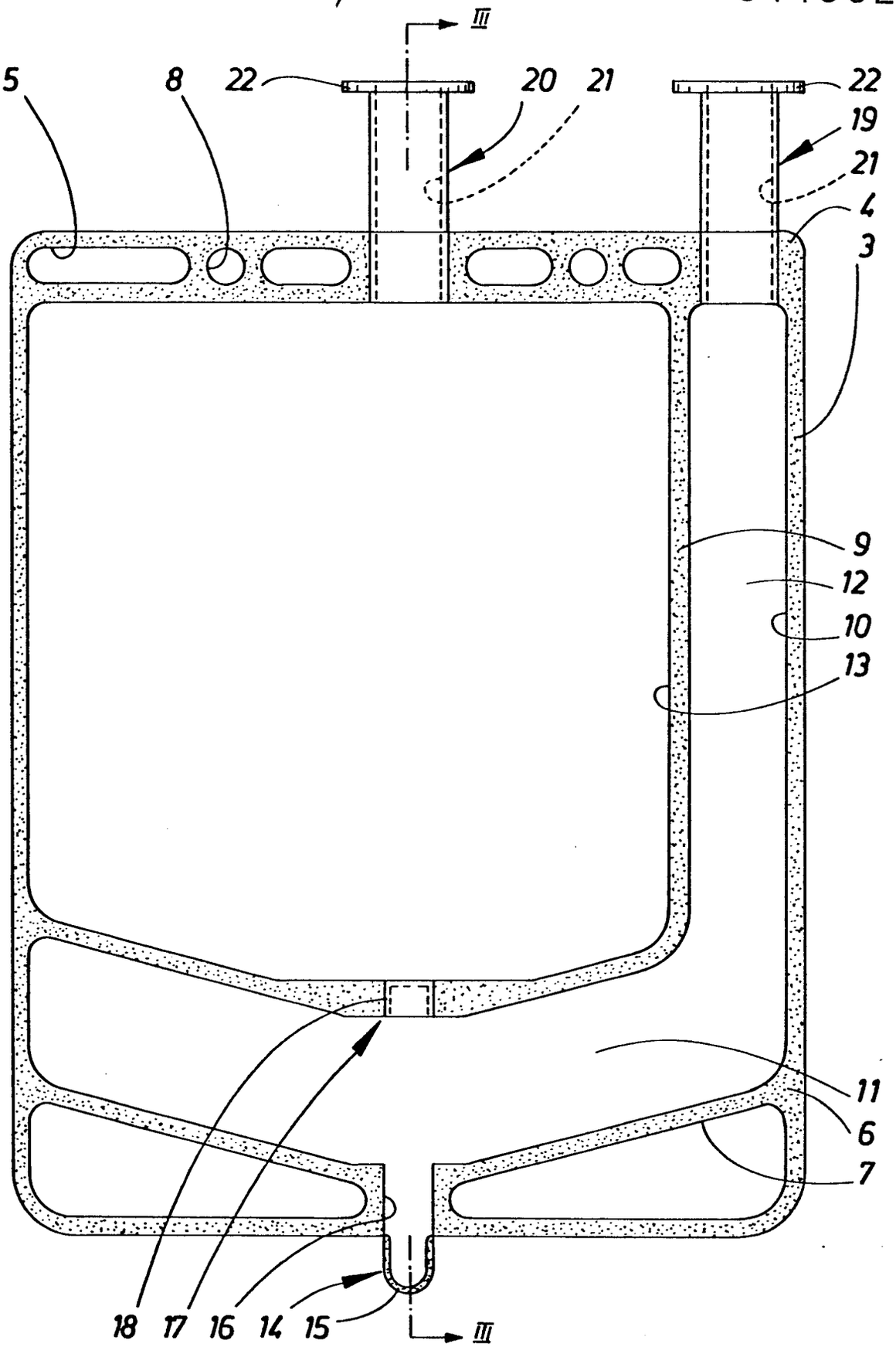

FIG. 1

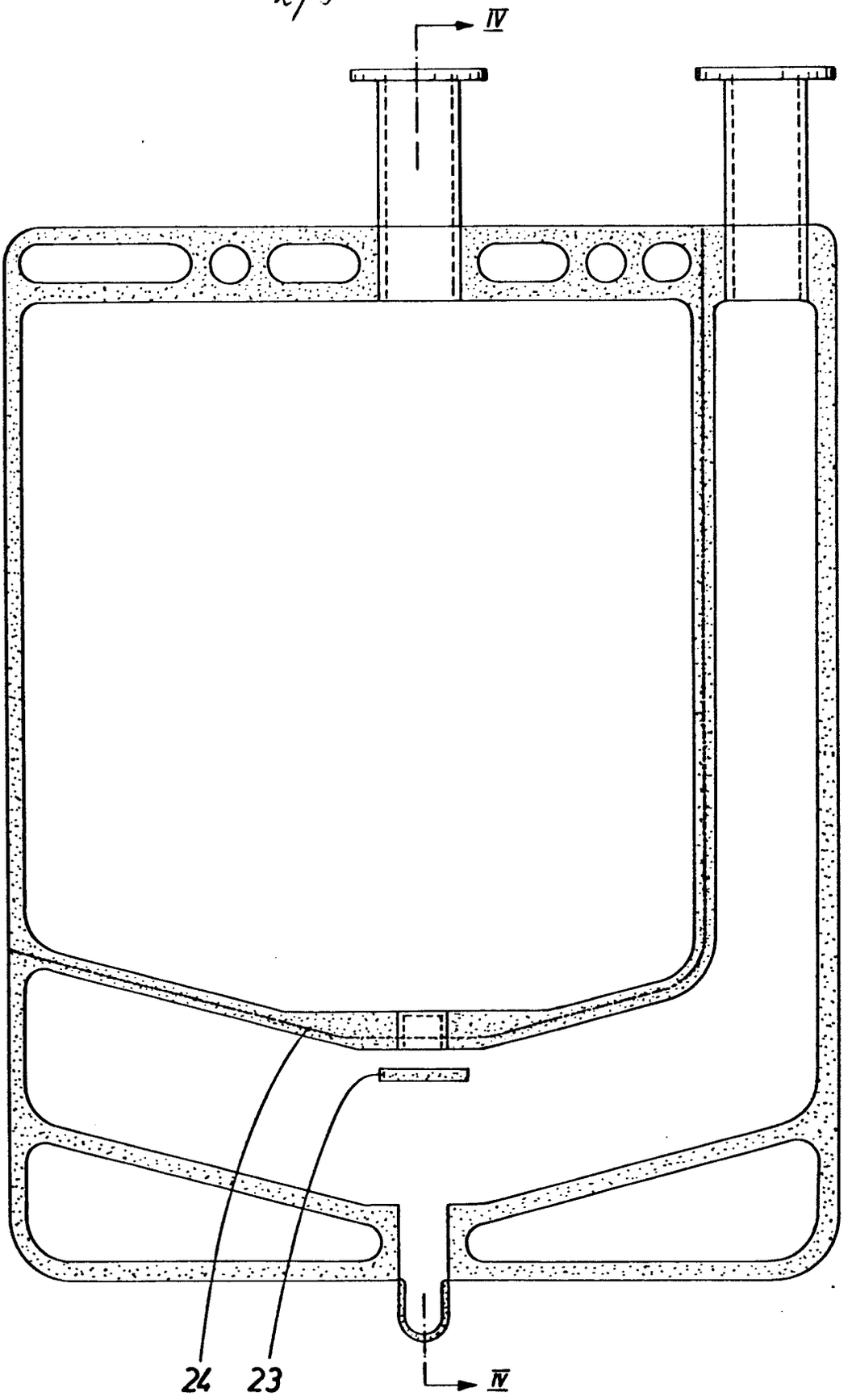

FIG.2

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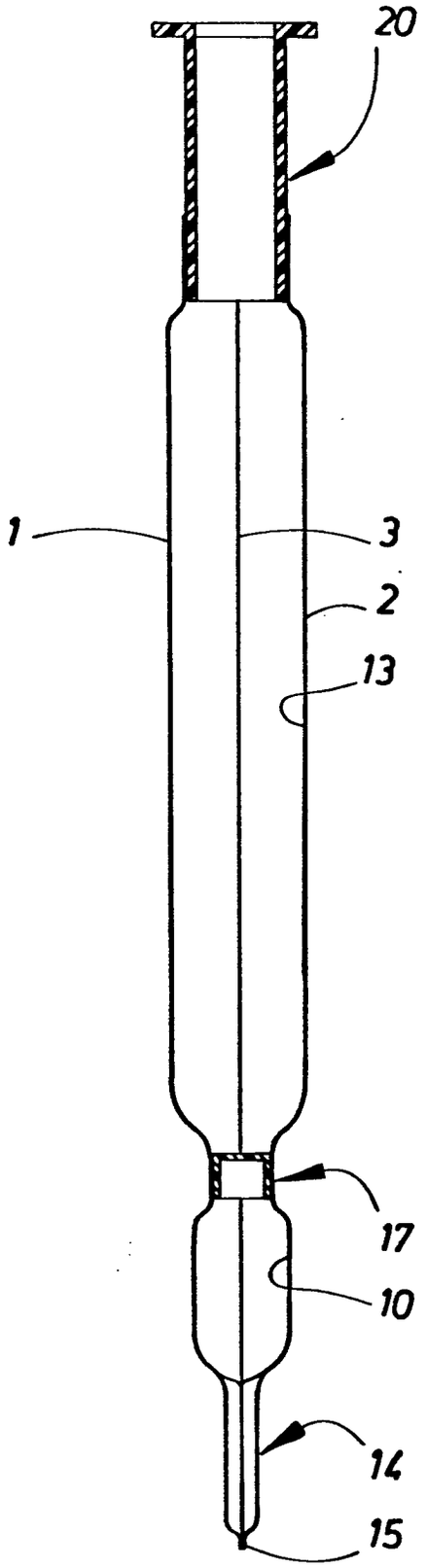

FIG.3

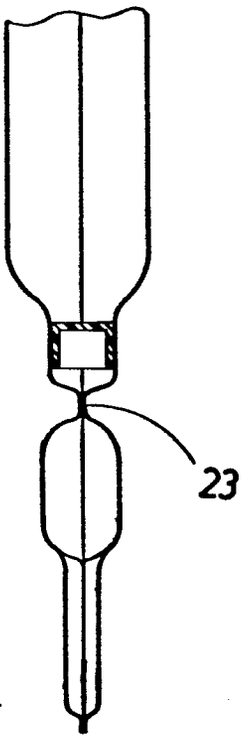

FIG.4

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EUROPEAN SEARCH REPORT

0145825
Application number

EP 83 85 0240

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.4)
A	DE-U-7 719 528 (KNOLL AG.) * Complete document *	1	A 61 J 1/00 A 61 M 5/14
A	US-A-4 381 776 (A. LATHAM) * Figures 2, 4, 6; claim 1 *	4	

TECHNICAL FIELDS SEARCHED (Int. Cl.4)

A 61 J 1/00
A 61 M 5/14

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
BERLIN	30-11-1984	BARNY DE ROMANET P.M

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
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
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