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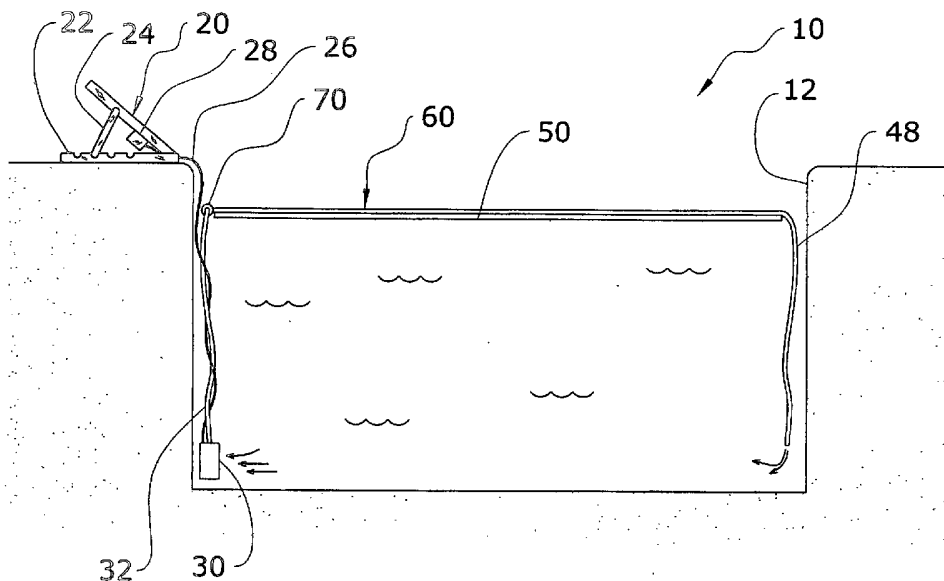
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(54) Title: SOLAR POOL HEATER SYSTEM



(57) Abstract: A solar pool heater system (10) for efficiently heating a pool (12) with solar energy. The solar pool heater system includes a buoyant support member (50), a distribution unit (60) attached to the support member, a manifold (70) fluidly connected to the distribution unit, a pump unit (30) fluidly connected to the manifold, and a solar unit (20) electrically connected to the pump unit. The pump unit draws colder water from the pool and provides the same to the manifold which distributes the water through distribution channels within the distribution unit. The water is heated via solar energy while passing through the distribution unit. The water is then returned to the body of pool water through an exhaust conduit (48).



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Solar Pool Heater System

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BACKGROUND OF THE INVENTION

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Field of the Invention

The present invention relates generally to pool heaters and more specifically it
25 relates to a solar pool heater system for efficiently heating a pool with solar energy.

Description of the Related Art

Pool heaters have been in use for years. One type of pool heater is comprised of an electrical heater unit that heats the water utilizing conventional electric power. A
5 second type of pool heater is comprised of a passive cover that allows solar energy to enter the pool but retains the solar energy within the pool. Another type of pool heater is comprised of a solar heater unit that is positioned away from the pool (e.g. on the roof of a house) wherein water is pumped to the solar heater unit and then returned.

10 Conventional pool heaters do not efficiently heat a pool. Conventional passive covers do not effectively heat a pool since they only heat a thin surface layer of the pool water. A further problem with conventional pool heaters is that they can be difficult and cumbersome to install. Another problem with conventional pool heaters is that they do not fit various sizes of pools.

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While these devices may be suitable for the particular purpose to which they address, they are not as suitable for efficiently heating a pool with solar energy. Conventional pool heaters do not efficiently heat various sizes and shapes of pools.

20 In these respects, the solar pool heater system according to the present invention substantially departs from the conventional concepts and designs of the prior art, and in so doing provides an apparatus primarily developed for the purpose of efficiently heating a pool with solar energy.

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BRIEF SUMMARY OF THE INVENTION

In view of the foregoing disadvantages inherent in the known types of pool heaters now present in the prior art, the present invention provides a new solar pool heater system construction wherein the same can be utilized for

The general purpose of the present invention, which will be described subsequently in greater detail, is to provide a new solar pool heater system that has many of the advantages of the pool heaters mentioned heretofore and many novel features that result in a new solar pool heater system which is not anticipated, rendered obvious, suggested, or even implied by any of the prior art pool heaters, either alone or in any combination thereof.

To attain this, the present invention generally comprises a buoyant support member, a distribution unit attached to the support member, a manifold fluidly connected to the distribution unit, a pump unit fluidly connected to the manifold, and a solar unit electrically connected to the pump unit. The pump unit draws colder water from the pool and provides the same to the manifold which distributes the water through distribution channels within the distribution unit. The water is heated via solar energy while passing through the distribution unit. The heated water is then returned to the body of pool water through an exhaust conduit.

There has thus been outlined, rather broadly, the more important features of the invention in order that the detailed description thereof may be better understood, and in order that the present contribution to the art may be better appreciated. There are additional features of the invention that will be described hereinafter and that will form the subject matter of the claims appended hereto.

In this respect, before explaining at least one embodiment of the invention in detail, it is to be understood that the invention is not limited in its application to the details of construction and to the arrangements of the components set forth in the following description or illustrated in the drawings. The invention is capable of other embodiments and of being practiced and carried out in various ways. Also, it is to be understood that the phraseology and terminology employed herein are for the purpose of the description and should not be regarded as limiting.

A primary object of the present invention is to provide a solar pool heater system that will overcome the shortcomings of the prior art devices.

A second object is to provide a solar pool heater system for efficiently heating a pool with solar energy.

Another object is to provide a solar pool heater system that may be utilized upon various sizes and shapes of pools.

An additional object is to provide a solar pool heater system that is modular.

A further object is to provide a solar pool heater system that does not require additional space other than the pool.

Another object is to provide a solar pool heater system that simultaneously heats and circulates the water within a pool.

Other objects and advantages of the present invention will become obvious to the reader and it is intended that these objects and advantages are within the scope of the present invention.

To the accomplishment of the above and related objects, this invention may be embodied in the form illustrated in the accompanying drawings, attention being called to the fact, however, that the drawings are illustrative only, and that changes may be made in the specific construction illustrated and described within the scope of the appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

Various other objects, features and attendant advantages of the present invention will become fully appreciated as the same becomes better understood when considered in conjunction with the accompanying drawings, in which like reference characters designate the same or similar parts throughout the several views, and wherein:

FIG. 1 is a side view of the present invention positioned within a pool.

FIG. 2 is a side view of the present invention positioned within the pool utilizing an exhaust conduit.

FIG. 3 is an upper perspective view of the solar unit.

FIG. 4 is an end view of distribution unit and support member.

FIG. 5 is an upper perspective view of distribution unit and support member.

FIG. 6a is a cutaway perspective view of the manifold within a sleeve.

FIG. 6b is a perspective view of the manifold within a sleeve.

FIG. 6c is a perspective view of the manifold.

FIG. 7 is an exploded perspective view of the present invention.

FIG. 8 is a side cutaway view of the distribution unit fluidly connected to the manifold.

FIG. 9a is a top view of one variation of the present invention within a pool.

FIG. 9b is a top view of a second variation of the present invention within a pool.

FIG. 10 is a block diagram illustrating the electrical connections between the electrical components of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

A. Introduction

Turning now descriptively to the drawings, in which similar reference characters denote similar elements throughout the several views, FIGS. 1 through 10 illustrate a solar pool heater system **10**, which comprises a buoyant support member **50**, a distribution unit **60** attached to the support member **50**, a manifold **70** fluidly connected to the distribution unit **60**, a pump unit **30** fluidly connected to the manifold **70**, and a solar unit **20** electrically connected to the pump unit **30**. The pump unit **30** draws colder water from the lower portion of the pool **12** and provides the same to the manifold **70** which distributes the water through distribution channels **62** within the distribution unit **60**. The water is heated via solar energy while passing through the distribution unit **60**. The heated water is then returned to the body of pool **12** water through an exhaust conduit **48**.

B. Support Member

The support member **50** is comprised of a buoyant material for floating upon the water surface of a pool **12**. The support member **50** may be comprised of a sheet material or a plurality of segment connected together. The support member **50** may be comprised of various types of buoyant materials such as but not limited to foam rubber and the like. The support member **50** further is preferably capable of insulating the pool **12** thereby retaining the heat within the body of water in the pool **12**.

C. Distribution Unit

The distribution unit **60** positioned upon the upper surface of the support member **50**. The distribution unit **60** is preferably attached to the upper surface of the support member **50**, however various other configurations may be utilized.

As best illustrated in Figures 5 and 7 of the drawings, the distribution unit 60 includes a plurality of distribution channels 62. The distribution channels 62 preferably extend substantially parallel to one another as further shown in Figures 5 and 7 of the drawings. The distribution channels 62 are preferably comprised of a relative broad and flat structure for maximizing the exposure of the water flowing through the distribution channels 62 to solar energy.

The upper surface or the lower surface of the distribution channels 62 is comprised of a colored or opaque material, for allowing for the absorption of solar energy and the heating of the water flowing through the distribution channels 62. If the lower surface is used for absorption of solar energy, a transparent or semitransparent material is used for the upper surface, allowing for the passage of solar energy to lower surface. If the upper surface is primarily used for absorption of solar energy, the lower surface may be of any color. The lower surface may also consist of the support member 50.

The exhaust conduit 48 is attached to a second end of the distribution unit 60 for dispensing the heated water back into the pool 12. The exhaust conduit 48 preferably extends downwardly to a lower portion of the pool 12 as best illustrated in Figures 1 and 2 of the drawings. The exhaust conduit 48 may have various shapes, lengths and sizes as can be appreciated to allow for the transfer of the heated water back into the lower portion of the pool 12.

D. Manifold

The manifold 70 is fluidly connected to the distribution unit 60 as best illustrated in Figure 8 of the drawings. The manifold 70 includes a plurality of ports 72 that open into a respective distribution channel of the distribution unit 60 for providing the water to be heated to the distribution unit 60.

As shown in Figures 6a, 6b and 8 of the drawings, the manifold 70 may be comprised of an elongate structure having a longitudinal axis with the ports 72 extending transversely from a main conduit. A cap member 74 may be attached to one end of the manifold 70 opposite of the pump unit 30 for preventing the escape of water through thereof as shown in Figure 6c of the drawings. The manifold 70 with extended ports 72 may be surrounded by a sleeve 40, for allowing the distribution unit 60 attached to the support member 50 to be easily rolled up when they are removed from the pool. The sleeve 40 is comprised of a material such as but not limited to foam rubber and the like. The sleeve 40 may be comprised of a buoyant material.

Alternatively, the manifold may be constructed as a tube around which the distribution unit 60 is wrapped, with ports 72 in the form of holes providing the fluid connection to the distribution channels 62. The manifold may also be constructed in the form of channels within distribution unit 60 itself.

As shown in Figure 1 in the drawings, a second manifold 70 may be used to collect the heated water from the distribution unit 60 and transfer it towards the bottom of the pool through an exhaust conduit 48. Figure 2 illustrates the alternative of dispensing with a second manifold, by using an extension of the distribution unit 60 as the exhaust conduit 48.

E. Pump Unit

The pump unit 30 is fluidly connected to the manifold 70 for providing water from within a pool 12 to the manifold 70 via a delivery tube 32 or similar fluid connection. The pump unit 30 is preferably comprised of a submersible pump structure that may be submerged for extended periods of time. Various pump devices may be utilized to construct the pump unit 30 which are well-known in the pump industry.

F. Solar Unit

The solar unit **20** is electrically connected to the pump unit **30** either directly or through a control unit as illustrated in Figure 10 of the drawings. The solar unit **20** includes one or more solar cells for converting solar energy from the sun to electricity which are well-known.

A power cable **26** or other electrical conducting device is electrically connected between the solar unit **20** and the pump unit **30**. The power cable **26** is insulated to prevent electrical conduction when positioned within the pool **12**.

Figure 3 best illustrates that the solar unit **20** includes a support base **22** and a support structure **24** adjustably attached to the support base **22** for allowing adjustment of the angle of solar cells within the solar unit **20** to best receive the solar energy from the sun. The support base **22** preferably has a plurality of cutouts for receiving a selected portion of the support structure **24** as further shown in Figure 1 of the drawings. Various other support structures **24** may be utilized to support the solar unit **20**.

The solar unit **20** automatically activates the pump unit **30** during solar energy periods and is preferably used in combination with a battery unit **28** and a control unit **80**. The battery unit **28** may be comprised of any conventional rechargeable power supply. When solar energy is present the solar unit **20** charges the battery unit **28** until a predetermined charge level is reached, at which time the control unit **80** activates the pump unit **30**. The pump unit **30** then operates for a preset time or until a predetermined discharge level is reached. This cycle repeats as long as solar energy is present.

G. *Operation of Invention*

The invention is first installed to a specific pool 12 structure. The support member 50, the distribution unit 60 and the manifold 70 may be trimmed according to the shape and size of the pool 12. Figures 9a and 9b illustrate some alternative variations of the present invention designed to accommodate different shaped pools 12. The support member 50 both supports 72 the distribution unit 60 upon the surface of the pool 12 to maximize the solar exposure and also insulates the body of water within the pool 12. The pump unit 30 is positioned within the pool 12 as shown in Figures 1 and 2 of the drawings. The solar unit 20 provides electrical power to the pump unit 30 either directly from the solar cells or from the battery unit 28, as regulated by the control unit 80, when sufficient solar energy is present. The pump unit 30 draws the cold water from the pool 12 and forces the cold water to the manifold 70. The cold water is then diverted through the ports 72 into the distribution channels 62 of the distribution unit 60. The water is then heated within the distribution channel by the solar energy. The heated water is then dispensed out the second end of the distribution unit 60 back into the water of the pool 12. An exhaust conduit 48 may be fluidly connected to the second end of the distribution unit 60 for diverting the heated water directly to the lower portion of the pool 12 as shown in Figure 2 of the drawings. As shown in Figure 1 of the drawings, a second manifold 70 may be fluidly connected to the second end of the distribution unit 60 and then fluidly connected at one end to the exhaust conduit 48 for diverting the heated water to the lower portion of the pool 12. Various other structures may be achieved utilizing the present invention.

As to a further discussion of the manner of usage and operation of the present invention, the same should be apparent from the above description. Accordingly, no further discussion relating to the manner of usage and operation will be provided.

With respect to the above description then, it is to be realized that the optimum dimensional relationships for the parts of the invention, to include variations in size,

materials, shape, form, function and manner of operation, assembly and use, are deemed to be within the expertise of those skilled in the art, and all equivalent structural variations and relationships to those illustrated in the drawings and described in the specification are intended to be encompassed by the present invention.

Therefore, the foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly, all suitable modifications and equivalents may be resorted to, falling within the scope of the invention.

CLAIMS

I claim:

1. A solar pool heater system, comprising:
a support member comprised of a buoyant material;
a distribution unit positioned upon said support member;
a manifold fluidly connected to said distribution unit;
a pump unit fluidly connected to said manifold for providing water from within
a pool to said manifold; and
a solar unit electrically connected to said pump unit.
2. The solar pool heater system of Claim 1, wherein said solar unit includes a support base and a support structure adjustably attached to said support base for allowing adjustment of the angle of solar cells within said solar unit.
3. The solar pool heater system of Claim 1, wherein said solar unit includes a battery unit.
4. The solar pool heater system of Claim 3, wherein said solar unit charges said battery unit.
5. The solar pool heater system of Claim 4, including a control unit that regulates recharging of said battery unit by said solar unit.

6. The solar pool heater system of Claim 5, wherein said control unit regulates said pump unit.

7. The solar pool heater system of Claim 1, wherein said support member is comprised of a sheet material.

8. The solar pool heater system of Claim 1, wherein said support member is comprised of a plurality of segments.

9. The solar pool heater system of Claim 1, wherein said distribution unit is attached to an upper surface of said buoyant member.

10. The solar pool heater system of Claim 1, wherein said distribution unit includes a plurality of distribution channels.

11. The solar pool heater system of Claim 8, wherein said manifold includes a plurality of ports that open into a respective distribution channel of said distribution unit.

12. The solar pool heater system of Claim 11, wherein said distribution unit may be rolled around said manifold in a storage position.

13. The solar pool heater system of Claim 1, including an exhaust conduit attached to a second end of said distribution unit for dispensing the heated water back into the pool.

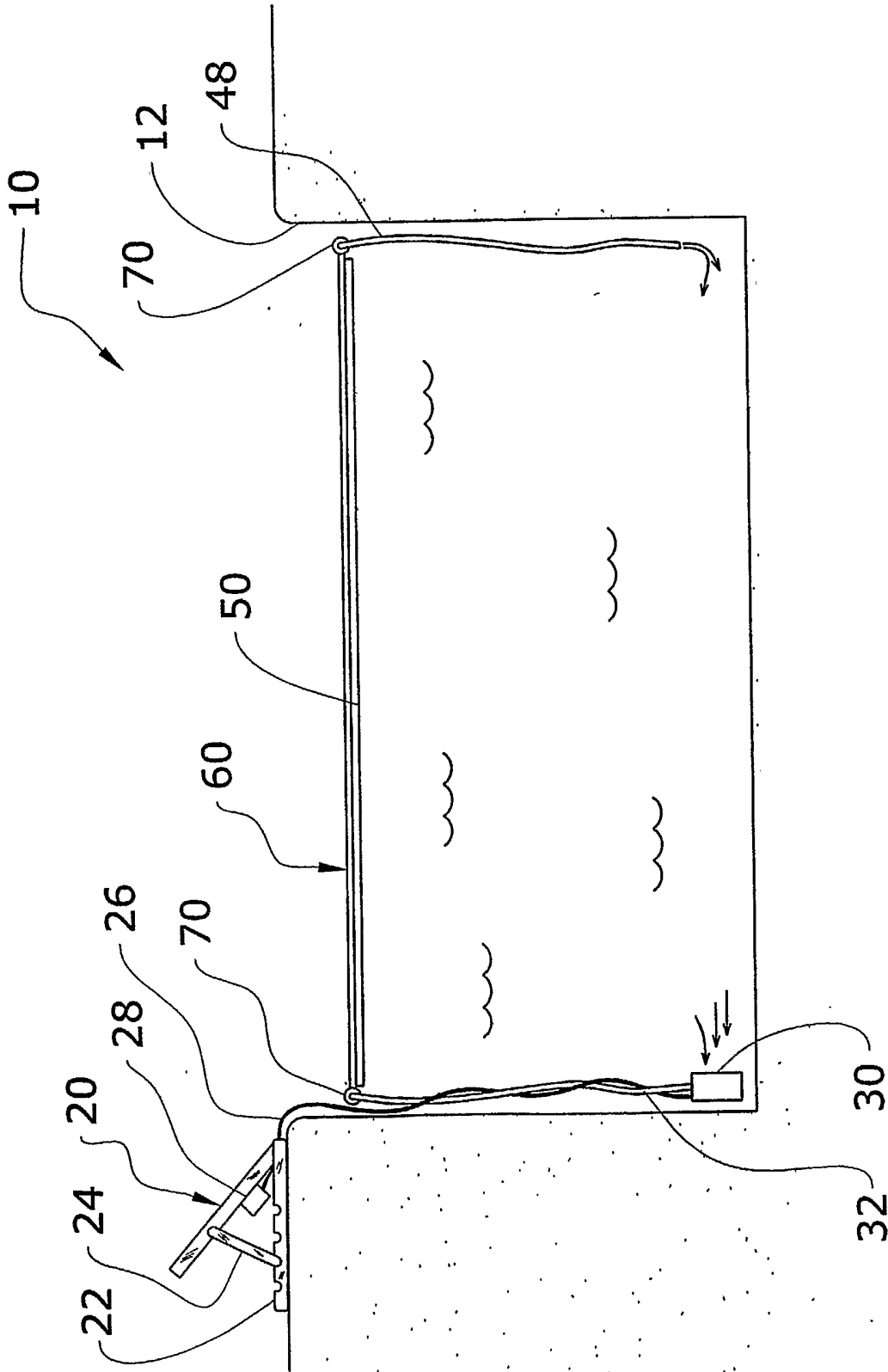


FIG. 1

SUBSTITUTE SHEET (RULE 26)

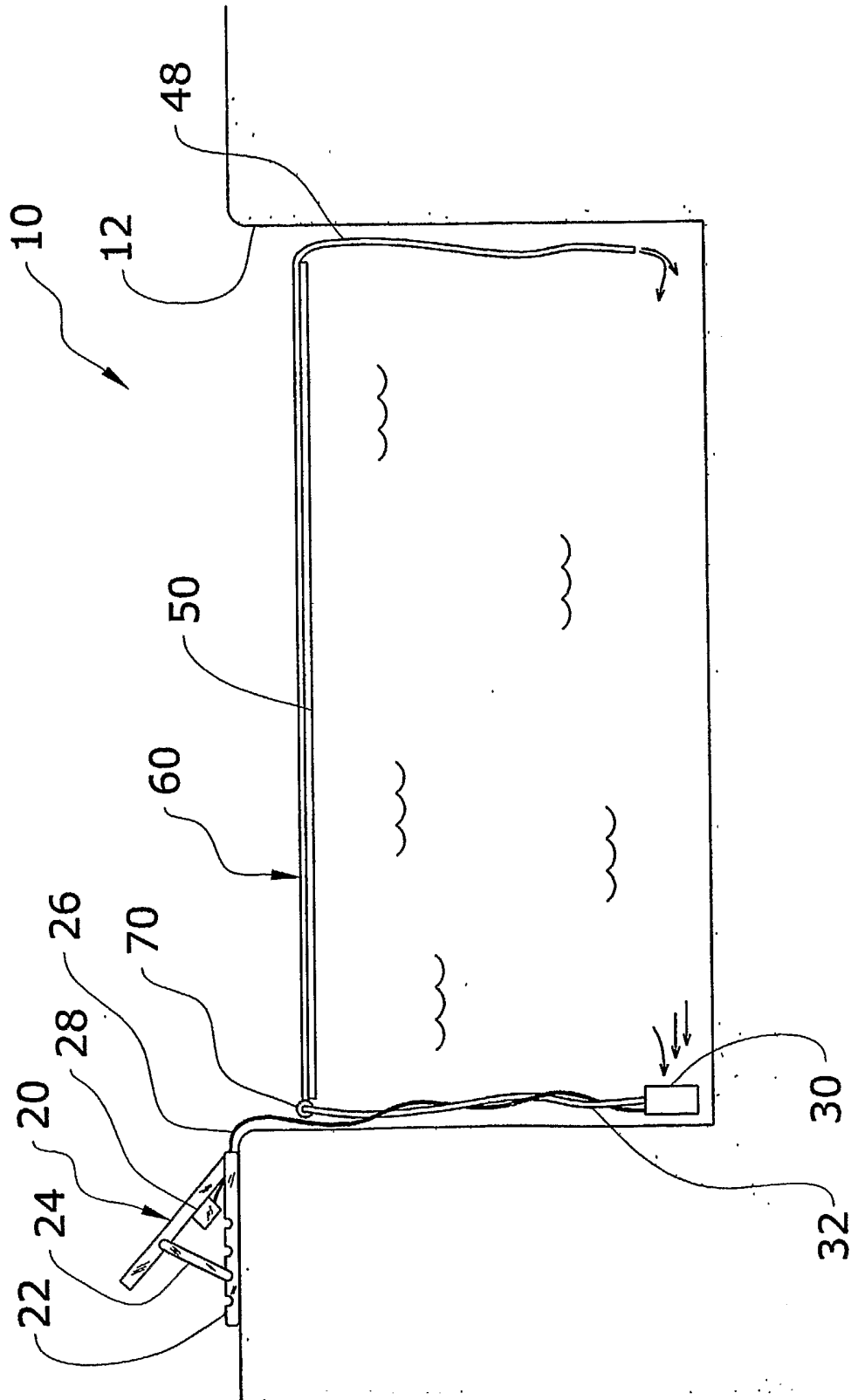


FIG. 2

SUBSTITUTE SHEET (RULE 26)

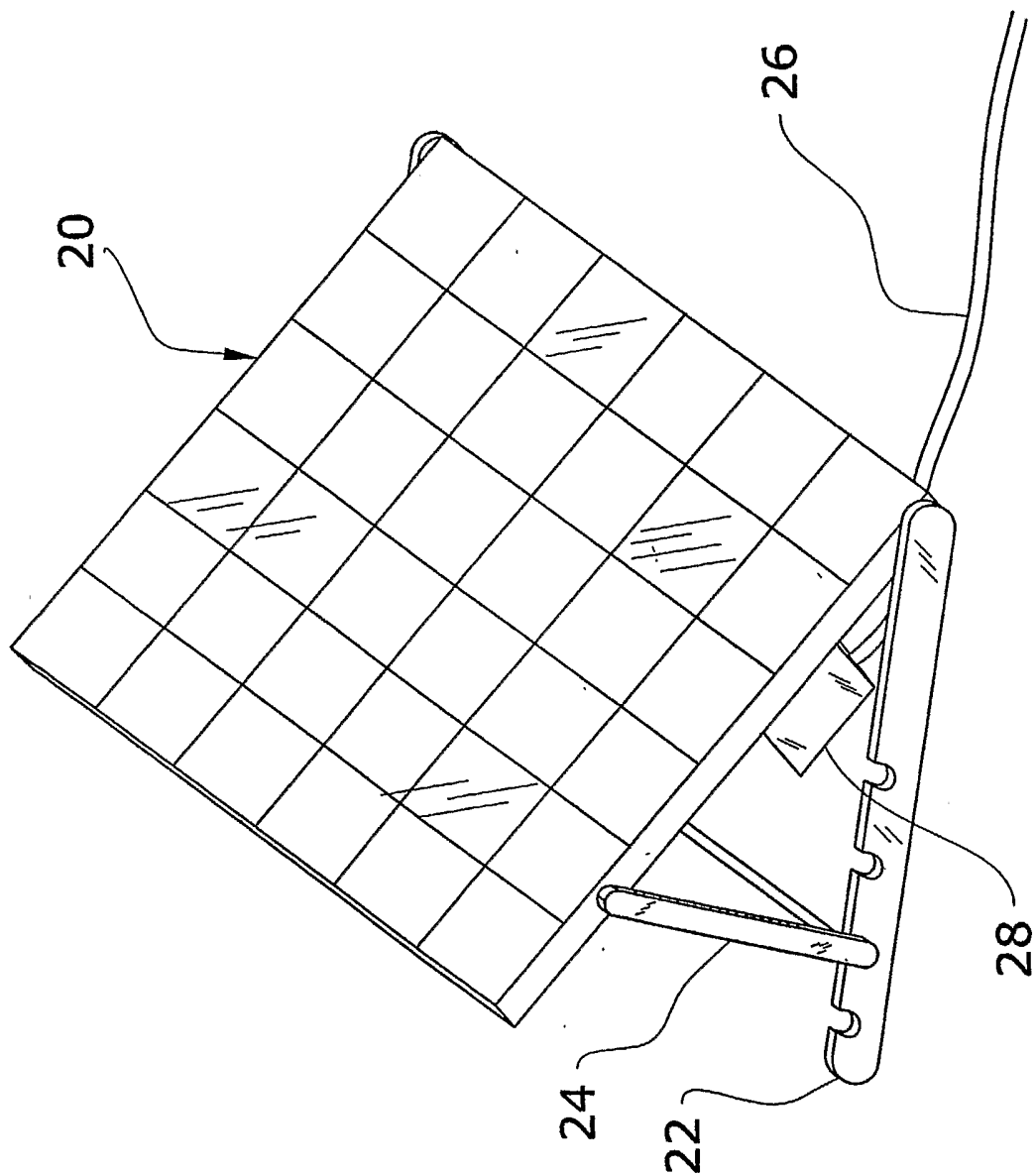


FIG. 3

SUBSTITUTE SHEET (RULE 26)

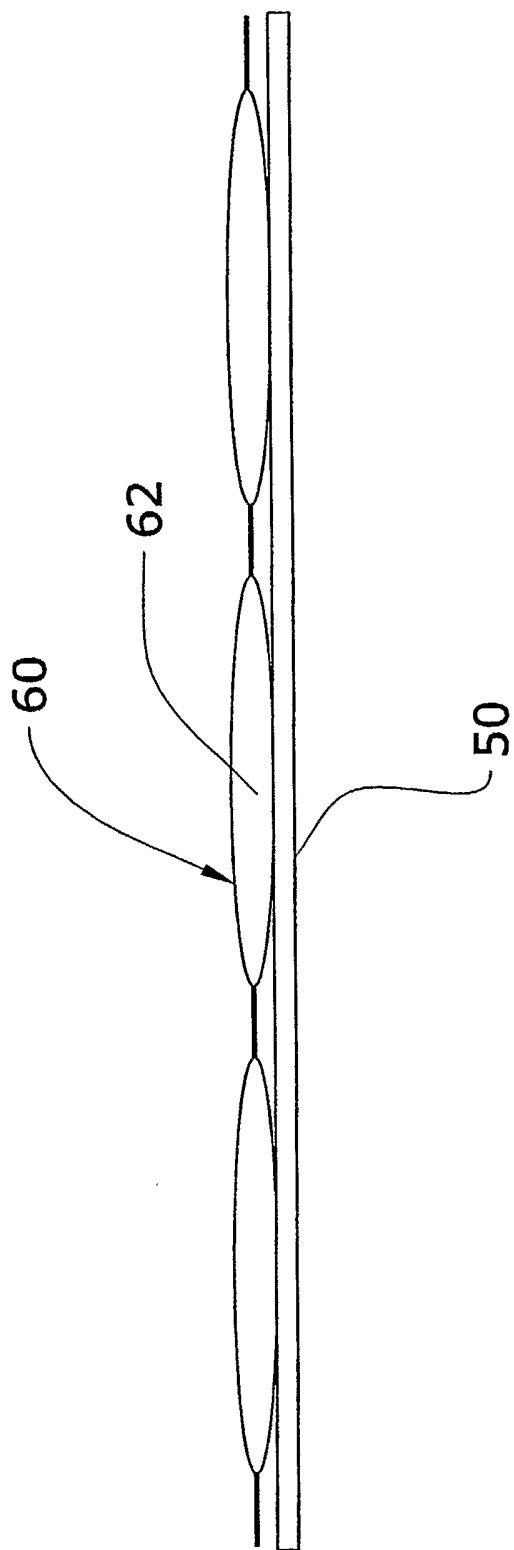


FIG. 4

SUBSTITUTE SHEET (RULE 26)

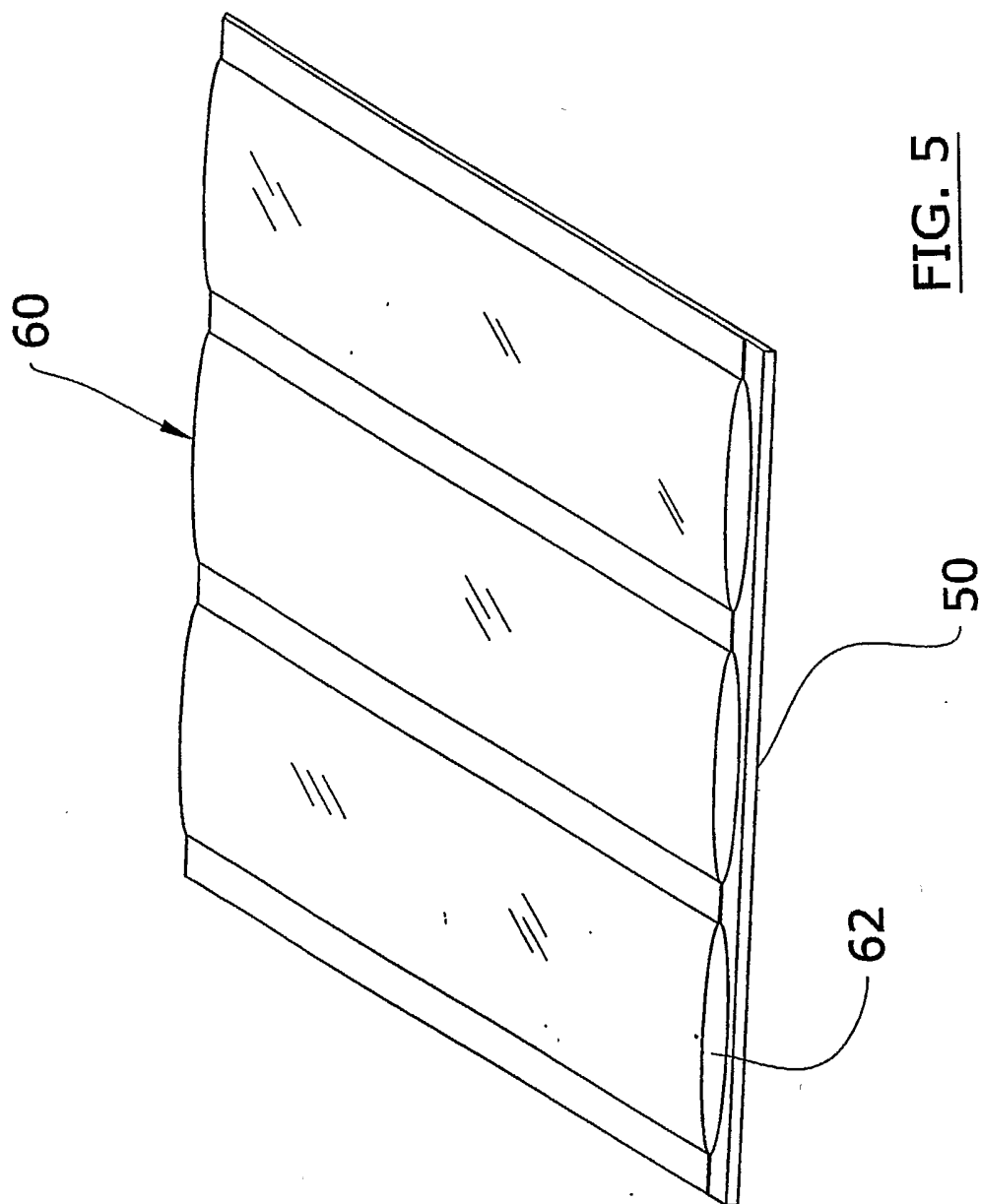
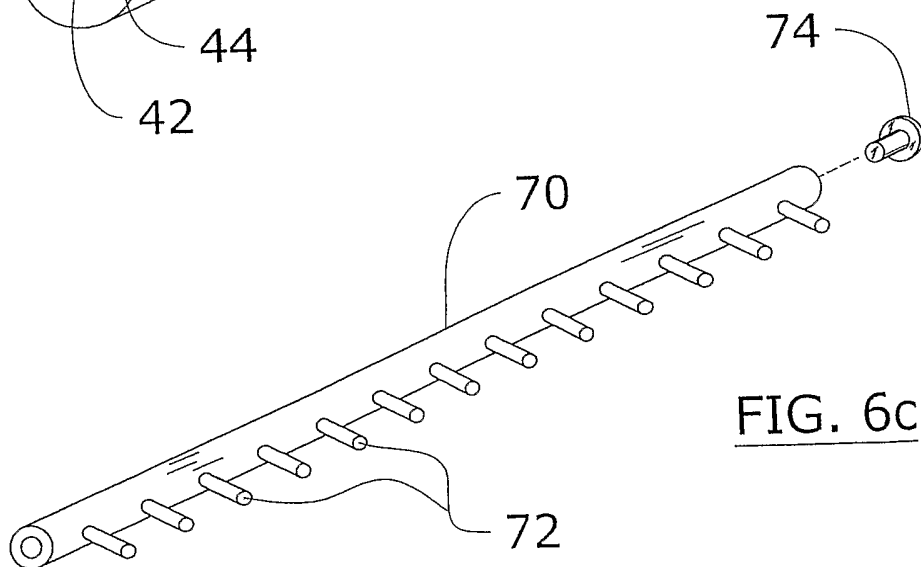
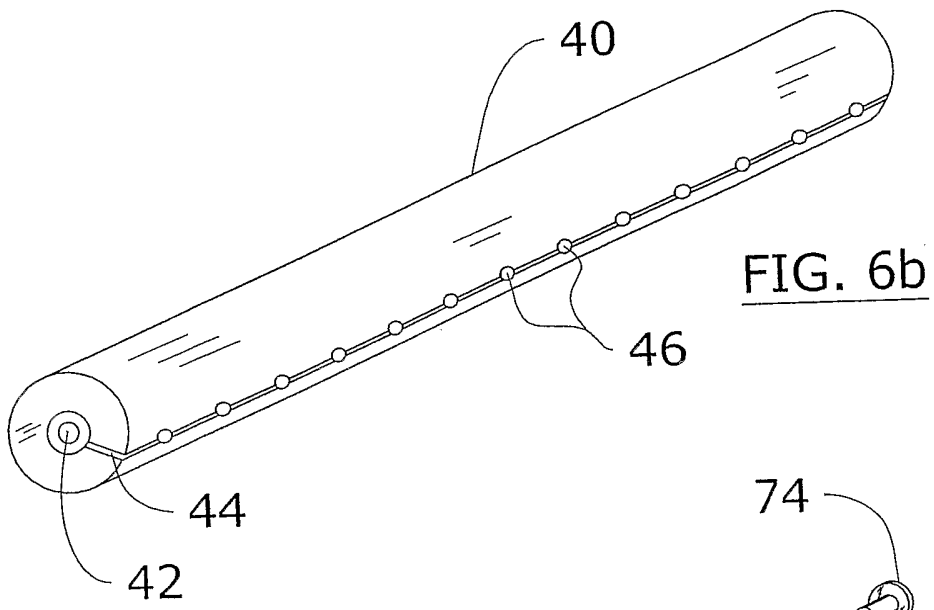
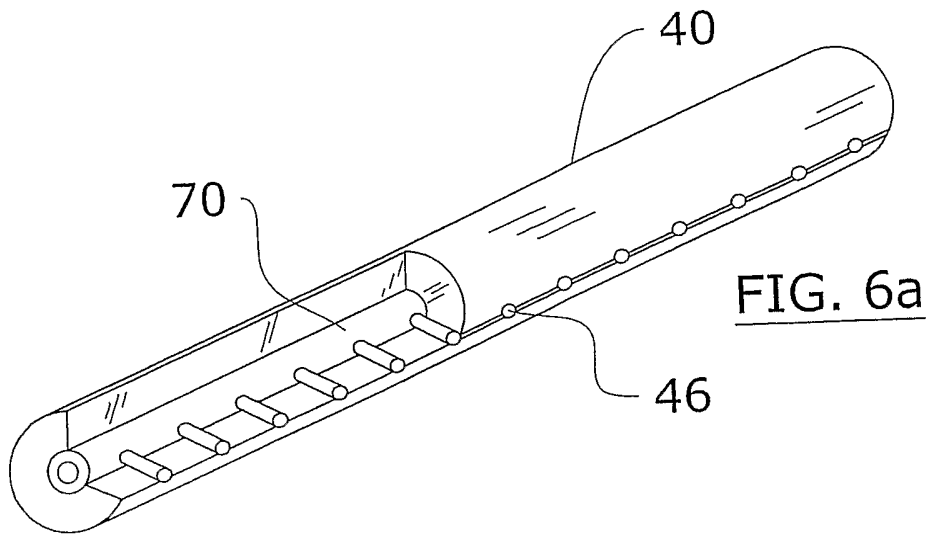


FIG. 5

SUBSTITUTE SHEET (RULE 26)



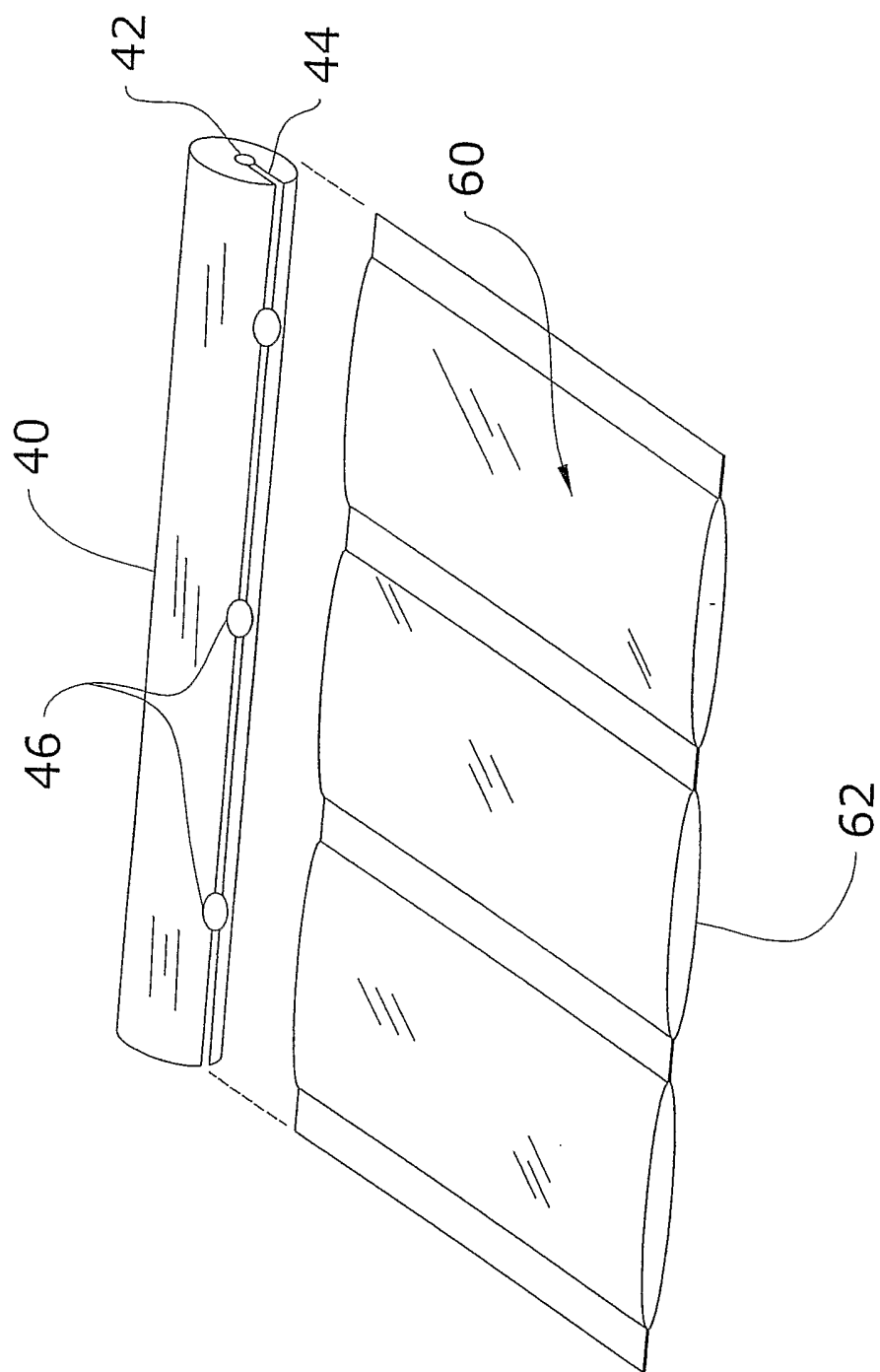


FIG. 7

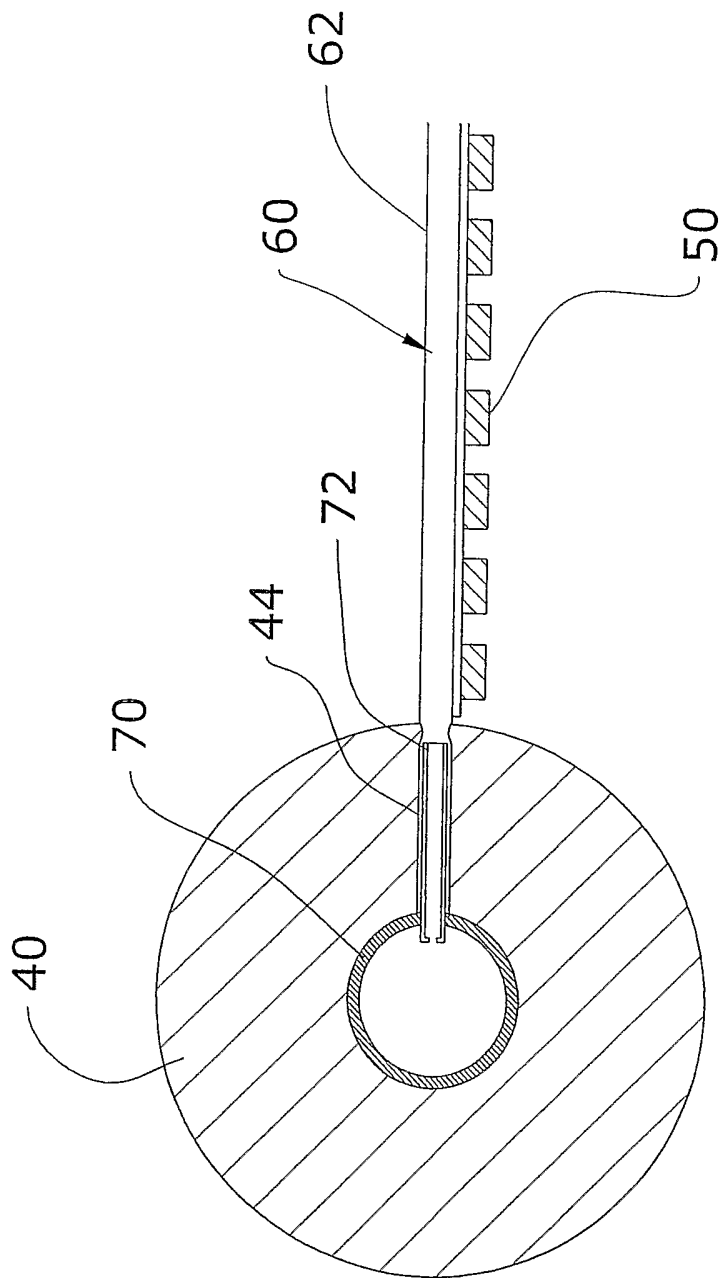


FIG. 8

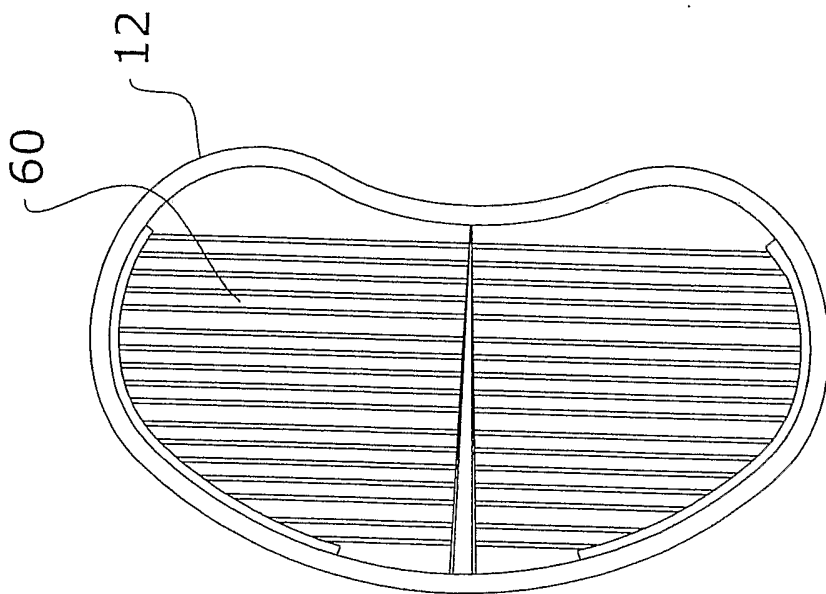


FIG. 9b

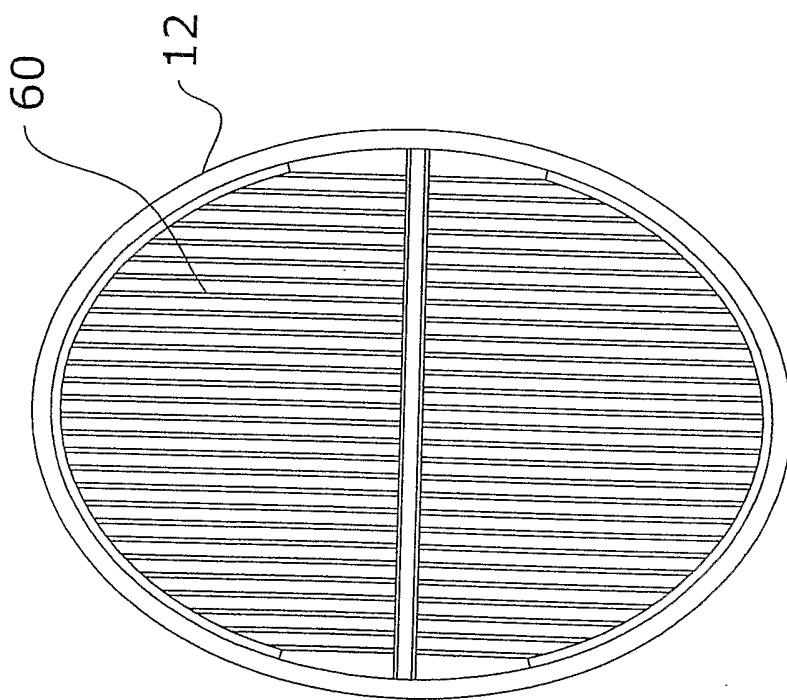


FIG. 9a

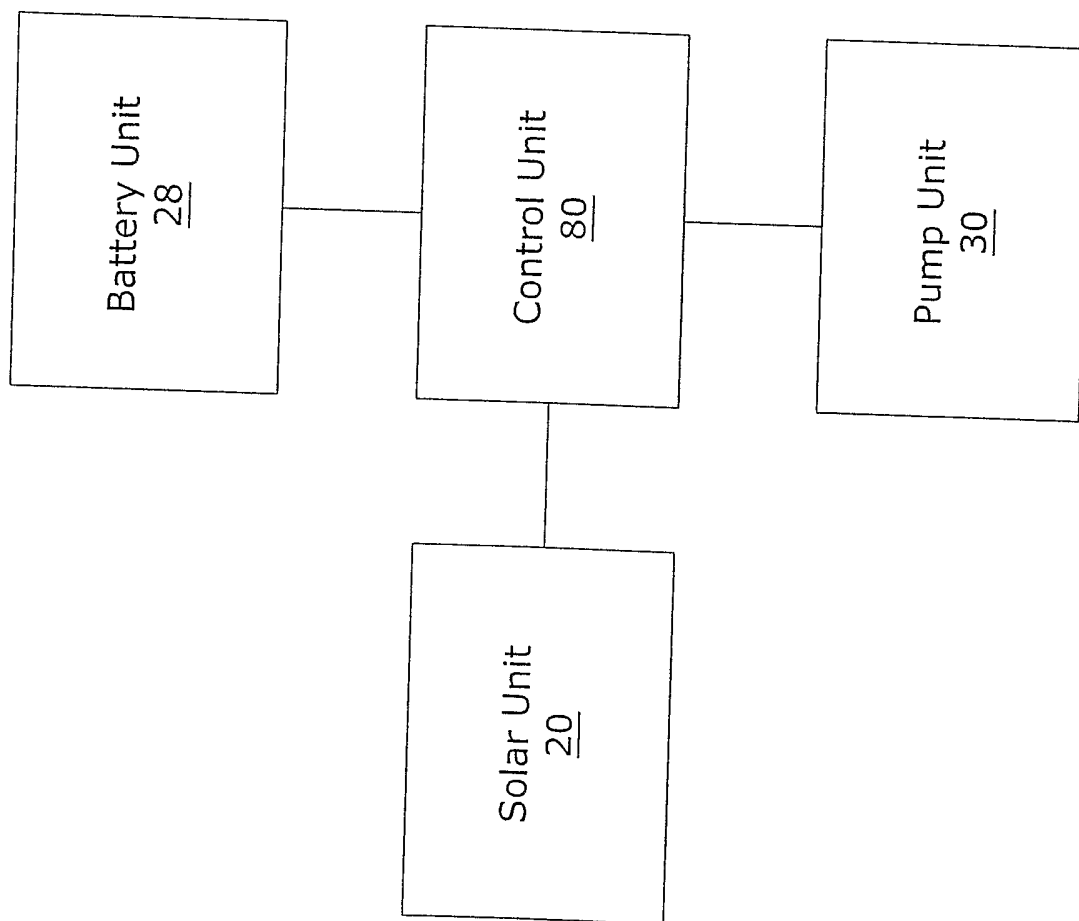


FIG. 10

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US03/09685

A. CLASSIFICATION OF SUBJECT MATTER		
IPC(7) : F24J 2/36		
US CL : 565,566,568,624,625,626,651,666,668,700		
According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED		
Minimum documentation searched (classification system followed by classification symbols) U.S. : 565,566,568,624,625,626,651,666,668,700		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 4,784,215 A (SING) 15 November 1988 (15.11.1988), see figure 2, elements 32,40,46.	1-13
Y	US 4,082,081 A (MCCOLGAN et al) 04 April 1978 (04.04.1978), see the entire document.	1-13
Y	US 4,709,688 A (PARADIS) 01 December 1987 (01.12.1987), see figure 5.	1-13
Y	US 4,227,511 A (MARGEN et al) 14 October 1980 (14.10.1980), see elements 5,6,7,8.	1-13
A	US 4,256,087 A (SOWERS) 17 March 1981 (17.03.1981), see elements 20,28,26a,26b.	1-13
A	US 5,143,052 A (CASE) 01 September 1992 (01.09.1992), see element 14.	1-13
Y	DE 27 32 470 A (GUTMANN) 01 February 1979 (01.02.1979), see the entire document.	1-13
Y	GB 2 144 035 A (BOYD) 27 February 1985 (27.02.1985), see the entire document.	1-13
Y	FR 2 506 434 A (MAJER) 26 November 1982 (26.11.1982), see the entire document.	1-13
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/> See patent family annex.		
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"A"	document defining the general state of the art which is not considered to be of particular relevance	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
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"O"	document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family
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Date of the actual completion of the international search		Date of mailing of the international search report
25 June 2003 (25.06.2003)		28 JUL 2003
Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US Commissioner for Patents P.O. Box 1450 Alexandria, Virginia 22313-1450 Facsimile No. (703)305-3230		Authorized officer CARL D. PRICE <i>Carl D. Price</i> Telephone No. 308-1148/0858