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(54) **FABRIC COLUMN AND PAD CONCRETE FORM**

TEXTILSCHALUNG FÜR EINE SÄULE ODER EINEN SOCKEL

COFFRAGE EN TISSU POUR COLONNES ET SOCLES EN BETON

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(73) Proprietor: **Fearn, Richard Neil**  
**South Surrey,**  
**British Columbia V4A 3K2 (CA)**

(72) Inventor: **Fearn, Richard**  
**Surrey, BCV4 3 K2 (CA)**

(74) Representative: **Knott, Stephen Gilbert et al**  
**Mathisen & Macara LLP**  
**120 Bridge Road**  
**Chertsey, Surrey KT16 8LA (GB)**

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## Description

### FIELD OF THE INVENTION

**[0001]** This invention relates generally to a concrete column and pad forming tube made of a fabric like material for receiving a flowable and settable material poured into the interior of the tube so as to form a round column or pad upon the hardening of the material, and which is characterized by folding flat for storage and shipping, while at the same time being able to be accurately positioned on the job site.

### BACKGROUND OF THE INVENTION

**[0002]** Concrete column forming tubes are conventionally formed of multiple layers of paper, which are spirally wound around a mandrel and with a wall thickness of about 6 mm so that the tube is rigid and maintains its circular cross section. Because of the large diameters and lengths, transportation and storage is very expensive.

**[0003]** In an effort to overcome these problems, it was proposed in US Patent Number 5,376,316 to have extremely thin and flexible paper walls, which would render the tube collapsible into a flat form so as to avoid the high transportation and storage expenses of the rigid cardboard tubes. While the use of the thin walls did make the tube collapsible, the following problems resulted: First, there was no means of holding the tube in position so that when filled with concrete, the column was correctly located. The patent contemplated an exterior framework so as to hold the tube correctly, but this would add considerably to the expense. Second, in order for the tube to fold flat for shipping, the paper layers would have to be very thin, and this thinness led to bulging, and possible form failure, particularly at the bottom of the column where the pressures were highest. Again, this would require reinforcement on the outside, defeating the purpose of the collapsible tube form. Third, the patent contemplates an alternative for vertically supporting the tube by cutting a series of notches in the upper end, which are folded outwardly over a circular supporting framework. Again, this would require additional bracing and labor, obviating the benefits of the collapsible form.

**[0004]** DE-U-9200496 discloses a method of forming concrete columns using mouldable fibre plates. The tube for the concrete columns is formed by joining adjacent plates together. The ends of two adjacent plates are joined to form a longitudinal tab to be supported by extra inserts.

### OBJECT AND SUMMARY OF THE INVENTION

**[0005]** Accordingly, it is the object of this invention to provide an improved collapsible tube form that overcomes the problems set forth above.

**[0006]** The above and other objects and advantages

of the present invention are achieved by the discovery that such forming tubes may be fabricated from fabric with one or more longitudinal tabs running the full length of the tube. Each tab is sandwiched between two vertical support members, which are used to properly locate the tube on the job site, before filling with concrete.

**[0007]** According to the invention there is provided a prefabricated flexible forming tube for a concrete column or pad comprising: at least one flexible sheet element of specified width characterized in that the flexible sheet element is formed from woven fabric, and one longitudinal edge of said flexible sheet element is arranged in overlapping relationship with either:

i) an opposing longitudinal edge of the same flexible sheet element whereby an outside surface of said flexible sheet element adjacent one of said longitudinal edges is fixed to an inside surface of said flexible sheet element to form a joint and so create said flexible forming tube and a longitudinal tab is formed from said flexible sheet element between another of said longitudinal edges and said joint; or

ii) a longitudinal edge of another said flexible sheet element whereby an outside surface adjacent to the longitudinal edge of one of said flexible sheet elements is fixed to an inside surface of the other of said flexible sheet element to form a joint and a longitudinal tab is formed from said other flexible sheet element between the joint and said longitudinal edge of said other flexible sheet element, such that said joined flexible sheet elements create at least a portion of said flexible forming tube, so that the multiplicity of joined flexible sheet form elements forms a specific diameter tube with a multiplicity of longitudinal tabs

**[0008]** According to the invention there is also provided a method of constructing a concrete column comprising the steps of:

1) forming a prefabricated flexible forming tube for said concrete column characterized by the steps of:

a) providing at least one flexible sheet element of indefinite length and specified width, formed from woven fabric, said flexible sheet element having a longitudinal edge;  
b) arranging said longitudinal edge in overlapping relationship with either:

i) an opposing longitudinal edge of the same flexible sheet element; fixing an outside surface of said flexible sheet element adjacent one of said longitudinal edges to an inside surface of said flexible sheet element to form a joint and thereby create said flexible forming tube having indefinite length and a

specific diameter; said flexible forming tube having a longitudinal tab formed from said flexible sheet element between another of said longitudinal edges and said joint; or

ii) a longitudinal edge of another said flexible sheet element; fixing an outside surface of one of said flexible sheet elements adjacent to a longitudinal edge of said flexible sheet element to an inside surface of the other said flexible sheet element to form a joint and thereby create at least a portion of a flexible forming tube of indefinite length, said at least a portion of said flexible forming tube having a longitudinal tab formed from the other said flexible sheet element between said joint and said longitudinal edge of the other said flexible sheet element, so that the multiplicity of joined flexible sheet form elements forms a specific diameter tube with a multiplicity of longitudinal tabs ; said method further including the steps of:

2) cutting off a specified length of said prefabricated flexible forming tube (12), said specified length being equal to the desired height for said concrete column (26);

3) sandwiching said longitudinal tab (16) between a pair of vertical support members (18, 20);

4) positioning and bracing said vertical support members (18, 20) with bracing members (22, 30), so that said flexible forming tube (12) is located in a position where said concrete column (26) is to be constructed;

5) supplying a flowable and settable foundation material (26) to substantially fill space within said flexible forming tube (12), to form said concrete column (26).

**[0009]** According to the invention there is further provided a method of constructing a concrete pad comprising the steps of:

1) forming a prefabricated flexible forming tube for said concrete pad characterized by the steps of:

a) providing at least one flexible sheet element of indefinite length and specified width, formed from woven fabric, said flexible sheet element having a longitudinal edge;

b) arranging said longitudinal edge in overlapping relationship with either:

i) an opposing longitudinal edge of the same flexible sheet element; fixing an outside sur-

face of said flexible sheet element adjacent one of said longitudinal edges to an inside surface of said flexible sheet element to form a joint and thereby create said flexible forming tube having indefinite length and a specific diameter; said flexible forming tube having a longitudinal tab formed from said flexible sheet element between another of said longitudinal edges and said joint; or

ii) a longitudinal edge of another said flexible sheet element; fixing an outside surface of one of said flexible sheet elements adjacent to a longitudinal edge of said flexible sheet element to an inside surface of the other said flexible sheet element to form a joint and thereby create at least a portion of said flexible forming tube of indefinite length, said at least a portion of said flexible forming tube having a longitudinal tab formed from the other said flexible sheet element between said joint and said longitudinal edge of the other said flexible sheet element, so that the multiplicity of joined flexible sheet form elements forms a specific diameter tube with a multiplicity of longitudinal tabs, said method further including the steps of:

2) cutting off a specified length of said prefabricated flexible forming tube (12), said specified length being equal to the desired height for said concrete pad (26);

3) positioning a stake (30) around a desired location for said concrete pad (26);

4) attaching (34) said longitudinal tab (16) to said stake (30) to position said flexible forming tube (12) in said desired location;

5) supplying a flowable and settable foundation material (26) to substantially fill space within said flexible forming tube (12), to form said concrete pad (26).

**[0010]** This invention also contemplates the use of a woven fabric of sufficient strength that bulging will not occur, while at the same time being able to fold flat. The fabric is joined into a tube by welding, sewing or zippering the edges together.

**[0011]** In a preferred embodiment, the fabric based forming tube is collapsed and folded into a small package to facilitate its storage and transportation. On the jobsite, the contractor cuts off the exact length of tube required for the column. The fabric tab is nailed or screwed between two vertical support members probably made from 75mm by 200mm lumber, and the assembly is placed vertically into position and braced. Concrete is then poured into the fabric tube so that it takes a cylindrical configuration across from the two vertical support mem-

bers. After the concrete is hardened, the fabric tube can be left in place, or removed at the weld, zipper, or cut with a sharp knife.

#### BRIEF DESCRIPTION OF THE DRAWINGS

**[0012]** While some of the advantages of the present invention have been set forth above, other advantages will become apparent from the description of the preferred embodiment of this invention when taken in conjunction with the accompanying drawings, in which:

FIGURE 1 a perspective view of the concrete forming tube used to form a column with a single longitudinal tab;

FIGURE 2 is a perspective view of the concrete forming tube used to form a pad with multiple longitudinal tabs;

FIGURE 3 is a vertical cross section of the tube when expanded with concrete showing two longitudinal tabs, one zipper to enable the form to be reused, and three flexible sheet form elements welded or sewn together;

FIGURE 4 is a perspective view showing the length of tube being cut from a larger package, and the longitudinal tab being stapled to the first vertical support member;

FIGURE 5 is a perspective view showing the second vertical support member being nailed or screwed to the first vertical support member, thereby sandwiching the vertical support tab.

#### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

**[0013]** FIGURE 1 is a perspective view of a preferred embodiment of a concrete forming tube used in accordance with the present invention as a concrete column and which is indicated generally at 10. The flexible sheet form element, or fabric 14 is joined to form a tube with the outside longitudinal edge forming a longitudinal tab 16. The longitudinal tab 16 can be seen at the top, sandwiched between the two vertical support members 18, 20. The vertical support members are braced with suitable lumber 22, and stakes 30 are used to support the lower end of each brace 22.

**[0014]** In this embodiment, there is only one longitudinal tab 16 on the fabric tube 12, with the vertical support members and bracing occurring on one side of the tube only. The tube, when filled with concrete 26 will form a cylinder, and center itself directly across from the two vertical support members. Steel reinforcing 24 can be installed in the fabric tube after the form assembly 10 has been set up; or the reinforcing 24 installed first, and the fabric tube 12 slid over the steel.

**[0015]** FIGURE 2 is a perspective view of a preferred embodiment of a concrete forming tube 12 used in accordance with the present invention as a concrete footing

pad and which is indicated generally at 28. Stakes 30 are driven into the ground just outside the circumference of the proposed circular pad 28. The desired length of fabric tube 42 is cut with a utility knife 52 from the longer length 40, and the longitudinal tabs 16 are stapled 34 to each stake 30 to support the tube in the correct position. Larger diameter pads could have a multiplicity of longitudinal tabs and supporting stakes. Pads could range in diameter from 450 mm up to 3000 mm, with the fabric tube welded or sewn together to achieve these diameters. Concrete 26 is placed inside the tube, and trowelled flat to the top of the fabric tube 12.

**[0016]** FIGURE 3 is a cross section of the fabric tube 12 expanded as if by the concrete to show manufacturing details. Three flexible sheet form elements 14 of indefinite length and a specific width are welded or sewn together at points 36 to form the correct diameter for the column or pad. Welding is the preferable method of joining as sewing can weaken the joint and create small holes for the concrete to leak out. The longitudinal tabs run the full length of the tube, with a width 38 running past the joining width 36. This longitudinal tab is sandwiched between the two vertical support members 18, 20 to support the tube in the vertical position for proper location during the concrete pour. The width of the longitudinal tab 38 is usually the same as the width of the vertical support members 18, 20 to ensure proper positioning of the tab.

**[0017]** The manufacturing process must accurately align and weld the fabric so that the correct diameter of the inflated tube is achieved. As the diameter of the tube increases, the hoop tension of the fabric will increase because of the increased concrete pressure. Therefore the thickness of the fabric and the width of the welded or sewn joint must be correspondingly increased.

**[0018]** A zipper 44 is shown in FIGURE 3. The zipper would be used where it is desirable to recycle the tube form to lower forming costs. The zipper would also have applications where it is needed to place a concrete column around an existing steel column, for example to protect a steel column in a warehouse from damage. The fabric overlap 46 protects the zipper from concrete damage when filling with concrete. The zipper would be either welded or sewn to the fabric. Velcro or sticky tape 48 may be required to ensure the overlap stays flat when filling to protect the zipper from concrete damage.

**[0019]** The flexible sheet form element 14 is typically made from a woven polyethylene or polypropylene material, with about 12 tapes per inch in the warp and weft direction. The tapes are high density to achieve strength, and a low-density coating on either or both sides of the scrim could be added to ensure the concrete does not leak through the fabric. It would also be possible to increase the fabric strength by adding warp and weft elements made of carbon fiber, for example, which, when left in place would provide external reinforcing to the concrete.

**[0020]** FIGURE 4 is an isometric view showing the fabric tube 12 being cut to the length 42 of a desired column

10, and the longitudinal tab 16 being positioned and stapled 34 to the first vertical support member 18. The tube shape and fabric thickness would only allow the tube to be wound on very large diameter rolls as otherwise the fabric will wrinkle excessively. Therefore packaging of the tube would be on very large rolls and folded, or festooned 40.

[0021] FIGURE 5 is an isometric view showing the second vertical support member 20 being attached to the first member 18 using nails or screws 50. The two vertical support members provide support to the longitudinal tab and therefore to the fabric tube during the pouring of concrete.

[0022] In the drawings and specification, there has been set forth a preferred embodiment of the invention, the scope of the invention being defined in the appended claims.

### Claims

1. A prefabricated flexible forming tube (12) for a concrete column (26) or pad (26) comprising: at least one flexible sheet element (14) of specified width **characterized in that** the flexible sheet element is formed from woven fabric, and one longitudinal edge of said flexible sheet element (14) is arranged in overlapping relationship with either:

i) an opposing longitudinal edge of the same flexible sheet element (14) whereby an outside surface of said flexible sheet element (14) adjacent one of said longitudinal edges is fixed to an inside surface of said flexible sheet element (14) to form a joint (36) and so create said flexible forming tube (12) and a longitudinal tab (16) is formed from said flexible sheet element (14) between another of said longitudinal edges and said joint (36); or

ii) a longitudinal edge of another said flexible sheet element (14) whereby an outside surface adjacent to the longitudinal edge of one of said flexible sheet elements (14) is fixed to an inside surface of the other of said flexible sheet elements (14) to form a joint (36) and a longitudinal tab (16) is formed from said other flexible sheet element (14) between the joint (36) and said longitudinal edge of said other flexible sheet element (14), such that said joined flexible sheet elements (14) create at least a portion of said flexible forming tube (12), so that the multiplicity of joined flexible sheet form elements forms a specific diameter tube with a multiplicity of longitudinal tabs.

2. A prefabricated flexible forming tube (12) according to claim 1 wherein said tube (12) is formed from a multiplicity of said flexible sheet elements (14), ad-

jacent flexible sheet elements (14) of said multiplicity being fixed together as claimed in claim 1 to form two or more said joints (36), each joint (36) having an associated longitudinal tab (16).

3. A prefabricated flexible forming tube (12) according to claim 1 or claim 2 wherein at least two of said flexible sheet elements (14) are longitudinally joined by temporary joining means (44).

4. A prefabricated flexible forming tube (12) according to claim 3 wherein said temporary joining means is a zipper (44).

5. A prefabricated flexible forming tube (12) according to claim 1 or claim 2 wherein said woven fabric is of such a nature that it adheres to a concrete column or pad formed by supplying said forming tube with foundation material (26), and said woven fabric cannot be stripped from said concrete column or pad.

6. A prefabricated flexible forming tube (12) according to claim 5 wherein said woven fabric contains high strength warp and/or weft elements to add structural strength to said concrete column or pad (26).

7. A prefabricated flexible forming tube (12) according to claim 6 wherein said warp and/or weft elements are made of carbon fibre.

8. A method of constructing a concrete column (26) comprising the steps of:

1) forming a prefabricated flexible forming tube (12) for said concrete column (26) **characterized by** the steps of:

a) providing at least one flexible sheet element (14) of indefinite length and specified width, formed from woven fabric, said flexible sheet element (14) having a longitudinal edge;

b) arranging said longitudinal edge in overlapping relationship with either:

i) an opposing longitudinal edge of the same flexible sheet element (14); fixing an outside surface of said flexible sheet element (14) adjacent one of said longitudinal edges to an inside surface of said flexible sheet element (14) to form a joint (36) and thereby create said flexible forming tube (12) having indefinite length and a specific diameter; said flexible forming tube (12) having a longitudinal tab (16) formed from said flexible sheet element (14) between another of said longitudinal edges and said

joint (36); or

ii) a longitudinal edge of another said flexible sheet element (14); fixing an outside surface of one of said flexible sheet elements (14) adjacent to a longitudinal edge of said flexible sheet element (14) to an inside surface of the other said flexible sheet element (14) to form a joint (36) and thereby create at least a portion of a flexible forming tube (12) of indefinite length, said at least a portion of said flexible forming tube (12) having a longitudinal tab (16) formed from the other said flexible sheet element (14) between said joint (36) and said longitudinal edge of the other said flexible sheet element (14), so that the multiplicity of joined flexible sheet form elements forms a specific diameter tube with a multiplicity of longitudinal tabs ;

said method further including the steps of:

2) cutting off a specified length of said prefabricated flexible forming tube (12), said specified length being equal to the desired height for said concrete column (26);

3) sandwiching said longitudinal tab (16) between a pair of vertical support members (18, 20);

4) positioning and bracing said vertical support members (18, 20) with bracing members (22, 30) so that said flexible forming tube (12) is located in a position where said concrete column (26) is to be constructed; and

5) supplying a flowable and settable foundation material (26) to substantially fill space within said flexible forming tube (12), to form said concrete column (26).

9. A method of constructing a concrete column (26) according to claim 8 wherein:

1) said step of forming said prefabricated flexible forming tube (12) includes joining a multiplicity of said flexible sheet elements (14), adjacent flexible sheet elements (14) of said multiplicity being fixed together as claimed in claim 8, to form two or more said joints (36), each said joint (36) having an associated longitudinal tab (16);

2) said step of sandwiching said longitudinal tab (16) includes sandwiching each said longitudinal tab between pairs of vertical support members; and

3) said step of positioning and bracing includes positioning and bracing each pair of vertical support members (18, 20) with bracing members

(22, 30).

10. A method of constructing a concrete column (26) according to claim 8 or 9 wherein said flexible forming tube (12) is left in place around said concrete column.

11. A method of constructing a concrete pad (26) comprising the steps of:

1) forming a prefabricated flexible forming tube (12) for said concrete pad (26) **characterized by** the steps of:

a) providing at least one flexible sheet element (14) of indefinite length and specified width, formed from woven fabric, said flexible sheet element (14) having a longitudinal edge;

b) arranging said longitudinal edge in overlapping relationship with either:

i) an opposing longitudinal edge of the same flexible sheet element (14); fixing an outside surface of said flexible sheet element (14) adjacent one of said longitudinal edges to an inside surface of said flexible sheet element (14) to form a joint (36) and thereby create said flexible forming tube (12) having indefinite length and a specific diameter; said flexible forming tube (12) having a longitudinal tab (16) formed from said flexible sheet element (14) between another of said longitudinal edges and said joint (36); or

ii) a longitudinal edge of another said flexible sheet element (14); fixing an outside surface of one of said flexible sheet elements (14) adjacent to a longitudinal edge of said flexible sheet element (14) to an inside surface of the other said flexible sheet element (14) to form a joint (36) and thereby create at least a portion of said flexible forming tube (12) of indefinite length, said at least a portion of said flexible forming tube (12) having a longitudinal tab (16) formed from the other said flexible sheet element (14) between said joint (36) and said longitudinal edge of the other said flexible sheet element (14), so that the multiplicity of joined flexible sheet form elements forms a specific diameter tube with a multiplicity of longitudinal tabs;

said method further including the steps of:

2) cutting off a specified length of said prefabricated flexible forming tube (12), said specified length being equal to the desired height for said concrete pad (26);  
 3) positioning a stake (30) around a desired location for said concrete pad (26);  
 4) attaching (34) said longitudinal tab (16) to said stake (30) to position said flexible forming tube (12) in said desired location;  
 5) supplying a flowable and settable foundation material (26) to substantially fill space within said flexible forming tube (12), to form said concrete pad (26).

12. A method of constructing a concrete pad (26) according to claim 11 wherein:

1) said step of forming said prefabricated flexible forming tube (12) includes joining a multiplicity of said flexible sheet elements (14), adjacent flexible sheet elements (14) of said multiplicity being fixed together as claimed in claim 11, to form two or more said joints (36), each said joint (36) having an associated longitudinal tab (16);  
 2) said step of positioning said stake includes positioning a stake (30) for each said longitudinal tab (16) around said desired location, spacing between adjacent stakes being equal to the spacing between adjacent longitudinal tabs (16); and  
 3) said attaching step includes attaching each longitudinal tab (16) to a respective stake (30).

13. A method of constructing a concrete pad (26) as claimed in claim 10 wherein said flexible forming tube (12) is left in place around said concrete pad (26).

### Patentansprüche

1. Vorgefertigtes, flexibles Schalungsrohr (12) für eine Betonsäule (26) oder ein Betonaufleger (26), enthaltend: wenigstens ein flexibles Folienelement (14) einer festgelegten Breite, **dadurch gekennzeichnet, dass** das flexible Folienelement aus einem Gewebe gefertigt ist und eine Längskante des flexiblen Folienelementes (14) überlappend angeordnet ist mit entweder:

i) einer gegenüberliegenden Längskante desselben flexiblen Folienelementes (14), wobei eine Außenoberfläche des flexiblen Folienelementes (14), die einer der Längskanten benachbart ist, an einer Innenoberfläche des flexiblen Folienelementes (14) befestigt ist, um eine Verbindung (36) zu bilden und so das flexible Schalungsrohr (12) zu erzeugen, und ein Längslappen (16) aus dem flexiblen Folienelement (14)

zwischen der anderen der Längskanten und der Verbindung (36) ausgebildet ist; oder

ii) einer Längskante eines weiteren flexiblen Folienelementes (14), wobei eine Außenoberfläche benachbart der Längskante eines der flexiblen Folienelemente (14) an einer Innenoberfläche des anderen der flexiblen Folienelemente (14) fixiert ist, um eine Verbindung (36) zu bilden, und ein Längslappen (16) aus dem anderen flexiblen Folienelement (14) zwischen der Verbindung (36) und der Längskante des anderen flexiblen Folienelementes (14) derart ausgebildet ist, dass die verbundenen flexiblen Folienelemente (14) wenigstens einen Abschnitt des flexiblen Schalungsrohres (12) erzeugen, so dass die Vielzahl verbundener Schalungselemente aus einer flexiblen Folie ein Rohr eines festgelegten Durchmessers mit einer Vielzahl von Längslappen bildet.

2. Vorgefertigtes, flexibles Schalungsrohr (12) nach Anspruch 1, bei dem das Rohr (12) aus einer Vielzahl der flexiblen Folienelemente (14) ausgebildet ist, wobei benachbarte flexible Folienelemente (14) der Vielzahl miteinander verbunden sind, wie es in Anspruch 1 beansprucht ist, um wenigstens zwei Verbindungen (36) zu bilden, wobei jede Verbindung (36) einen zugehörigen Längslappen (16) hat.

3. Vorgefertigtes, flexibles Schalungsrohr (12) nach Anspruch 1 oder 2, bei dem wenigstens zwei der flexiblen Folienelemente (14) in der Längsrichtung mit Hilfe einer temporären Verbindungseinrichtung (44) verbunden sind.

4. Vorgefertigtes, flexibles Schalungsrohr (12) nach Anspruch 3, bei dem die temporäre Verbindungseinrichtung ein Reißverschluss ist.

5. Vorgefertigtes, flexibles Schalungsrohr (12) nach Anspruch 1 oder 2, bei dem das Gewebe derart beschaffen ist, dass es an einer Betonsäule oder einem Betonaufleger haftet, das ausgebildet wird, indem dem Schalungsrohr Fundamentmaterial (26) zugeführt wird, und das Gewebe von der Betonsäule oder dem Betonaufleger nicht abgezogen werden kann.

6. Vorgefertigtes, flexibles Schalungsrohr (12) nach Anspruch 5, bei dem das Gewebe Kett- und/oder Durchschusselemente enthält, um die strukturelle Festigkeit der Betonsäule oder des Betonauflegers (26) zu erhöhen.

7. Vorgefertigtes, flexibles Schalungsrohr (12) nach Anspruch 6, bei dem die Kett- und/oder Durchschusselemente aus Kohlefasern bestehen.

8. Verfahren zum Errichten einer Betonsäule (26), um-

fassend folgende Schritte:

1) Ausbilden eines vorgefertigten, flexiblen Schalungsrohrs (12) für die Betonsäule (26), **gekennzeichnet durch** folgende Schritte:

a) Bereitstellen wenigstens eines flexiblen Folienelementes (14) einer unbestimmten Länge und einer festgelegten Breite, das aus einem Gewebe besteht, wobei das flexible Folienelement (14) eine Längskante hat;

b) Anordnen der Längskante in überlappender Beziehung entweder mit:

i) einer gegenüberliegenden Längskante desselben flexiblen Folienelementes (14); wobei eine Außenoberfläche des flexiblen Folienelementes (14), benachbart einer der Längskanten, an einer Innenoberfläche des flexiblen Folienelementes (14) fixiert wird, um eine Verbindung (36) auszubilden und **dadurch** das flexible Schalungsrohr (12) zu erzeugen, das eine unbestimmte Länge und einen speziellen Durchmesser hat; wobei das flexible Schalungsrohr (12) einen Längslappen (16), der aus dem flexiblen Folienelement (14) ausgebildet ist, zwischen der anderen Längskante und der Verbindung (36) aufweist; oder

ii) einer Längskante eines weiteren flexiblen Folienelementes (14); wobei eine Außenoberfläche eines der flexiblen Folienelemente (14), benachbart zu einer Längskante des flexiblen Folienelementes (14) an einer Innenoberfläche des anderen flexiblen Folienelementes (14) fixiert wird, um eine Verbindung auszubilden und **dadurch** wenigstens einen Abschnitt eines flexiblen Schalungsrohres (12) einer unbestimmten Länge auszubilden, wobei der wenigstens eine Abschnitt des flexiblen Schalungsrohres (12) einen Längslappen, der aus dem anderen flexiblen Folienelement (14) ausgebildet ist, zwischen der Verbindung (36) und der Längskante des anderen flexiblen Folienelementes (14) aufweist; so dass die Vielzahl der verbundenen Schalungselemente aus flexibler Folie ein Rohr mit einem bestimmten Durchmesser mit einer Vielzahl von Längslappen ausbildet;

wobei das Verfahren weiterhin folgende Schritte umfasst:

2) Abschneiden einer bestimmten Länge von dem vorgefertigten, flexiblen Schalungsrohr (12), wobei diese festgelegte Länge gleich der gewünschten Höhe der Betonsäule (26) ist;

3) sandwichartiges Anordnen des Längslappens (16) zwischen zwei vertikalen Trägerelementen (18, 20);

4) Positionieren und Stützen der vertikalen Trägerelemente (18, 20) mit Stützelementen (22, 30), so dass sich das flexible Schalungsrohr (12) an einer Stelle befindet, an der die Betonsäule (26) zu errichten ist; und

5) Zuführen eines flüssigen und aushärtenden Fundamentmaterials (26), um im wesentlichen den Raum innerhalb des flexiblen Schalungsrohres (12) zu füllen, um die Betonsäule (26) auszubilden.

9. Verfahren zum Errichten einer Betonsäule (26) nach Anspruch 8, bei dem:

1) der Schritt des Ausbildens des vorgefertigten, flexiblen Schalungsrohrs (12) das Verbinden einer Vielzahl der flexiblen Folienelemente (14) umfasst, wobei benachbarte flexible Folienelemente (14) aus der Vielzahl miteinander verbunden werden, wie es in Anspruch 8 beansprucht ist, um wenigstens zwei Verbindungen (36) auszubilden, wobei jede Verbindung einen zugeordneten Längslappen (16) hat;

2) der Schritt des sandwichartigen Anordnens des Längslappens (16) das sandwichartige Anordnen jedes Längslappens zwischen Paaren vertikaler Trägerelemente umfasst und

3) der Schritt des Positionierens und Abstützens das Positionieren und Abstützen jedes Paares vertikaler Trägerelemente (18, 20) mit Abstützelementen (22, 30) umfasst.

10. Verfahren zum Errichten einer Betonsäule (26) nach Anspruch 8 oder 9, bei dem das flexible Schalungsrohr (12) die Betonsäule umgebend an Ort und Stelle belassen wird.

11. Verfahren zum Errichten eines Betonaufagers (26), umfassend folgende Schritte:

1) Ausbilden eines vorgefertigten, flexiblen Schalungsrohrs (12) für das Betonauflager (26), **gekennzeichnet durch** folgende Schritte:

a) Bereitstellen wenigstens eines flexiblen Folienelementes (14) einer unbestimmten Länge und einer festgelegten Breite, das aus einem Gewebe besteht, wobei das flexible Folienelement (14) eine Längskante hat;

b) Anordnen der Längskante in überlappender

der Art und Weise entweder mit:

i) einer gegenüberliegenden Längskante desselben flexiblen Folienelementes (14); wobei eine Außenoberfläche des flexiblen Folienelementes (14), benachbart zu einer der Längskanten, an einer Innenoberfläche des flexiblen Folienelementes (14) fixiert wird, um eine Verbindung (36) auszubilden und **dadurch** das flexible Schalungsrohr (12) auszubilden, das eine unbestimmte Länge und einen bestimmten Durchmesser hat; wobei das flexible Schalungsrohr (12) einen Längslappen (16), der aus dem flexiblen Folienelement (14) ausgebildet ist, zwischen der anderen der Längskanten und der Verbindung (36) aufweist; oder

ii) einer Längskante eines weiteren flexiblen Folienelementes (14); wobei eine Außenoberfläche eines der flexiblen Folienelemente (14), benachbart zu einer Längskante des flexiblen Folienelementes (14), an einer Innenoberfläche des anderen flexiblen Folienelementes (14) fixiert wird, um eine Verbindung (36) auszubilden und **dadurch** wenigstens einen Abschnitt des flexiblen Schalungsrohrs (12) unbestimmter Länge auszubilden, wobei der wenigstens eine Abschnitt des flexiblen Schalungsrohres (12) einen Längslappen (16), der aus dem anderen flexiblen Folienelemente (14) ausgebildet ist, zwischen der Verbindung (36) und der Längskante des anderen flexiblen Folienelementes (14) aufweist, so dass die Vielzahl der verbundenen Schalungselemente aus flexibler Folie ein Rohr eines bestimmten Durchmessers mit einer Vielzahl von Längslappen bildet;

wobei das Verfahren weiterhin folgende Schritte umfasst:

2) Abschneiden einer bestimmten Länge des vorgefertigten, flexiblen Schalungsrohrs (12), wobei die bestimmte Länge gleich der gewünschten Höhe des Betonauflegers (26) ist;

3) Positionieren eines Pflocks (30) im Bereich einer gewünschten Stelle für das Betonaufleger (26);

4) Anbringen (34) des Längslappens (16) an dem Pflock (30), um das flexible Schalungsrohr (12) an der gewünschten Stelle zu positionieren; und

5) Zuführen eines flüssigen und aushärtenden

Fundamentmaterials (26), um im wesentlichen den Raum innerhalb des flexiblen Schalungsrohrs (12) zu füllen und das Betonaufleger (26) auszubilden.

12. Verfahren zum Errichten eines Betonauflegers (26) nach Anspruch 11, bei dem:

1) der Schritt des Ausbildens des vorgefertigten, flexiblen Schalungsrohrs (12) das Verbinden einer Vielzahl der flexiblen Folienelemente (14) umfasst, wobei benachbarte flexible Folienelemente (14) aus der Vielzahl miteinander verbunden werden, wie es in Anspruch 11 beansprucht ist, um wenigstens zwei Verbindungen (36) auszubilden, wobei jede Verbindung einen zugeordneten Längslappen (16) hat;

2) der Schritt des Positionierens des Pflocks das Positionieren eines Pflocks (30) für jeden Längslappen (16) im Bereich der gewünschten Stelle beinhaltet, wobei der Abstand zwischen benachbarten Pflocken gleich dem Abstand zwischen benachbarten Längslappen (16) ist; und

3) der Anbringungsschritt das Anbringen jedes Längslappens (16) an einem entsprechenden Pfosten (30) umfasst.

13. Verfahren zum Errichten eines Betonauflegers (26) nach Anspruch 10, bei dem das flexible Schalungsrohr (12) das Betonaufleger (26) umgebend an Ort und Stelle belassen wird.

### Revendications

1. Tube de coffrage flexible préfabriqué (12) pour une colonne (26) ou socle (26) en béton comprenant : au moins un élément de feuille flexible (14) de largeur spécifiée, **caractérisé en ce que** l'élément de feuille flexible est formé à partir d'un tissu tissé, et un bord longitudinal dudit élément de feuille flexible (14) est agencé en relation de chevauchement avec :

i) un bord longitudinal opposé du même élément de feuille flexible (14) moyennant quoi une surface extérieure dudit élément de feuille flexible (14) adjacent à l'un desdits bords longitudinaux est fixée sur une surface intérieure dudit élément de feuille flexible (14) afin de former un joint (36) et de créer ledit tube de coffrage flexible (12) et une languette longitudinale (16) est formée à partir dudit élément de feuille flexible (14) entre un autre desdits bords longitudinaux et ledit joint (36) ; ou bien

ii) un bord longitudinal d'un autre desdits éléments de feuille flexible (14) moyennant quoi une surface extérieure adjacente au bord longitudinal de l'un desdits éléments de feuille flexible

- (14) est fixée sur une surface intérieure de l'autre desdits éléments de feuille flexible (14) afin de former un joint (36) et une languette longitudinale (16) est formée à partir dudit autre élément de feuille flexible (14) entre le joint (36) et ledit bord longitudinal dudit autre élément de feuille flexible (14), de sorte que lesdits éléments de feuille flexible (14) assemblés créent au moins une partie dudit tube de coffrage flexible (12), de sorte que la multiplicité d'éléments de coffrage en feuille flexible assemblés forme un tube de diamètre spécifique avec une multiplicité de languettes longitudinales.
2. Tube de coffrage flexible préfabriqué (12) selon la revendication 1, dans lequel ledit tube (12) est formé à partir d'une multiplicité desdits éléments de feuille flexible (14), les éléments de feuille flexible (14) adjacents de ladite multiplicité étant fixés ensemble selon la revendication 1, afin de former deux desdits joints (36) ou plus, chaque joint (36) ayant une languette longitudinale (16) associée.
  3. Tube de coffrage flexible préfabriqué (12) selon la revendication 1 ou la revendication 2, dans lequel au moins deux desdits éléments de feuille flexible (14) sont longitudinalement assemblés par des moyens d'assemblage temporaires (44).
  4. Tube de coffrage flexible préfabriqué (12) selon la revendication 3, dans lequel lesdits moyens d'assemblage temporaires sont une fermeture éclair (44).
  5. Tube de coffrage flexible préfabriqué (12) selon la revendication 1 ou la revendication 2, dans lequel ledit tissu tissé a une nature telle qu'il se fixe sur une colonne ou socle en béton formé(e) en amenant dans ledit tube de coffrage, un matériau de fondation (26), et ledit tissu tissé ne peut pas être détaché de ladite colonne ou socle en béton.
  6. Tube de coffrage flexible préfabriqué (12) selon la revendication 5, dans lequel ledit tissu tissé contient des éléments de chaîne et/ou de trame à haute résistance pour ajouter de la résistance structurelle à ladite colonne ou socle en béton (26).
  7. Tube de coffrage flexible préfabriqué (12) selon la revendication 6, dans lequel lesdits éléments de chaîne et/ou trame sont réalisés à partir de fibres de carbone.
  8. Procédé pour construire une colonne en béton (26) comprenant l'étape consistant à :
    - 1) former un tube de coffrage flexible préfabriqué (12) pour ladite colonne en béton (26), ca-

**ractérisé par** les étapes consistant à :

a) prévoir au moins un élément de feuille flexible (14) de longueur indéfinie et de largeur spécifiée, formé à partir de tissu tissé, ledit élément de feuille flexible (14) ayant un bord longitudinal ;

b) agencer ledit bord longitudinal selon une relation de chevauchement avec :

i) un bord longitudinal opposé du même élément de feuille flexible (14) ; fixer une surface extérieure dudit élément de feuille flexible (14) adjacent à l'un desdits bords longitudinaux, sur une surface intérieure dudit élément de feuille flexible (14) afin de former un joint (36) et créer ainsi ledit tube de coffrage flexible (12) ayant une longueur indéfinie et un diamètre spécifique ; ledit tube de coffrage flexible (12) ayant une languette longitudinale (16) formée à partir dudit élément de feuille flexible (14) entre un autre desdits bords longitudinaux et ledit joint (36) ; ou bien

ii) un bord longitudinal d'un autre desdits éléments de feuille flexible (14) ; fixer une surface extérieure de l'un desdits éléments de feuille flexible (14) adjacent à un bord longitudinal dudit élément de feuille flexible (14), sur une surface intérieure de l'autre desdits éléments de feuille flexible (14) afin de former un joint (36) et créer ainsi au moins une partie d'un tube de coffrage flexible (12) de longueur indéfinie, ladite au moins une partie dudit tube de coffrage flexible (12) ayant une languette longitudinale (16) formée à partir de l'autre desdits éléments de feuille flexible (14) entre ledit joint (36) et ledit bord longitudinal de l'autre desdits éléments de feuille flexible (14), de sorte que la multiplicité d'éléments de coffrage en feuille flexible assemblés forme un tube de diamètre spécifique avec une multiplicité de languettes longitudinales ; ledit procédé comprenant en outre les étapes consistant à :

2) découper une longueur spécifiée dudit tube de coffrage flexible préfabriqué (12), ladite longueur spécifiée étant égale à la hauteur souhaitée pour ladite colonne en béton (26) ;

3) prendre en sandwich ladite languette longitudinale (16) entre une paire d'éléments de support verticaux (18, 20) ;

4) positionner et renforcer lesdits éléments de

support verticaux (18, 20) avec des éléments d'entretoisement (22, 30) de sorte que ledit tube de coffrage flexible (12) est positionné dans une position dans laquelle ladite colonne en béton (26) doit être construite ; et

5) amener un matériau de fondation liquide et durcissable (26) pour remplir sensiblement l'espace à l'intérieur dudit tube de coffrage flexible (12), afin de former ladite colonne en béton (26).

9. Procédé pour construire une colonne en béton (26) selon la revendication 8, dans lequel :

1) ladite étape consistant à former ledit tube de coffrage flexible préfabriqué (12) comprend l'étape consistant à assembler une multiplicité desdits éléments de feuille flexible (14), les éléments de feuille flexible (14) adjacents de ladite multiplicité étant fixés ensemble selon la revendication 8, afin de former deux desdits joints (36) ou plus, chacun desdits joints (36) ayant une languette longitudinale (16) associée ;

2) ladite étape consistant à prendre en sandwich ladite languette longitudinale (16) comprend l'étape consistant à prendre en sandwich chacune desdites languettes longitudinales entre des paires d'éléments de support verticaux ; et

3) ladite étape de positionnement et de renforcement comprend l'étape consistant à positionner et à renforcer chaque paire d'éléments de support verticaux (18, 20) avec des éléments d'entretoisement (22, 30).

10. Procédé pour construire une colonne en béton (26) selon la revendication 8 ou 9, dans lequel ledit tube de coffrage flexible (12) est laissé en place autour de ladite colonne en béton.

11. Procédé pour construire un socle en béton (26) comprenant l'étape consistant à :

1) former un tube de coffrage flexible préfabriqué (12) pour ledit socle en béton (26), **caractérisé par** les étapes consistant à :

a) prévoir au moins un élément de feuille flexible (14) de longueur indéfinie et de largeur spécifiée, formé à partir d'un tissu tissé, ledit élément de feuille flexible (14) ayant un bord longitudinal ;

b) agencer ledit bord longitudinal selon une relation de chevauchement avec :

i) un bord longitudinal opposé du même élément de feuille flexible (14) ; fixer une surface extérieure dudit élément de feuille flexible (14) adjacent à l'un desdits bords longitudinaux, sur une

surface intérieure dudit élément de feuille flexible (14) afin de former un joint (36) et de créer ainsi ledit tube de coffrage flexible (12) ayant une longueur indéfinie et un diamètre spécifique ; ledit tube de coffrage flexible (12) ayant une languette longitudinale (16) formée à partir dudit élément de feuille flexible (14) entre un autre desdits bords longitudinaux et ledit joint (36) ; ou bien

ii) un bord longitudinal d'un autre desdits éléments de feuille flexible (14) ; fixer une surface extérieure de l'un desdits éléments de feuille flexible (14) adjacent à un bord longitudinal dudit élément de feuille flexible (14), sur une surface intérieure de l'autre desdits éléments de feuille flexible (14) afin de former un joint (36) et de créer ainsi au moins une partie dudit tube de coffrage flexible (12) de longueur indéfinie, ladite au moins une partie dudit tube de coffrage flexible (12) ayant une languette longitudinale (16) formée à partir de l'autre desdits éléments de feuille flexible (14) entre ledit joint (36) et ledit bord longitudinal de l'autre desdits éléments de feuille flexible (14), de sorte que la multiplicité d'éléments de coffrage de feuille flexible assemblés forme un tube de diamètre spécifique avec une multiplicité de languettes longitudinales ;

ledit procédé comprenant en outre les étapes consistant à :

2) découper une longueur spécifiée dudit tube de coffrage flexible préfabriqué (12), ladite longueur spécifiée étant égale à la hauteur souhaitée pour ledit socle en béton (26) ;

3) positionner un pieu (30) autour d'un emplacement souhaité pour ledit socle en béton (26) ;

4) fixer (34) ladite languette longitudinale (16) sur ledit pieu (30) afin de positionner ledit tube de coffrage flexible (12) dans ledit emplacement souhaité ;

5) amener un matériau de fondation liquide et durcissable (26) pour remplir sensiblement l'espace à l'intérieur dudit tube de coffrage flexible (12), afin de former ledit socle en béton (26).

12. Procédé pour construire un socle en béton (26) selon la revendication 11, dans lequel :

1) ladite étape consistant à former ledit tube de coffrage flexible préfabriqué (12) comprend l'étape consistant à assembler une multiplicité

desdits éléments de feuille flexible (14), les éléments de feuille flexible (14) adjacents de ladite multiplicité étant fixés ensemble selon la revendication 11, afin de former deux desdits joints (36) ou plus, chacun desdits joints (36) ayant une languette longitudinale (16) associée ;

2) ladite étape consistant à positionner ledit pieu comprend l'étape consistant à positionner un pieu (30) pour chacune desdites languettes longitudinales (16) autour dudit emplacement souhaité, l'espacement entre les pieux adjacents étant identique à l'emplacement entre les languettes longitudinales (16) adjacentes ; et

3) ladite étape de fixation comprend l'étape consistant à fixer chaque languette longitudinale (16) sur un pieu (30) respectif.

13. Procédé pour construire un socle en béton (26) selon la revendication 10, dans lequel ledit tube de coffrage flexible (12) est laissé en place autour dudit socle en béton (26).

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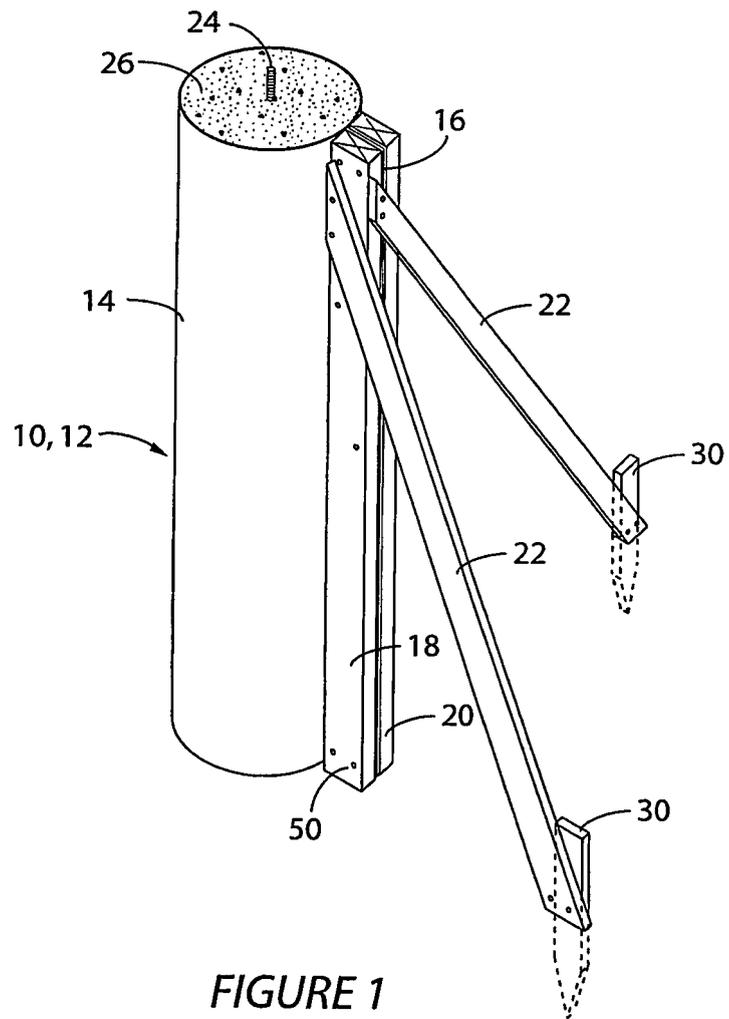


FIGURE 1

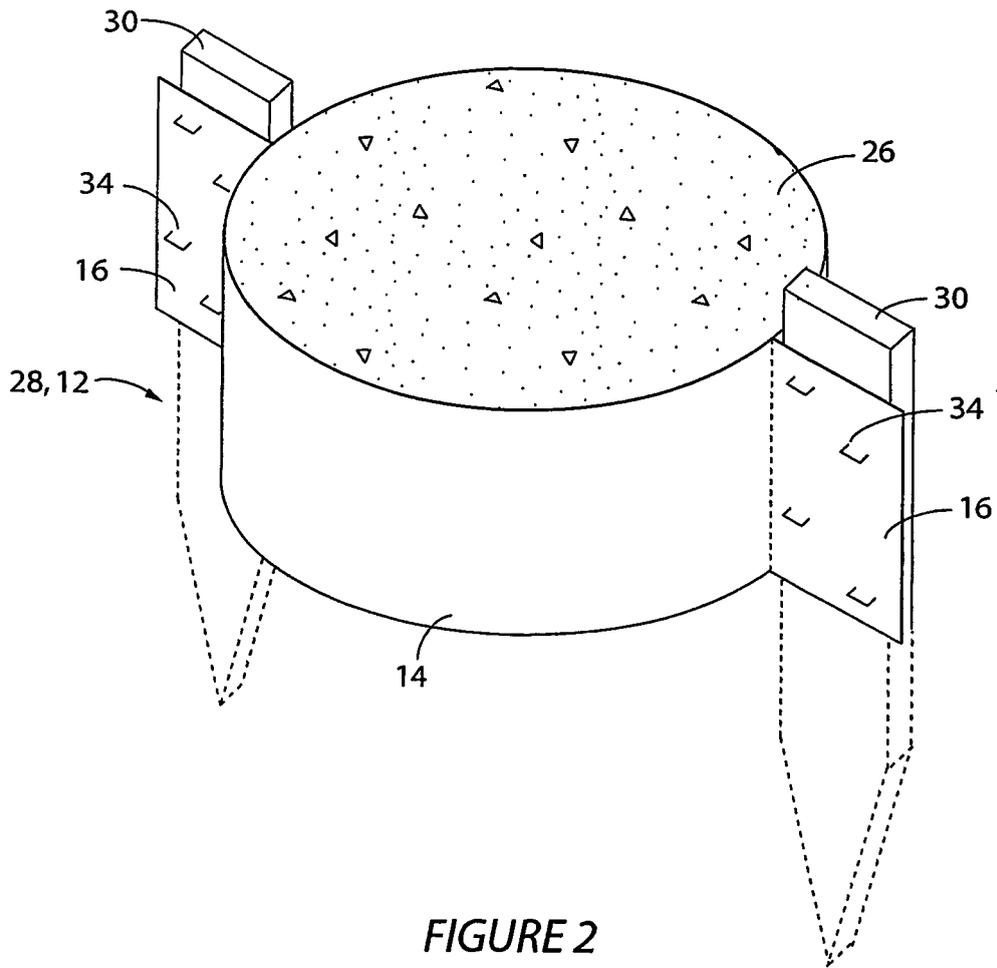


FIGURE 2

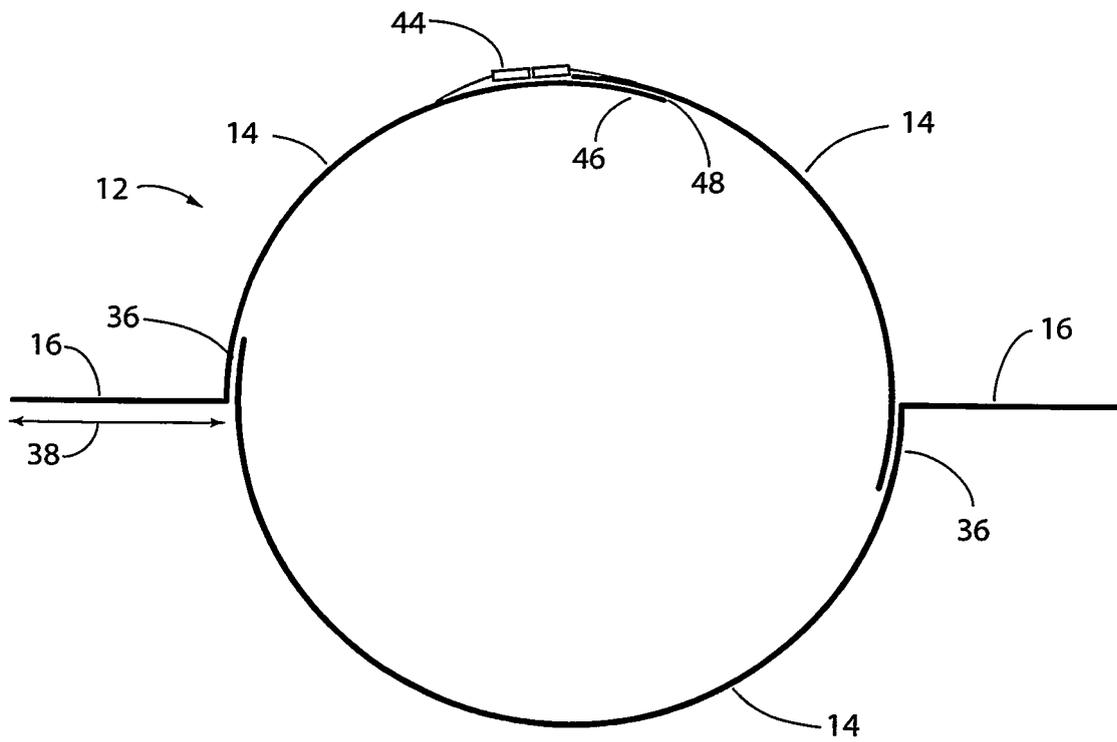


FIGURE 3

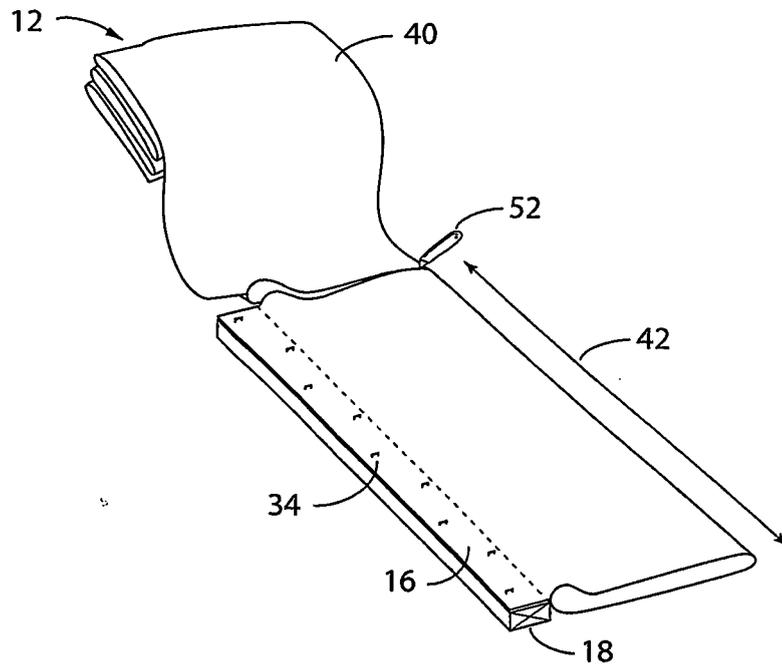


FIGURE 4

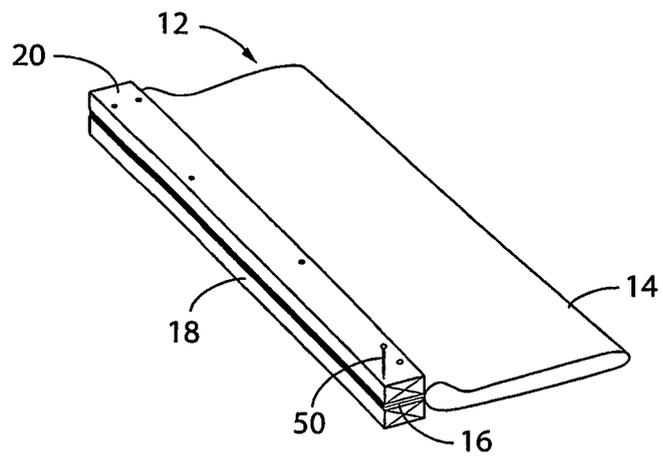


FIGURE 5

**REFERENCES CITED IN THE DESCRIPTION**

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