



(12) **EUROPEAN PATENT APPLICATION**

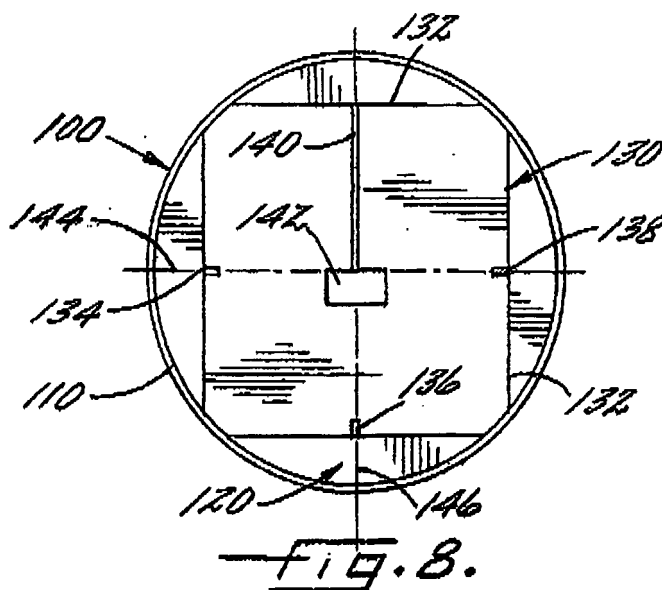
(43) Date of publication: **08.04.2009 Bulletin 2009/15** (51) Int Cl.: **E04G 13/02 (2006.01) E04G 21/18 (2006.01)**
(21) Application number: **08017284.4**
(22) Date of filing: **01.10.2008**

(84) Designated Contracting States: AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MT NL NO PL PT RO SE SI SK TR Designated Extension States: AL BA MK RS (30) Priority: 04.10.2007 US 867187 (71) Applicant: Sonoco Development, Inc. Hartsville, South Carolina 29550 (US)	(72) Inventor: Niu, Xiaokai Hartsville South Carolina 29550 (US) (74) Representative: Ullrich & Naumann Patent-und Rechtsanwälte Luisenstrasse 14 69115 Heidelberg (DE)
--	--

(54) **Concrete form assembly for square columns, and locating template for use therewith**

(57) A locating template (130) for a non-round concrete form (100) of the type having a round outer tube (110) and an insert assembly (120) installed in the outer tube for defining the desired non-round shape. The locating template (130) can be fit into the end of the channel defined by the insert assembly (120). The locating template (130) has a crosshair (20) or series of marks (112) indicating the center of the locating template (130), which

corresponds to the center of the channel defined by the insert assembly (120). The contractor simply marks the outer surface of the outer tube (110) at two or more locations aligned with the crosshair (20) or marks (112) on the locating template (130). The locating template (130) is removed, and the form is set up on the ground with the marks (112) on the outer tube (110) aligned with the crosshair on the ground. The column can then be poured in the usual manner.



Description

BACKGROUND OF THE INVENTION

[0001] The present disclosure relates to non-round (e.g., square/rectangular) concrete forms of the type having a round outer tube and an insert assembly that fits into the outer tube to define the desired non-round cross-section for the concrete column.

[0002] On the jobsite, it is difficult for the contractor to precisely center the form at the desired location for the column. Typically the contractor marks a pair of perpendicular lines forming a "crosshair" on the floor or ground, which identifies where the non-round column should be centered as well as how the non-round column should be oriented. Since the contractor cannot see the insert assembly in the outer tube, but can only see the outer tube, it is difficult to know when the center of the insert assembly is properly aligned with the crosshair.

BRIEF SUMMARY OF THE DISCLOSURE

[0003] The present disclosure is directed to a device to address this problem in an inexpensive yet effective way. The device comprises a locating template that fits into the end of the non-round channel defined by the insert assembly in the outer tube. The locating template has a crosshair or series of marks indicating the center of the locating template, which corresponds to the center of the channel defined by the insert assembly. The contractor simply marks the outer surface of the outer tube at two or more locations aligned with the crosshair or marks on the locating template. The locating template is then removed, and the form is set up on the floor or ground with the marks on the outer tube aligned with the crosshair on the floor or ground. The column can then be poured in the usual manner.

[0004] The locating template advantageously can be made of a polymer foam material such as expanded polystyrene (EPS). However, there is no particular limitation on the material of which the locating template can be made.

[0005] The present disclosure also relates to a combination of a concrete form and a locating template as described above. Apart from the locating template's utility for centering the form on a crosshair, the locating template also helps support the end of the concrete form to resist collapsing of the form under pressure, such as when multiple forms are stacked atop one another for shipment. With conventional forms, such stacking can result in the forms becoming out of round (oval or egg-shaped) because of the significant pressure exerted by a pile of forms.

[0006] Additionally, the locating template prevents a fork of a forklift from being inserted into the end of the concrete form for lifting the form, which is a common practice employed for loading forms into and unloading them from a trailer, but which can cause gouges and/or pro-

trusions on the inner surface of the form. This is highly undesirable because it results in unsightly recesses and/or protrusions on the concrete column, which must be patched and/or machined off after the column sets.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

[0007] Having thus described the disclosure in general terms, reference will now be made to the accompanying drawings, which are not necessarily drawn to scale, and wherein:

FIG. 1 is a perspective view showing a concrete form in accordance with one embodiment of the invention erected on a surface upon which a crosshair has been marked for indicating the desired location of the geometric center and the desired orientation of the non-round column to be formed by the concrete form;

FIG. 2 is an end view of the concrete form without any locating template installed;

FIG. 3 is a perspective view of a locating template for the concrete form in accordance with one embodiment of the invention;

FIG. 4 is a perspective view of a locating template in accordance with another embodiment;

FIG. 5 is a perspective view of a locating template in accordance with another embodiment;

FIG. 6 is a perspective view of a locating template in accordance with still another embodiment;

FIG. 7 is a top or plan view of a locating template in accordance with a further embodiment;

FIG. 8 is an end view of the concrete form with a locating template installed therein in accordance with one embodiment; and

FIG. 9 is a flow chart showing steps of using the concrete form assembly in accordance with the invention.

DETAILED DESCRIPTION OF THE DRAWINGS

[0008] The present inventions now will be described more fully hereinafter with reference to the accompanying drawings in which some but not all embodiments of the inventions are shown. Indeed, these inventions may be embodied in many different forms and should not be construed as limited to the embodiments set forth herein; rather, these embodiments are provided so that this disclosure will satisfy applicable legal requirements. Like

numbers refer to like elements throughout.

[0009] A concrete form **100** in accordance with one embodiment of the invention is illustrated in FIGS. 1 and 2. The form **100** includes an outer tube **110** of circular cross-section, and an insert assembly **120** installed within the outer tube. The outer tube can comprise a spirally wound paperboard tube generally as shown, although the invention is not limited to any particular type or construction of outer tube. The outer tube can have an inside diameter ranging from about 12 inches to about 48 inches depending on the desired size of the concrete column to be produced, although the invention is not limited to any particular diameter. The insert assembly **120** defines a central channel **C** of non-round (square or rectangular being illustrated) cross-section for defining the desired cross-section for a concrete column.

[0010] The insert assembly **120** can be of any suitable construction providing the desired channel **C**. In one embodiment for forming a substantially square column as illustrated, the insert assembly is formed by four segments **122** each forming one respective side of the substantially square channel. Each segment has a length substantially the same as that of the outer tube and has a substantially constant cross-section over that length (although a constant cross-section is not a necessity). Each segment has an inner surface (i.e., the surface that imparts a desired shape to the concrete) that is substantially planar and an opposite outer surface (i.e., the surface that confronts the inner surface of the outer tube **110**) that is formed as an angular segment of a cylinder of substantially the same diameter as the inside diameter of the outer tube **110**. The segments can be formed of any suitable material, including but not limited to polymer foam material. In the case of polymer foam segments, each of the segments can be formed as a continuous extrusion of polymer foam material. A suitable non-limiting example of a polymer foam material that can make up the segments is expanded polystyrene (EPS). The inner surfaces of the segments **122** can be affixed to a liner sheet (not shown) that forms the innermost surface of the insert assembly **120** that contacts the concrete.

[0011] The axial length of the insert assembly **120** is substantially the same as that of the outer tube **110** and the insert assembly's opposite ends are substantially coincident with the opposite ends of the outer tube. Thus, the channel **C** has a first opening of non-round (square in the illustrated embodiment) shape at one end of the outer tube and an opposite second opening of non-round shape at an opposite end of the outer tube. Once the form **100** has been vertically erected and braced in position by suitable bracing (not shown), wet concrete is poured into the top opening of the channel **C** until the form is substantially filled with the concrete. After drying and hardening of the concrete, the form is stripped off the column.

[0012] As noted, a difficulty encountered with such non-round concrete forms is that unlike a round form where the rotational orientation of the round column is

irrelevant and the form can be oriented in any arbitrary rotational orientation, with a non-round form the orientation of the column usually is important and must be according to the builder's or architect's plan. Additionally, because the insert assembly **120** cannot be seen from outside of the form once the form has been vertically erected, the contractor does not know whether the insert assembly is properly oriented and centered with respect to the desired orientation and center location for the column to be produced.

[0013] In accordance with the present invention, these problems are addressed by providing a locating template **130, 230, 330, 430, 530** (see the various embodiments in FIGS. 3-7, respectively) configured to be positioned in the bottom opening of the channel **C** proximate the bottom end of the outer tube **110**. The locating template has an outer peripheral surface **132, 232, 332, 432, 532** having sides defining a non-round shape for the locating template. The size and shape of the locating template is such that the template can be fit into the non-round opening of the channel **C** with a frictional engagement with the inner surface of the insert assembly at the channel opening. Additionally, the shape of the locating template is such that the template can be fitted into the opening of the channel in only one orientation or in a limited number of orientations in all of which the geometric center of the locating template coincides (neglecting small manufacturing tolerances) with the geometric center of the channel **C**. The locating template defines a plurality of indicators that are visually discernable when the locating template is positioned in the opening of the channel (prior to the form being vertically erected on the ground). The indicators indicate the geometric center of the locating template and thus of the channel opening. Based on the indicators, the outer surface of the outer tube **110** can be marked with marks **112** (two of which are shown in FIG. 1) that can be aligned with a crosshair **20** that has previously been marked on the ground to indicate the desired location of the center of the column and the desired orientation of the column. In this manner, it is assured that the insert assembly **120** within the outer tube **110** is properly centered and oriented.

[0014] The locating template **130** of FIG. 3 has indicators **134, 136, 138** each of which is formed in or on the outer peripheral surface **132** of the locating template. In this embodiment, the locating template has a generally square shape for use with a square concrete form such as shown in FIG. 2; thus, the locating template has four sides. The indicator **134** is located so as to bisect one side, the indicator **136** is located so as to bisect a second side, and the indicator **138** is located so as to bisect a third side. The indicators **134, 136, 138** can be grooves formed in the outer peripheral surface **132** as illustrated; alternatively, the indicators could be printed (e.g., with ink or the like) on the outer peripheral surface. The locating template **130** also has a fourth indicator **140** on a fourth side of the locating template that is different from the other indicators. The indicator **140** comprises a slot

formed entirely through the thickness of the locating template, i.e., from one major face to the opposite major face of the locating template, but only partway across the width of the locating template. In this embodiment, the locating template also includes an aperture **142** extending entirely through the thickness at or near the geometric center of the locating template, and the slot **140** extends from the outer peripheral surface **132** to the aperture **142** and connects with the aperture. The slot **140** can be formed by a hot wire that is also used for cutting the aperture **142**. The aperture **142** facilitates removal of the locating template from the channel, such as by inserting one or more fingers or a tool into the aperture and pulling the insert out of the channel.

[0015] With reference to FIGS. 8 and 9, in operation, the locating template **130** is inserted into the bottom opening of the insert assembly **120** (step **200** in FIG. 9). The indicators **134, 136, 138, 140** establish a crosshair, i.e., a line **144** extending from the indicator **134** to the indicator **138**, and a perpendicular line **146** extending from the indicator **136** to the indicator **140**. The contractor can use a ruler or straightedge to facilitate marking where these lines intersect the outer surface of the outer tube **110**, and using a pen, pencil, or other implement the contractor can mark the outer surface of the tube at two or more locations (e.g., see marks **112** in FIG. 1; see step **202** in FIG. 9). Next, the locating template is removed from the form (step **204**). Finally, the form **100** is vertically erected on the ground by aligning the marks **112** on the outer tube with the crosshair **20** on the ground (step **206**). External bracing (not shown) or the like can then be used to affix the form in the desired location and orientation.

[0016] Locating templates of other configurations and designs can be used in accordance with the invention. For example, FIG. 4 shows a locating template **230** having an overall configuration similar to the locating template **130**, but having a different configuration of indicators. More particularly, the locating template **230** includes a first indicator **234** formed on or in the outer face (i.e., the major face that is substantially normal to a central longitudinal axis of the form **100** and faces away from the interior of the form when the locating template is inserted into the form) of the locating template, and a second indicator **236** formed on or in the outer face of the locating template. The indicator **234** is a straight line extending from one side of the locating template to an opposite side thereof, bisecting these two sides. The indicator **236** is a straight line extending perpendicular to the indicator **234** and bisecting the remaining two sides of the locating template. As shown, the indicators **234, 236** can comprise grooves (e.g., formed by a hot wire) in the outer face; alternatively, the indicators could be printed on the outer face or otherwise formed on or in the outer face. Usage of the locating template **230** is substantially the same as usage of the locating template **130** previously described.

[0017] FIG. 5 shows yet another locating template **330** in accordance with the invention. The locating template

330 includes indicators **334, 336, 338, 340** generally similar to indicators **134, 136, 138, 140** of the locating template **130**, except that indicators **334, 336, 338** are formed as grooves or notches in the corners formed between the outer peripheral surface **332** and the outer face of the locating template and do not extend along the outer peripheral surface **332** along the entire thickness of the locating template between the outer face and the opposite inner face; in contrast, indicators **134, 136, 138** of locating template **130** do extend the full thickness of the locating template along the outer peripheral surface **132**. Additionally, the generally centrally located aperture **342** of locating template **330** has a generally diamond shape as opposed to the generally rectangular shape of aperture **142** of locating template **130**. Usage of the locating template **330** is substantially the same as usage of the locating template **130** previously described.

[0018] FIG. 6 depicts a locating template **430** generally similar to the locating template **330** of FIG. 5, but having indicators **434, 436, 438** formed as grooves extending along the outer peripheral surface **432** over the full thickness of the template. Additionally, the locating template **430** has four additional indicators **434a, 436a, 438a, 440a** that are clocked 45° with respect to the indicators **434, 436, 438, 440**. More particularly, a line extending between indicators **434a** and **438a** makes a 45° angle with respect to a line extending between indicators **434** and **438**. A line extending between indicators **436a** and **440a** makes a 45° angle with respect to a line extending between indicators **436** and **440**. The provision of eight indicators facilitates aligning the locating template and concrete form with a 45° line that some contractors mark on the ground.

[0019] A locating template **530** in accordance with yet another embodiment is shown in FIG. 7. The locating template **530** differs from those previously described in that its overall plan shape is not substantially complementary to the shape of the channel **C** in the concrete form as is true for the locating templates **130, 230, 330, 430**. Rather, the locating template **530** has a "cross" shape that is still able to frictionally engage the inner surface of the insert assembly. Further, like the other locating templates, the template **530** can fit into the channel defined by the insert assembly in a limited number of orientations (in this embodiment, four orientations angularly clocked 90° with respect to each other), and the geometric center of the template coincides with the geometric center of the channel in all of those orientations. The locating template **530** has the advantages that it uses less material than the previously described templates and it can be cut, along with a plurality of identical templates, from a large sheet of material with less waste than the other templates (the main waste being the material cut out to form the central aperture **542**). The locating template **530** includes indicators **534, 536, 538, 540** formed as grooves in the outer surface **532**, similar to the corresponding indicators **434, 436, 438, 440** of the FIG. 6 embodiment.

[0020] The locating templates **130, 230, 330, 430, 530** can be formed of any suitable material, including but not limited to polymer foam materials. A non-limiting example of a suitable polymer foam material is EPS.

[0021] In addition to being useful for facilitating proper alignment and orientation of a non-round concrete form, the locating templates in accordance with the invention also have utility in shipping of forms from one location to another. In many cases, a multitude of forms may be shipped in a truck or trailer, stacked one upon another. The weight of overlying forms bearing on underlying forms can cause the underlying forms to be squeezed out of round (e.g., oval or egg-shaped), which is undesirable. In accordance with the invention, a locating template as described can be inserted into each end of each form. The locating templates provide additional structural support at the ends of the forms and help resist deformation as described.

[0022] Many modifications and other embodiments of the inventions set forth herein will come to mind to one skilled in the art to which these inventions pertain having the benefit of the teachings presented in the foregoing descriptions and the associated drawings. Therefore, it is to be understood that the inventions are not to be limited to the specific embodiments disclosed and that modifications and other embodiments are intended to be included within the scope of the appended claims. Although specific terms are employed herein, they are used in a generic and descriptive sense only and not for purposes of limitation.

Claims

1. A device for use with a concrete form for forming a non-round concrete column, the form having a circular cylindrical outer surface and having an inner surface defining a central channel of non-round cross-section for defining the desired cross-section for a concrete column, the channel defining a first opening of non-round shape at one end of the form and an opposite second opening of non-round shape at an opposite end of the form, the device comprising:

a first locating template configured to be inserted into either of the first and second openings of the channel, the first locating template including an outer peripheral surface for frictionally engaging an inner surface of the form at the first opening so as to retain the first locating template in the first opening, and the first locating template defining a plurality of indicators that are visually discernable when the first locating template is positioned in the first opening, the indicators indicating a geometric center of the first locating template and thus of the first opening.

2. The device of claim 1, wherein the non-round shape

of the first locating template is square or rectangular having four sides, and the indicators are arranged to indicate a location for each of the four sides of the first locating template at which said side is bisected.

3. The device of claim 1, wherein the first locating template has an outer face substantially normal to a central longitudinal axis of the form and facing away from an interior of the form, and an opposite inner face, a thickness of the first locating template being defined between the outer and inner faces.
4. The device of claim 3, and wherein at least one of the indicators is at or on the outer face.
5. The device of claim 3, wherein the indicators comprise straight grooves formed in the outer face.
6. The device of claim 3, wherein the indicators comprise straight lines printed or marked on the outer face.
7. The device of claim 3, wherein one of the indicators comprises a slot formed entirely through the thickness of the first locating template and extending from the outer peripheral surface at one side of the first locating template partway toward an opposite side thereof.
8. The device of claim 7, wherein the first locating template defines an aperture extending through the thickness.
9. The device of claim 8, wherein the aperture is positioned generally centrally in the first locating template and the slot extends to and connects with the aperture.
10. The device of claim 3, wherein at least some of the indicators comprise notches formed in the outer peripheral surface of the first locating template.
11. The device of claim 3, wherein the first locating template defines an aperture extending through the thickness.
12. The device of claim 11, wherein at least some of the indicators comprise notches formed in the outer peripheral surface of the first locating template, each of the notches extending to an edge at which the outer peripheral surface joins with the outer face.
13. The device of claim 1, wherein the first locating template is made of polymer foam.
14. A concrete form assembly for pouring a concrete column of non-round cross-section, comprising:

a form having a circular cylindrical outer surface
and having an inner surface defining a central
channel of non-round cross-section for defining
the desired cross-section for a concrete column,
the channel defining a first opening of non-round 5
shape at one end of the form and an opposite
second opening of non-round shape at an op-
posite end of the form; and
a first locating template in accordance with any
one of claims 1 to 13, the first locating template 10
being positioned in the first opening of the chan-
nel with the outer peripheral surface frictionally
engaging the inner surface of the form at the first
opening so as to retain the first locating template
in the first opening. 15

15. The concrete form assembly of claim 14, further
comprising a second locating template substantially
identical to the first locating template and positioned
in the second opening of the channel. 20

25

30

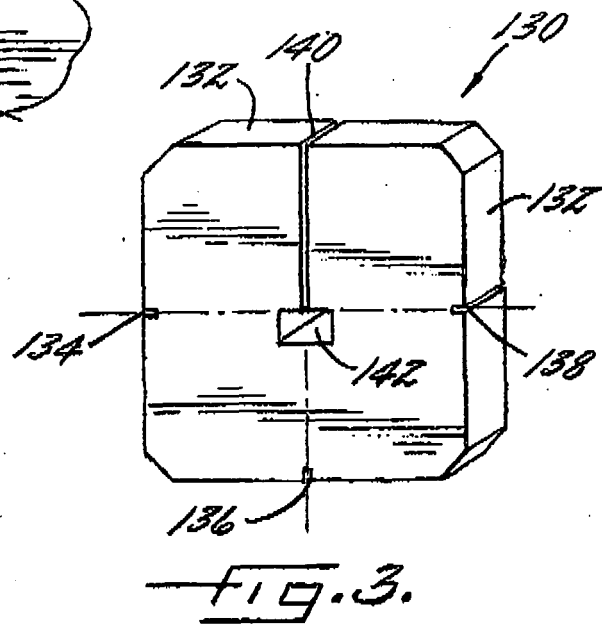
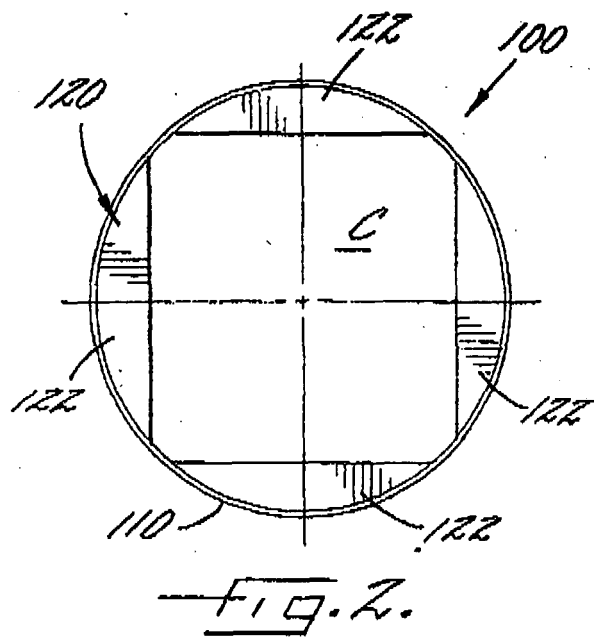
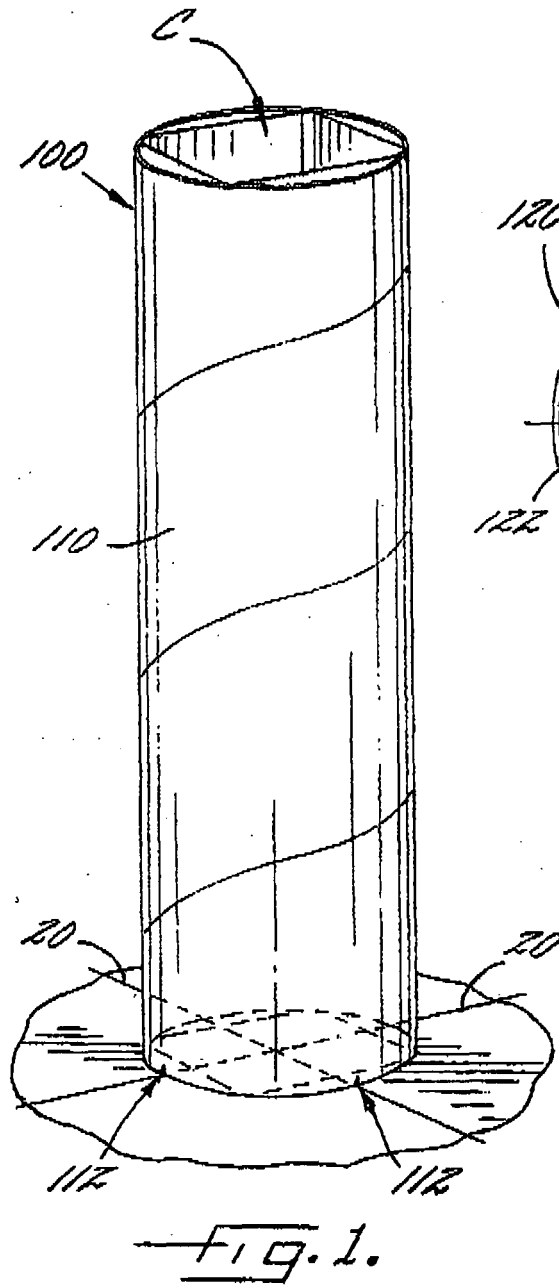
35

40

45

50

55



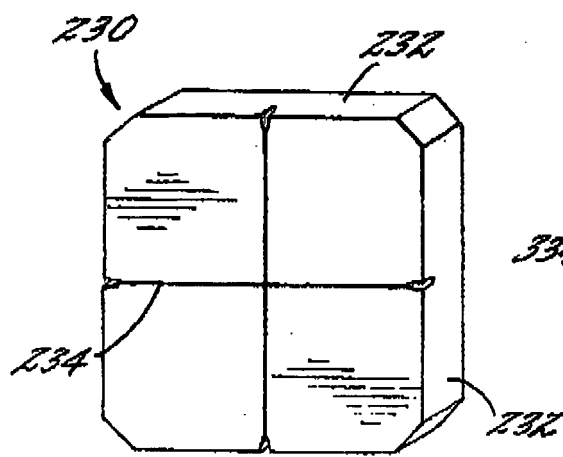


FIG. 4.

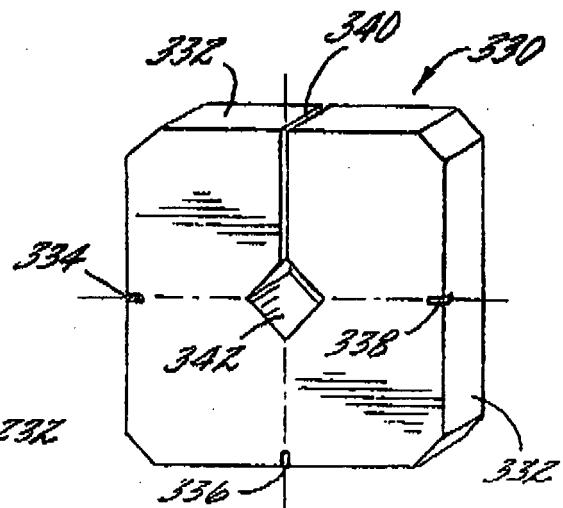


FIG. 5.

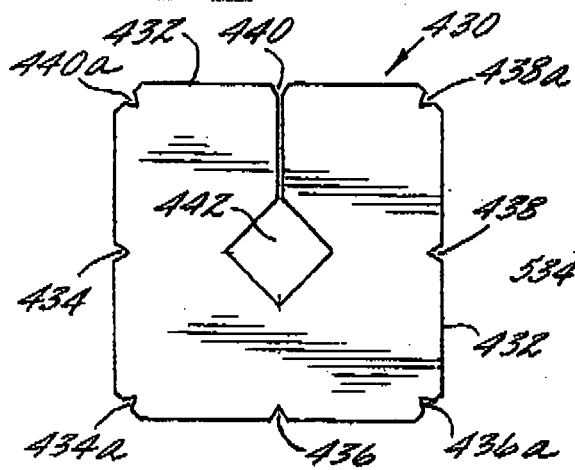


FIG. 6.

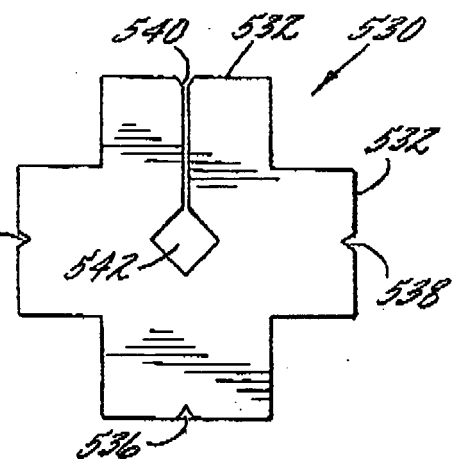


FIG. 7.

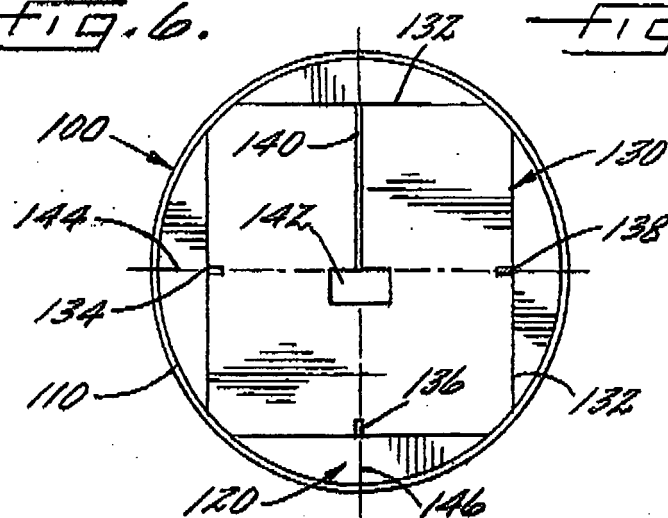


FIG. 8.

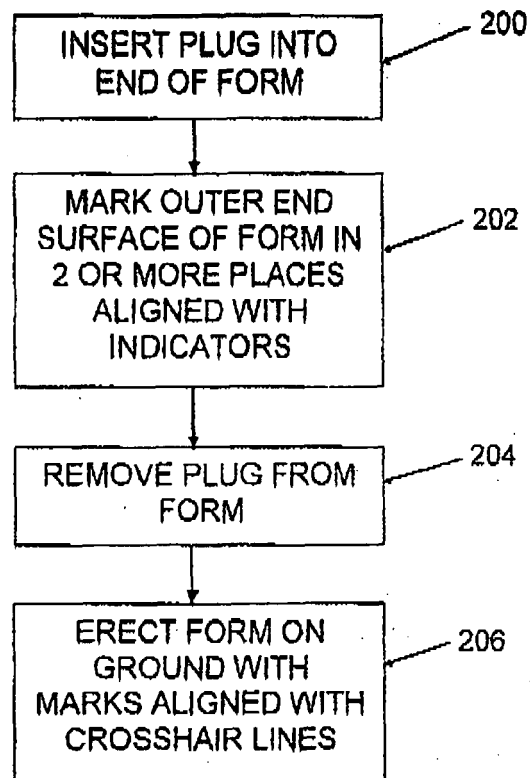


FIG. 9