(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number : **0 443 978 A1**

(12) EUROPEAN PATENT APPLICATION

(21) Application number : **91500013.7**

(51) Int. Cl.[5] : **D06B 3/26**

(22) Date of filing : **06.02.91**

(30) Priority : **19.02.90 ES 9000475**

(43) Date of publication of application :
28.08.91 Bulletin 91/35

(84) Designated Contracting States :
DE DK ES FR GB IT

(71) Applicant : **Montagut Guma, Juan**
C. Barcelona, 79
E-08640 Olesa de Montserrat (Barcelona) (ES)

(72) Inventor : **Montagut Guma, Juan**
C. Barcelona, 79
E-08640 Olesa de Montserrat (Barcelona) (ES)

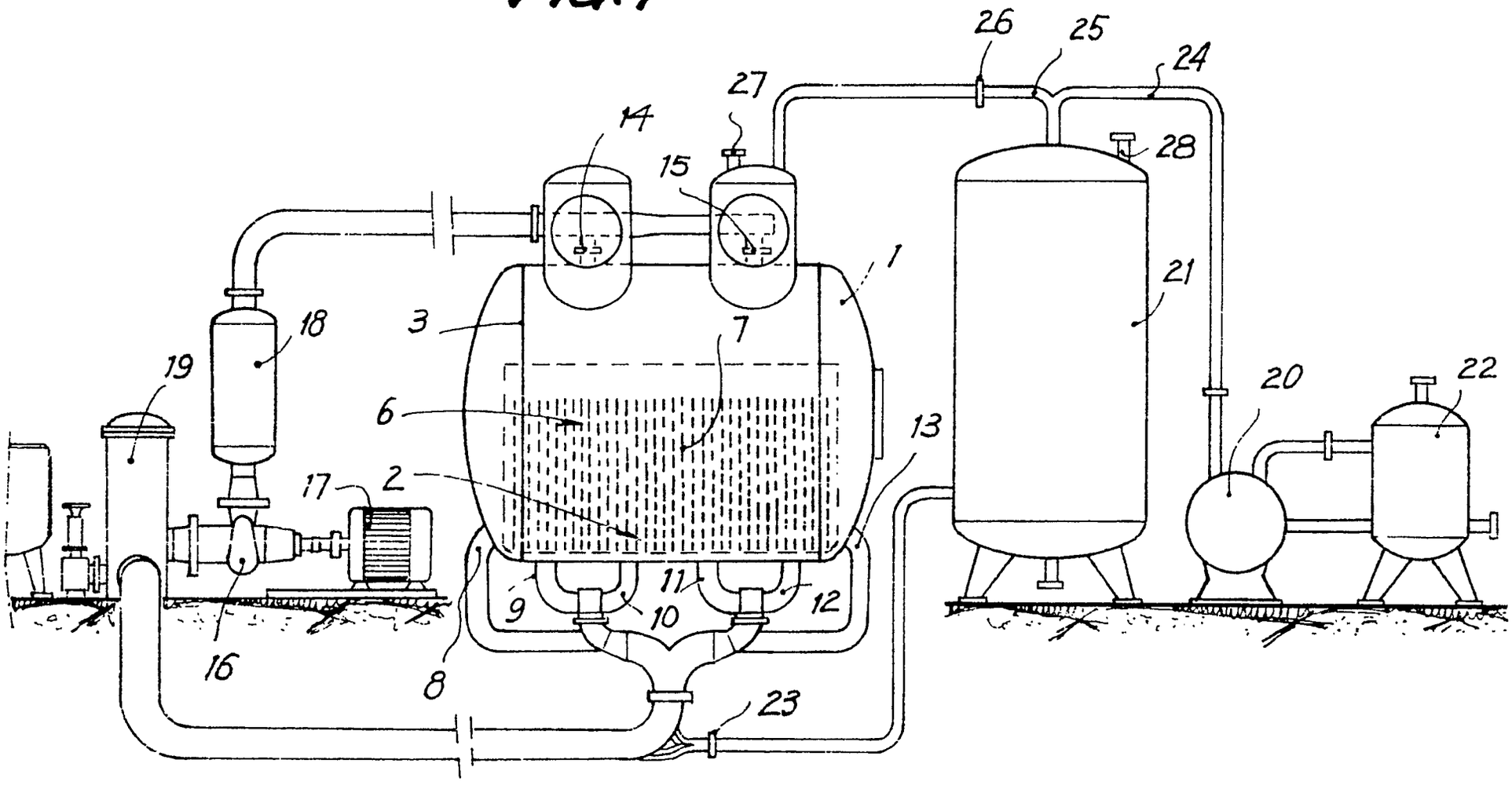
(74) Representative : **Ponti Sales, Adelaida**
Paseo de Gracia, 33
E-08007 Barcelona (ES)

(54) Equipment and method for vacuum treating corded fabrics.

(57) The equipment includes :
— a dyeing chamber (1), containing a dyeing bath (1) and inside which are means for the continuous pulling of the fabric, and means for atomization of the bath,
— a bath flow circuit comprising a pump (16), a heat exchanger (18) and a filter (19), and
— a vacuum circuit comprising a vacuum pump (20), a recovery receptacle (21) and an expansion tank (22).
With the method, vacuum treatment of fabrics is effected at a temperature between 70 and 100°C.
Saving of washing water, saving of steam and efficacious draining of the fabric are achieved.

EP 0 443 978 A1

FIG. 1



EQUIPMENT AND METHOD FOR VACUUM TREATMENT OF CORDED FABRICS

The present invention relates to an equipment for vacuum treatment of corded fabrics, said equipment comprising a dyeing chamber which contains a dyeing bath inside which are means for continuous pulling of the fabric, and means for atomization of the liquid, and also including a bath flow circuit which runs from a plurality of outlets situated to the lower part of the dyeing chamber up to at least one inlet to the upper part of same, the circuit of which comprises a pump, a heat exchanger and a filter.

The invention relates also to a method for vacuum treatment of corded fabrics.

With the equipment and the method of the invention savings of water and steam are achieved, together with better draining of the fabric.

BACKGROUND OF THE INVENTION

There exist known methods for treating corded fabrics which consist essentially in causing the corded fabric to circulate continuously in a bath of treatment liquid and in subjecting it simultaneously to a jet of the aforesaid atomized liquid in the initial zone of the run of the fabric.

The known apparatuses comprise a generally circular dyeing chamber, in whose lower part there is found a treatment bath for the fabric, means for the continuous pulling of the fabric provided in the upper part of the chamber, and means for atomization of the liquid or bath in the initial zone of the run of the fabric, same circulating through a passageway substantially in the form of a circular crown defined between an outer plate located next to the chamber wall and an inner plate.

The corded fabric is a continuous fabric that is placed along the aforementioned circular crown and is moved continuously by a shaft or ratchet located in the upper part of the chamber.

The bath occupies the lower part of the chamber and the fabric circulates in a continuous manner through the bath, becoming impregnated with the treatment liquid, generally dye. The corded fabric simultaneously receives the jet of atomized liquid. After the fabric has been impregnated by the liquid, the liquid is drained off at the bottom of the chamber, generally through the side walls that are provided with openings.

The jet of atomized liquid distributes the liquid over the fabric and assists in moving the fabric.

The holder of the present application is also holder of Spanish patent ES-A-8900692 in which homogeneous distribution of the fabric is improved and a major saving of the bath is achieved.

In accordance with this patent, the fabric is submitted simultaneously to injection and atomization of the liquid from the treatment bath by means of mixture of air with the liquid, which is separated into microparticles, the atomization being applied throughout the entire run of the fabric, intake from the bath being effected from various points and at low pressure, thus achieving stable and uniform treatment with a minimum bath quantity.

The apparatus object of said patent comprises a plurality of points of injection and atomization of the bath liquid along the entire run of the fabric in the chamber. It also comprises a grid fitted to the outer plate of the bottom of the chamber, which grid facilitates contact between the bath and the fabric, the self-expressing (wringing) of the fabric and the travel of the fabric thereon.

Thanks to the grid it is possible to reduce the ratio of the dye bath to 1/2 or 1/3. With the self-expressing there is facilitated a better penetration of the dye bath, which considerably increases the points of contact.

It also comprises a plurality of aspiration outlets on the bottom of the chamber, in such a way that flow of the liquid through the grid forms arcs between the grid which distribute the particles in all directions.

DESCRIPTION OF THE INVENTION

The present invention achieves major savings of water and steam, together with better wringing of the fabric.

The equipment for the vacuum treatment of corded fabrics, object of the invention, comprises a dyeing chamber containing a dyeing bath inside which are means for continuous pulling of the fabric, and means for atomization of the liquid, and also including a bath flow circuit which runs from a plurality of outlets situated to the lower part of the dyeing chamber up to at least one inlet to the upper part of same, the circuit of which comprises a pump, a heat exchanger and a filter, and is characterized in that it comprises a vacuum circuit including a vacuum pump connected to at least one of the outlets situated to the lower part of the dyeing chamber.

The vacuum pump produces aspiration from the fabric bath, thus effecting more efficacious wringing.

In accordance with a preferred embodiment of the invention, the vacuum circuit comprises a vacuum pump, a recovery receptacle and an expansion tank. The recovery receptacle is connected by its lower part to the outlets of the dyeing chamber through a first valve, and by its upper part to two conduits, one of which is connected to the vacuum pump and the other to at least one inlet of the dyeing chamber through a second valve, with the vacuum pump being connected to the expansion tank. The dyeing chamber and the recovery receptacle each comprise air inlet val-

ves.

Another feature of said embodiment consists in the dyeing chamber including a plurality of reinforcing rings. Those rings are of use to withstand the vacuum which is produced inside the dyeing chamber.

In the preferred embodiment of the invention the dyeing chamber includes a grid provided to the bottom of same, of the type mentioned in patent ES-S-8900692, which facilitates contact between the bath and the fabric, auto-expressing (wringing) of the fabric and movement of the fabric thereon. The grid of the present application is characterized by the fact that it is formed of a plurality of tubes, of diameter between 10 and 30 mm, laid out in the direction of movement of the fabric and equidistant from each other at a distance of between 2 and 4 mm. These constructional characteristics provide optimum functioning of the grid.

The method for the vacuum treatment of corded fabrics, object of the invention, consists in the following phases:

a) With the first valve open, with the second valve closed, with the air inlet valve to the recovery receptacle closed and with the air inlet valve in the dyeing chamber open, the vacuum pump is set into operation and effects absorption from the bath, which passes from the dyeing chamber to the recovery receptacle. During this phase the fabric bath is extracted and the dirtiest part of the bath which is not utilizable for further dyeing is eliminated from the recovery receptacle;

b) When the bath reaches the predetermined level in the recovery receptacle, the first valve and the air inlet valve to the dyeing chamber shut and the second valve opens, so that the vacuum is applied through the upper part of the dyeing chamber to the entire bath flow circuit;

c) Once the vacuum has been produced in the dyeing chamber the first valve and the air inlet valve to the recovery receptacle open and the flow pump comes into operation, so that the bath begins to pass from the recovery receptacle to the dyeing chamber and to the bath flow circuit. Dyeing of the fabric is thus effected under vacuum. When the bath reaches a minimum level in the recovery receptacle the first and second valves close, as does the air inlet valve to the recovery receptacle, leaving a vacuum in the vacuum circuit.

Opening the first valve results in a return to phase a), with the cycle being repeated.

To wash the fabric the cycle is repeated as many times as necessary, replacing the bath by washing water.

In the procedure just described, dyeing of the fabric is carried out at a temperature between 70 and 100°C.

Said temperature range is very much lower than that normally used in the art, which ranges between 130 and 140°C.

This method achieves a major saving of washing water. It also achieves major saving of steam due to the method being carried out at low temperature.

As was stated above, efficacious draining of the fabric is also achieved, leaving it ready to pass on to the dryer, thus omitting the centrifuging phase which is usual in known fabric treatment equipments.

BRIEF DESCRIPTION OF THE DRAWINGS

For a better understanding of all that has been set forth, there are attached some drawings in which, schematically and only as non-restrictive example, a practical case of embodiment is shown.

In those drawings, Figure 1 is a side view of the fabrics treatment equipment of the invention; Figure 2 is a detail of the grid for the movement and draining of the fabric.

DESCRIPTION OF A PREFERRED EMBODIMENT

As shown in Figure 1, the equipment for the treatment of corded fabrics of the invention comprises a substantially circular dyeing chamber 1, in whose lower part 2 there is a bath for treatment of the fabric.

As can be seen in Figure 2, it also comprises an outer plate 3 and an inner plate 4 which remain substantially parallel, thereby defining a passageway 5 through which the fabric circulates. Over the outer plate 3 there is a grid 6, formed by a plurality of tubes 7 of diameter between 10 and 30 mm, positioned in the direction of the movement of the fabric and equidistant from each other at a distance of between 2 and 4 mm.

Returning to Figure 1, the equipment of the invention comprises a bath flow circuit, represented at the left part of the figure, which runs from a plurality of outlets 8, 9, 10, 11, 12, 13 situated to the lower part of the dyeing chamber 1 to some inlets 14, 15 to the upper part of same, which circuit includes a pump 16 driven by a motor 17, a heat exchanger 18 and a filter 19.

The right-hand part of the figure shows a vacuum circuit comprising a vacuum pump 20, a recovery receptacle 21 and an expansion tank 22.

The recovery receptacle 22 is connected by its lower part to the outlets 8, 9, 10, 11, 12, 13 of the dyeing chamber 1 through a valve 23 and by its upper part to two conduits 24, 25, one of which 24 is connected to the vacuum pump 20 and the other 25 to the inlet 15 of the dyeing chamber 1 through a valve 26, the vacuum pump 20 being connected to the expansion tank 22.

The dyeing chamber 1 and the recovery receptacle each comprise air inlet valves 27, 28.

Operation of the equipment of the invention is

effected in the following phases:

a) With the valve 23 open, with the valve 26 closed, with the air inlet valve 28 to the recovery receptacle 21 closed and with the air inlet valve 27 in the dyeing chamber 1 open, the vacuum pump 20 is set into operation and effects absorption from the bath, which passes from the dyeing chamber 1 to the recovery receptacle 21.

This phase continues until the bath reaches a certain level in the recovery receptacle 21. During this phase the fabric bath is extracted and the dirtiest part of the bath which is not utilizable for further dyeing is eliminated from the recovery receptacle 21;

b) When the bath reaches the predetermined level in the recovery receptacle 21, the valve 23 and the air inlet valve 27 to the dyeing chamber 1 shut and the valve 28 opens, so that the vacuum is applied through the upper part of the dyeing chamber 1 to the entire bath flow circuit (to the left of the dyeing chamber [1] in Figure 1);

c) Once the vacuum has been produced in the dyeing chamber 1 the valve 23 and the air inlet valve 28 to the recovery receptacle 21 open and the flow pump 16 comes into operation, so that the bath begins to pass from the recovery receptacle 21 to the dyeing chamber 1 and to the bath flow circuit. Dyeing of the fabric is thus effected under vacuum.

When the bath reaches a minimum level in the recovery receptacle 21, the valves 23 and 26 close, as does the air inlet valve 28 to the recovery receptacle 21, leaving a vacuum in the vacuum circuit (to the right of the dyeing chamber [1] in Figure 1).

Opening the valve 23 results in a return to phase a), with the cycle being repeated.

As has been stated hereinabove, dyeing of the fabric is carried out at a temperature between 70 and 100°C, with the advantages which have been stressed:

- saving of washing water.
- saving of steam.
- efficacious draining of the fabric.

Claims

1. Equipment for the vacuum treatment of corded fabrics, which comprises a dyeing chamber (1) containing a dyeing bath inside which are means for continuous pulling of the fabric, and means for atomization of the liquid, and also including a bath flow circuit which runs from a plurality of outlets (8, 9, 10, 11, 12, 13) situated to the lower part of the dyeing chamber (1) up to at least one inlet to the upper part of same, the circuit of which comprises a pump (16), a heat exchanger (18) and a filter (19), characterized by the fact that it comprises a vacuum circuit including a vacuum pump (20) connected to at least one of the outlets (8, 9, 10, 11, 12, 13) located at the lower part of the dyeing chamber (1).

2. Equipment according to claim 1, characterized in that the vacuum circuit comprises a vacuum pump (20), a recovery receptacle (21) and an expansion tank (22), the recovery receptacle (21) being connected by its lower part to the outlets (8, 9, 10, 11, 12, 13) of the dyeing chamber (1) through a first valve (23), and by its upper part to two conduits (24, 25), one of which is connected to the vacuum pump (20) and the other to at least one inlet of the dyeing chamber (1) through a second valve (26), the vacuum pump (20) being connected to the expansion tank (22), the dyeing chamber (1) and the recovery receptacle (21) each comprising air inlet valves (27, 28).

3. Equipment according to any of the preceding claims, characterized in that the dyeing chamber (1) comprises a plurality of reinforcing rings in order to withstand the vacuum which is produced inside the dyeing chamber.

4. Equipment according to any of the preceding claims, in which the dyeing chamber (1) comprises a grid (6) provided to the bottom of same on which the corded fabric slides, characterized in that the aforesaid grid (6) is formed of a plurality of tubes (7), of diameter between 10 and 30 mm, laid out in the direction of the movement of the fabric and equidistant from each other at a distance of between 2 and 4 mm.

5. Method for vacuum treatment of corded fabrics in an equipment according to claim 2, characterized in that it consists in the following phases:

a) With the first valve (23) open, with the second valve (26) closed, with the air inlet valve (28) to the recovery receptacle (21) closed and with the air inlet valve (27) in the dyeing chamber (1) open, the vacuum pump (20) is set into operation and effects absorption from the bath, which passes from the dyeing chamber (1) to the recovery receptacle (21). This phase continues until the bath reaches a certain level in the recovery receptacle (21). During this phase the fabric bath is extracted and the dirtiest part of the bath which is not utilizable for further dyeing is eliminated from the recovery receptacle (21);

b) When the bath reaches the predetermined level in the recovery receptacle (21), the first valve (23) and the air inlet valve (27) to the dyeing chamber (1) shut and the second valve opens (26), so that the vacuum is applied

through the upper part of the dyeing chamber (1) to the entire bath flow circuit;

c) Once the vacuum has been produced in the dyeing chamber (1) the first valve (23) and the air inlet valve (28) to the recovery receptacle (21) open and the flow pump (16) comes into operation, so that the bath begins to pass from the recovery receptacle (21) to the dyeing chamber (1) and to the bath flow circuit. Dyeing of the fabric is thus effected under vacuum. When the bath reaches a minimum level in the recovery receptacle (21) the first (23) and second (26) valves close, as does the air inlet valve (28) to the recovery receptacle, leaving a vacuum in the vacuum circuit.

Opening the first valve (23) results in a return to phase a), with the cycle being repeated.

6. Method according to claim 5, characterized in that dyeing of the fabric is effected at a temperature of between 70 and 100°C.

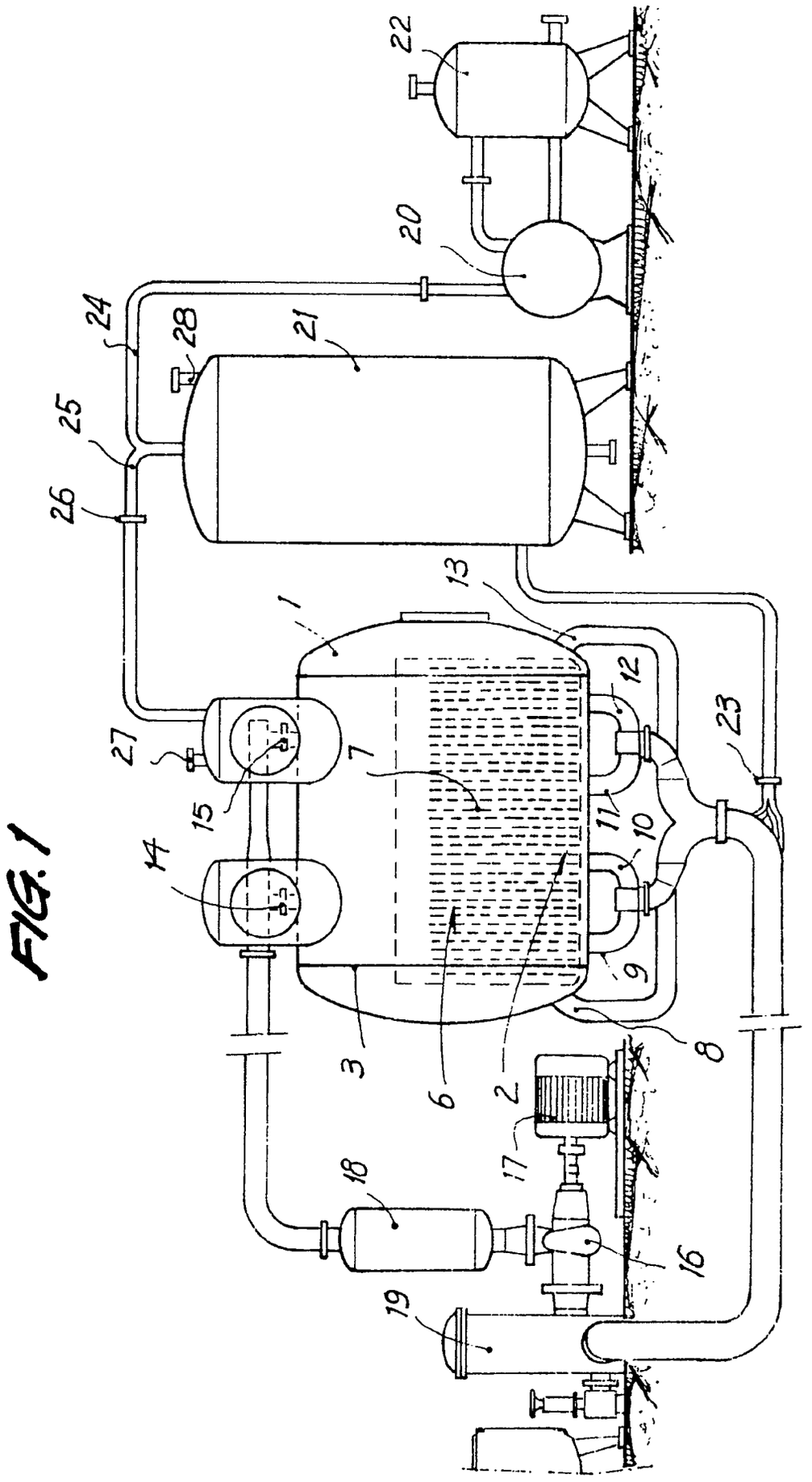
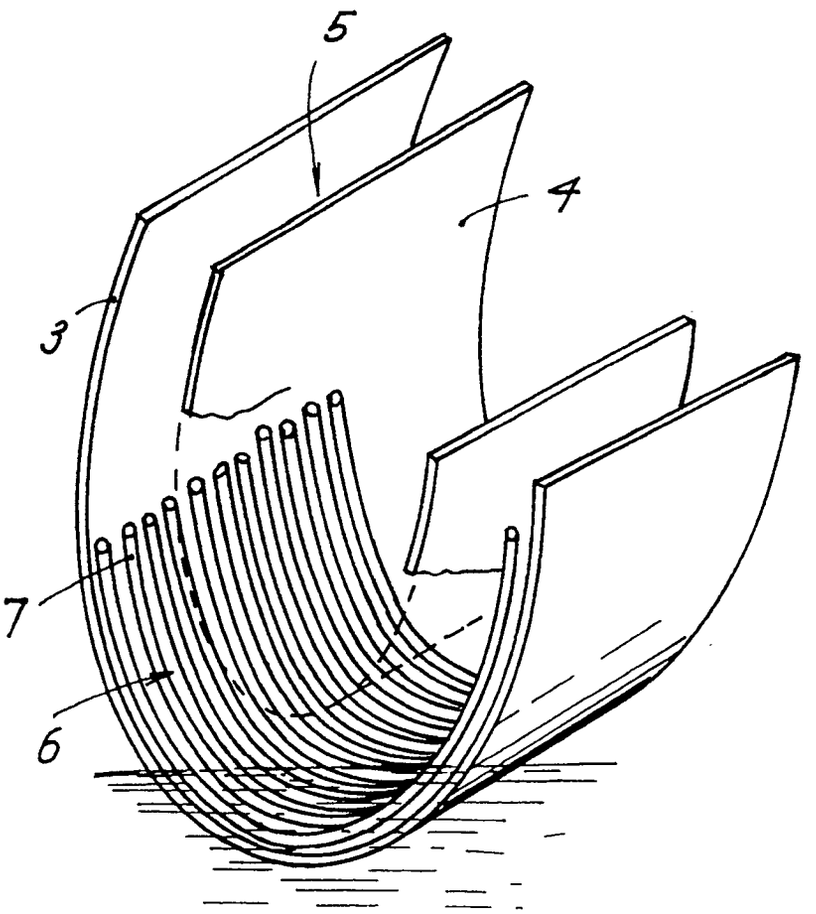


FIG. 1

FIG. 2



European Patent Office

EUROPEAN SEARCH REPORT

Application Number

EP 91 50 0013

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.5)
A	EP-A-229 887 (BRUCKNER)		D06B3/26
A	EP-A-325 789 (BERTOLDI)		
A	US-A-4 210 005 (ARGELICH , TERMES)		
A	FR-A-2 595 726 (JOSE ABS SOBRINHO & ALVARO ADIB LIMA)		
A	FR-A-2 272 748 (MARTIN)		
A	FR-A-1 296 431 (CHARLES BLOUNT)		

TECHNICAL FIELDS SEARCHED (Int. Cl.5)

D06B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	27 MAY 1991	PETIT J.P.

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
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P0401)