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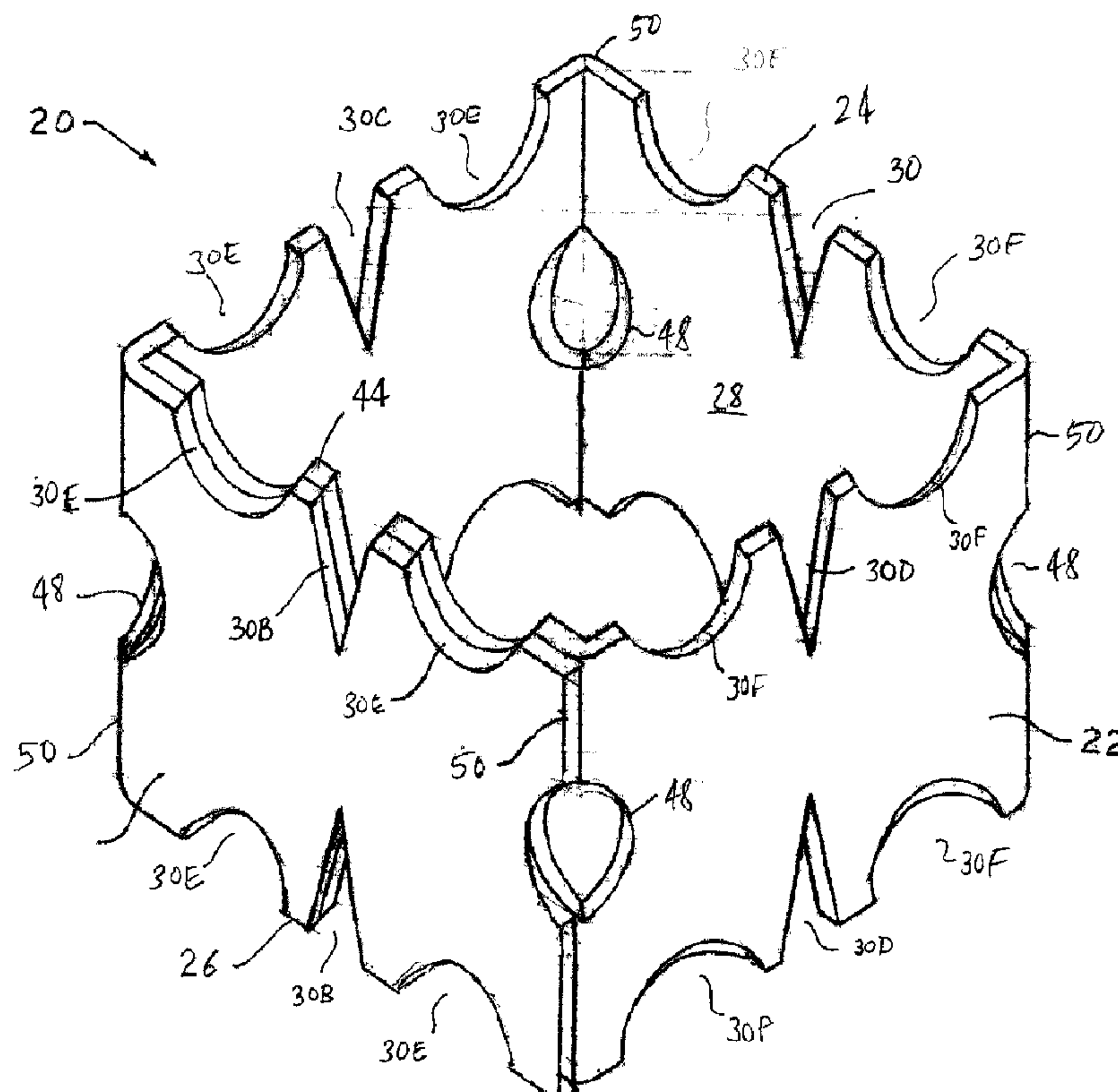
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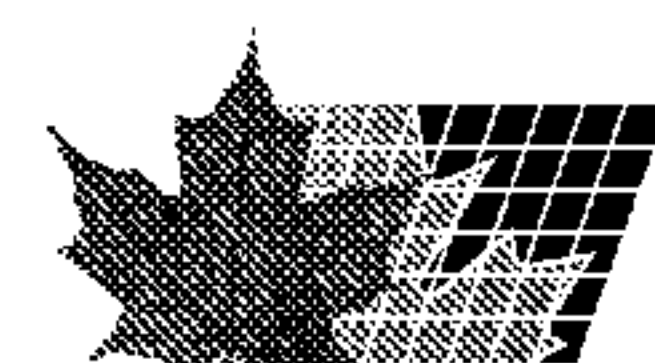
(54) Titre : COQUE EN CARTON POUR SUPPORTER UN ELEMENT DE RENFORCEMENT EN BETON DURANT LA  
MISE EN PLACE DU BETON

(54) Title: PAPERBOARD SHELL FOR SUPPORTING CONCRETE REINFORCEMENT ELEMENT DURING  
CONCRETE POUR



(57) Abrégé/Abstract:

A reinforcement support is provided for use in connection with concrete reinforcement elements and poured concrete. The reinforcement support includes a tubular paperboard shell having first and second ends with a channel extending therebetween. At least a first notch is formed into the first end extending towards the second end with the first notch being configured to supportably accommodate at least one concrete reinforcement element.



## ABSTRACT

5 [0043] A reinforcement support is provided for use in connection with concrete reinforcement elements and poured concrete. The reinforcement support includes a tubular paperboard shell having first and second ends with a channel extending therebetween. At least a first notch is formed into the first end extending towards the second end with the first notch being configured to supportingly accommodate at least one concrete reinforcement element.

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**PAPERBOARD SHELL FOR SUPPORTING CONCRETE REINFORCEMENT**  
**ELEMENT DURING CONCRETE POUR**

BACKGROUND OF THE INVENTION

5    **[0001]** The presently disclosed technologies are directed generally to an article and method for supporting reinforcing in concrete, and in particular, to an article made of paperboard and a method for supporting reinforcing elements in concrete during the pouring of the concrete.

10   **[0002]** It is well known in the construction trades that reinforcement consisting of steel bars (rebar), or cable, or wire mesh is used to strengthen poured concrete. The reinforcement must be supported in a form, above the base and below the top of the form, so that the concrete flows under and over the reinforcement. Further supports are needed for conduit to carry electrical wiring through the concrete, as well as, piping and tubing.

15   **[0003]** A support currently used for this purpose is known in the trade as a “mesh-up” or a “chair.” Typically, it is made from sheet metal, wire metal, molded plastic, or concrete. These materials are not entirely environmentally benign. Metals and plastics take energy to recycle. Plastics are not made from renewable sources. Concrete is not recyclable,  
20   and is heavy to transport.

**[0004]** The mesh-up support has notches or grooves that receive the reinforcement. The mesh-up is available in various heights and widths depending upon the design requirements of the reinforcement. Cutouts in the mesh-up allow concrete to flow into  
25   the mesh-up during the pour, to preclude the forming of voids in the concrete.

**[0005]** Apparatus and methods for reinforcement support are known in the art. Some examples are disclosed in the following U.S. Patents.

## PATENT

[0006] Lowery, U.S. Patent Nos. 6,962,029 and 7,458,192, discloses a plastic support having four legs, U-shaped notches on top, and a flange base. The plastic legs of Lowery are designed to bow or bend outward under the forces imposed by the concrete pour, then straighten back up later. The legs may not return to the proper height, leaving the  
5 reinforcement at varying heights.

[0007] Sorkin, U.S. Patent No. 5,555,693 and Sizemore, U.S. Patent No. 4,682,461, each show a plastic support having a V-shaped notch at the top end. Sorkin discloses a shaped support which cannot be shipped or stored in a flat state. Sizemore discloses a two-piece  
10 construction which requires maintenance of inventory of the two pieces.

## SUMMARY

[0008] In accordance with the present invention, there is disclosed a reinforcement support for use in connection with reinforcement and poured concrete. The  
15 reinforcement support includes a shell made from paperboard. As used herein, “paperboard” refers to any paperboard construction (e.g., corrugated, non-corrugated, etc.) which may be wholly paperboard or which includes at least a layer of paperboard (e.g., treated or coated or laminated paperboard).

20 [0009] In particular, a reinforcement support is provided for use in connection with concrete reinforcement elements and poured concrete. The reinforcement support includes a tubular paperboard shell having first and second ends with a channel extending therebetween. At least a first notch is formed into the first end extending towards the second end with the first notch being configured to supportingly accommodate at least  
25 one concrete reinforcement element.

[0010] These and other aspects, objectives, features, and advantages of the disclosed technologies will become apparent from the following detailed description of illustrative embodiments thereof, which is to be read in connection with the accompanying drawings.

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## BRIEF DESCRIPTION OF THE DRAWINGS

[0011] Figure 1 is a perspective view of a first embodiment of a reinforcement support, rectangular in section, constructed in accordance with the invention.

5 [0012] Figure 2 is a front elevational view of the reinforcement support of Figure 1.

[0013] Figure 3 is a top plan view of the reinforcement support of Figure 1.

[0014] Figure 4 is a top plan view of a blank useable to form the reinforcement support  
10 of Figure 1.

[0015] Figure 5 is a perspective view of a second embodiment of a reinforcement support, rectangular in section, constructed in accordance with the invention.

15 [0016] Figure 6 is a front elevational view of the reinforcement support of Figure 5.

[0017] Figure 7 is a top plan view of the reinforcement support of Figure 5.

[0018] Figure 8 is a top plan view of a blank useable to form the reinforcement support  
20 of Figure 5.

[0019] Figure 9 is a perspective view of a third embodiment of a reinforcement support, circular in section, constructed in accordance with the invention.

25 [0020] Figure 10 is a front elevational view of the reinforcement support of Figure 9.

[0021] Figure 11 is a top plan view of the reinforcement support of Figure 9.

[0022] Figure 12 is a perspective view of a fourth embodiment of a reinforcement  
30 support, circular in section, constructed in accordance with the invention.

[0023] Figure 13 is a front elevational view of the reinforcement support of Figure 12.

[0024] Figure 14 is a top plan view of the reinforcement support of Figure 12.

5 [0025] Figure 15 is a perspective view of a fifth embodiment of a reinforcement support, rectangular in section, constructed in accordance with the invention.

[0026] Figure 16 shows the shell of the subject invention in a collapsed state.

10 [0027] Figures 17-21 show different notch configurations useable with the subject invention.

[0028] Figure 22 is a schematic showing a method useable with the subject invention.

## 15 DETAILED DESCRIPTION

[0029] With reference to the Figures, a reinforcement support 20 is shown which includes a tubular shell 22. The shell 22 includes paperboard. As will be appreciated by those skilled in the art, the shell 22 may be wholly formed from paperboard or include at least a layer of paperboard which may be provided in conjunction with other materials, such as a coating, treatment or other secondary layer (e.g., a laminated layer). The paperboard may be treated or coated with water proofing or other protective substances. Also, the paperboard may be formed from recovered recycled materials and may itself be recyclable. The use of such materials may allow contractors to claim benefit of "leeds" credits.

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[0030] The shell 22 includes first and second ends 24, 26 with a channel 28 extending therebetween. At least a first notch 30 is formed in the first end 24 to extend towards the second end 26. The first notch 30 is configured to supportingly accommodate at least one concrete reinforcement element. The concrete reinforcement element may be disposed to extend across a portion of the channel 28 or may be located to only partly extend across the channel 28 (e.g., one end of the concrete reinforcement element is located within the channel 28 with the concrete reinforcement element extending out from the shell 22).

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[0031] As will be understood by those skilled in the art, concrete reinforcement elements may be any element provided to reinforce a concrete structure, including, but not limited to, wire mesh, rebar, cabling, and the like. Concrete reinforcement elements are typically formed of metal or plastic. As used herein, “concrete reinforcement elements” may be not only elements which solely have the functionality of reinforcing in poured concrete (e.g., rebar) but may also include elements which provide additional functionality, e.g., electrical conduits, piping, tubing, and so forth. The presence of the latter elements in poured concrete may provide reinforcing while also providing passageways for electrical wires, liquids, etc. The extent, if at all, of reinforcement provided by a concrete reinforcement element is not critical to the subject invention; the subject invention relates to the need to support concrete reinforcement elements during concrete pouring (e.g., supporting electrical conduit which may or may not ultimately provide reinforcement).

[0032] The first notch 30 may be formed with various configurations. As shown in Figure 17, the first notch 30 includes sides 32 which may extend convergently away from mouth 34 located at the first end 24. As shown in Figure 17, the sides 32 may come to meet to provide the first notch 30 with a general V-shape. Alternatively, as shown in Figure 18, the sides 32 may extend to an enlarged opening 36. This provides the first notch 30 with a general keyhole shape. Any accommodated concrete reinforcement element may be urged into the enlarged opening 36 with the sides 32 restricting movement out of the enlarged opening 32. Further, as shown in Figure 19, a general straight end 38 may be provided which extends between the sides 32. The first notch 30 may be also provided with an arcuate shape (arcuate end 40), as shown in Figure 20, or be provided with the arcuate end 40 with the sides 32 extending between the arcuate end 40 and the first end 24 (Figure 21). As will be appreciated by those skilled in the art, the first notch 30 may be formed with other shapes, such as other polygonal shapes, irregular shapes, and so forth. In addition, the first notch 30 may be sized to accommodate various sized concrete reinforcement elements (e.g., wire mesh of different diameters, such as #4, #6, and #8).

[0033] The first notch 30 may be formed with different aspect ratios. Where the reinforcement support 20 is intended for use with lighter-weight concrete reinforcement elements, the aspect ratio may be provided so that the depth of the first notch 30 is greater than the width of its opening. In particular, with reference to Figure 17, the mouth 34 defines a width W, whereas the first notch 30 extends a distance from the first end 24 which defines a notch depth L. With lighter-weight concrete reinforcement elements, it is preferred that the notch depth L be greater than the width W of the mouth 34. This reduces the likelihood of the concrete reinforcement element being dislodged from the first notch 30. Where heavier-weight concrete reinforcement elements are to be used, the aspect ratio can be adjusted so that the notch depth L is equal to or less than the width W of the mouth 34 (Figure 20). This allows for the first notch 30 to have a wider profile which is shallower than the deeper profile described above. Here, however, the likelihood of dislodgment of the concrete reinforcement element is offset by the inherent weight of the element. It is envisioned that wire mesh and cabling may be used with the aspect ratio of the notch depth L being greater than the width W, while rebar may be used with the notch depth L being equal to or less than the width W. This is generally envisioned, but may be adjusted as needed, as will be appreciated by those skilled in the art.

[0034] To allow for a single reinforcement support 20 to be utilized with various concrete reinforcement elements, a plurality of notches may be utilized. With reference to Figure 1, a second notch 30B may be provided in the first end 24 or the second end 26. By providing notches in both the first and second ends 24, 26, the reinforcement support 20 may provide for further configurations.

[0035] The first notch 30 and the second notch 30B may be formed in the first end 24 and aligned along a common axis which extends across a portion of the channel 28. This alignment allows for simultaneous support of a concrete reinforcement element by both the first notch 30 and the second notch 30B.

[0036] Further notches, such as a third notch 30C and a fourth notch 30D, may be provided in addition to the first and second notches 30, 30B. The notches 30, 30B, 30C,

30D may be uniformly spaced about the first end 24. This allows for an approximate right angle alignment of the first and second notches 30, 30B relative to the third and fourth notches 30C, 30D. Such an alignment allows for simultaneous support of a wire mesh which has generally right angle criss-crossing elements (Figure 22).

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[0037] In addition, a plurality of notches may be provided about the first end 24 of the shell 22 so that more than one concrete reinforcement element may be supported at a time. For example, notches 30E, 30F may be provided adjacent to the first and second notches 30, 30B so as to allow for adjacent support of two separate concrete

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reinforcement elements.

[0038] As shown in Figures 1, 5, 9, 12 and 15, notches may be provided in various quantities on or both of the first and second ends 24, 26 of the shell 22. The notches may be provided with any characteristics discussed above with respect to the first notch 30 (shape, aspect ratio). The use of designation by reference numerals is not intended to be limiting. As will be understood by those skilled in the art, various combinations of the notches (shape, location) are possible with the subject invention. In addition, the shell 22 may be provided with various cross-sectional shapes, such as, a polygonal cross-section, e.g., a generally rectangular cross-section, as viewed in a direction transverse to a longitudinal axis of the shell 22 (Figure 1) or a circular cross-section as viewed in a direction transverse to a longitudinal axis of the shell 22 (Figure 9).

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[0039] The shell 22 may be collapsed to a generally flat state, as shown in Figure 16, for shipping and storage. The shell 22 may be provided unassembled, e.g., as a blank as discussed below, and assembled on-site as needed, or provided in a collapsed state and erected on-site as needed. In either case, shipping and storage space may be minimized.

25

[0040] Further, the shell 22 may be formed from a single blank B which is formed as a continuous strip of paperboard and then assembled into a tubular shape with ends 42 being glued, stapled and/or fixed in any other known manner. Examples of useable blanks B are shown in Figures 4 and 8. The first notch 30, and other notches and features, may be die cut or otherwise formed in the blank B. In assembling the shell 22,

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portions of the blank B may be overlapped, as shown in Figure 1, to have a double layer portion 44. The double layer portion 44 may cover all or a portion of one side of the shell 22. Also, fold lines 46 may be provided, as needed, on the blank B by scoring, perforating, or otherwise weakening, portions of the blank B to define fold lines for assembling the shell 22. The fold lines 46 may be also utilized to allow for collapsing the shell 22 into a generally flat state for shipping and storage. Fold lines are not required for assembling a circular cross-section shell 22, but may be provided to permit collapsing. As will be appreciated by those skilled in the art, the shell 22 may be formed by a plurality of assembled pieces, rather than a single blank.

**[0041]** One or more vent holes 48 may be formed in the shell 22 to allow for concrete to pass therethrough during pouring. The vent holes 48 relieve possible stress from concrete being only introduced through the first end 24 and/or the second end 26. As shown in Figure 1, with the shell 22 having a polygonal cross-section, one or more vent holes 48 may be formed at one or more corners 50 of the shell 22.

**[0042]** In use, the reinforcement support 20 is located at a site where concrete is to be poured. The reinforcement support 20 may be stood on one of the first and second ends 24, 26 to be upright. This allows for rigid upright support for one or more concrete reinforcement element(s), spaced from the supporting ground. At least one concrete reinforcement element is placed into engagement with at least one first notch 30. A plurality of the reinforcement supports may be used to support a matrix of concrete reinforcement elements (e.g., a plurality of rebar, wire mesh, etc.). Once prepared, concrete is poured about the reinforcement support 20 and the supported concrete reinforcement element(s). While supporting concrete reinforcement element(s), the poured concrete may enter the shell 22: through the exposed first or second end 24, 26; through any vent hole(s) 48; and/or, through any notches provided on the shell 22 but not utilized to support a concrete reinforcement element.

THE EMBODIMENTS OF THE INVENTION IN WHICH AN EXCLUSIVE  
PROPERTY OR PRIVILEGE IS CLAIMED ARE DEFINED AS FOLLOWS:

1. A reinforcement support for use in connection with concrete reinforcement elements and poured concrete, the reinforcement support comprising a tubular paperboard  
5 shell having first and second ends with a channel extending therebetween, the shell having a first notch formed into the first end extending towards the second end, the first notch being configured to supportingly accommodate at least one concrete reinforcement element.
- 10 2. The reinforcement support of claim 1, wherein a second notch being formed into the first end extending towards the second end, the second notch being configured to supportingly accommodate one concrete reinforcement element.
3. The reinforcement support of claim 2, wherein the first and second notches being  
15 aligned along a common axis which extends across a portion of the channel.
4. The reinforcement support of claim 2, wherein the shell having third and fourth notches formed into the first end extending towards the second end, the first, second, third and fourth notches being spaced apart approximately uniformly around the first end.  
20
5. The reinforcement support of claim 4, wherein the alignment of the first and second notches being at approximately right angles to the alignment of the third and fourth notches.
- 25 6. The reinforcement support of claim 1, wherein the first notch has sides extending convergently away from a mouth at the first end.
7. The reinforcement support of claim 6, wherein the mouth having a mouth width, the first notch extending a distance from the first end defining a notch depth.

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## PATENT

8. The reinforcement support of claim 7, wherein, the first notch has an aspect ratio where the notch depth is greater than the mouth width.

5 9. The reinforcement support of claim 7, wherein the first notch has an aspect ratio where the notch depth is equal to or less than the mouth width.

10. The reinforcement support of claim 6, wherein said sides extend to an enlarged opening.

10 11. The reinforcement support of claim 6, wherein a generally straight end extends between said sides.

12. The reinforcement support of claim 1, wherein the first notch has an arcuate shape.

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13. The reinforcement support of claim 1, wherein the first notch terminates at an arcuate end.

14. The reinforcement of claim 13, wherein the first notch includes at least one side  
20 extending between the first end and the arcuate end.

15. The reinforcement support of claim 1, wherein the shell is polygonal in cross-section transverse to a longitudinal axis of the shell.

25 16. The reinforcement support of claim 1, wherein the shell is generally circular in cross-section transverse to a longitudinal axis of the shell.

17. The reinforcement support of claim 1, wherein, the shell having at least one vent hole extending therethrough so as to allow flow of concrete into the shell.

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18. The reinforcement support of claim 1, wherein at least a portion of the shell is of double thickness construction with overlapping material joined together.

19. The reinforcement support of claim 1, wherein a second notch is formed into the second end extending towards the first end, the second notch being configured to supportingly accommodate at least one concrete reinforcement element.

20. A method of reinforcing concrete, said method comprising:  
providing a tubular paperboard shell having first and second ends with at least one notch;  
disposing said shell at a location where concrete is to be poured;  
placing at least one concrete reinforcement element into engagement with said at least one notch; and,  
pouring concrete about said shell and said engaged at least one concrete reinforcement element.

21. The method of reinforcing concrete of claim 20, wherein the concrete reinforcement element is selected from the group consisting of wire mesh, rebar, cabling, electrical conduit, piping and tubing.

Application number / Numéro de demande: 2841569

Figures: 5, 9,

Pages: \_\_\_\_\_

12 Feb 2014

*Drawings*

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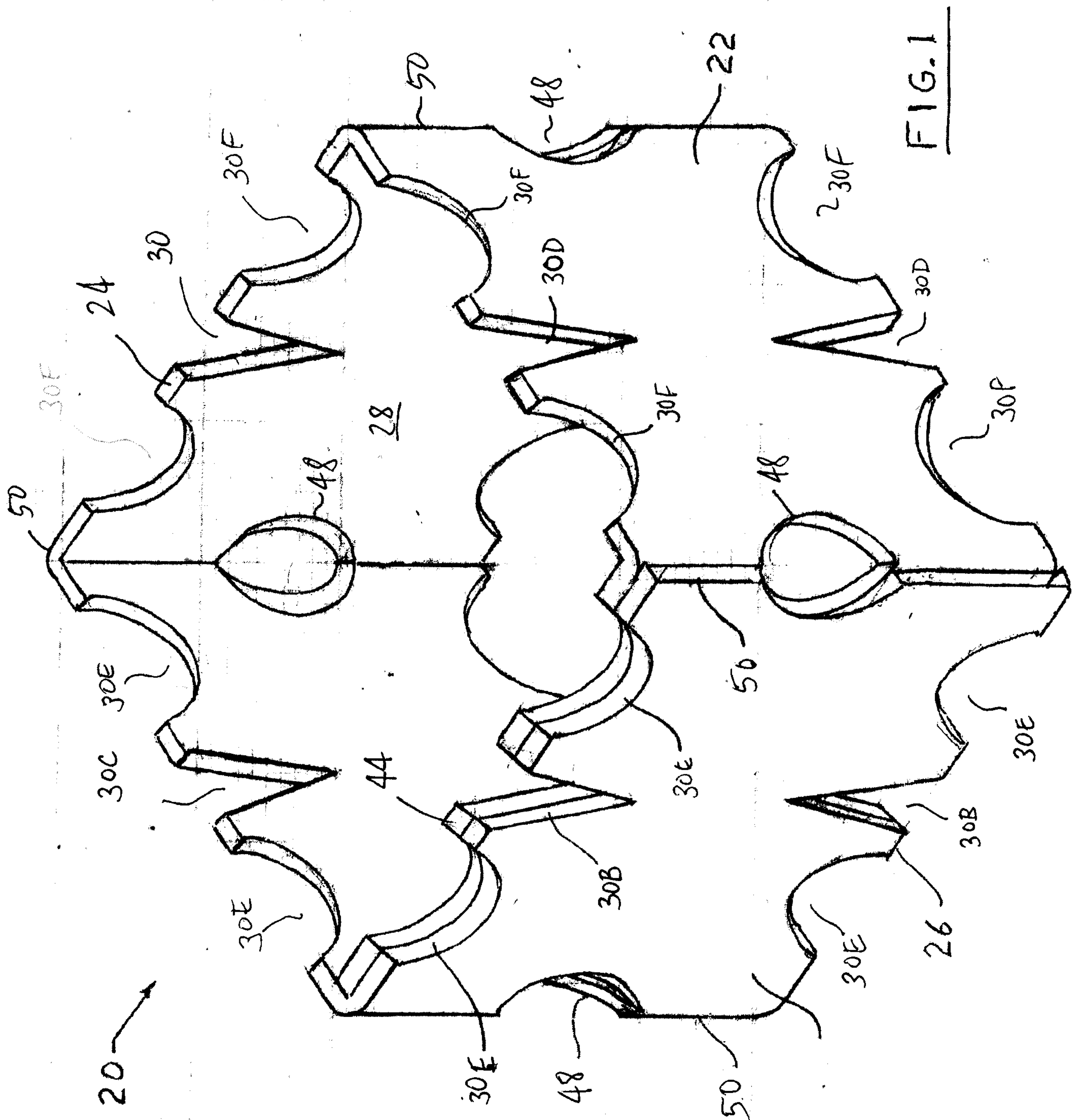
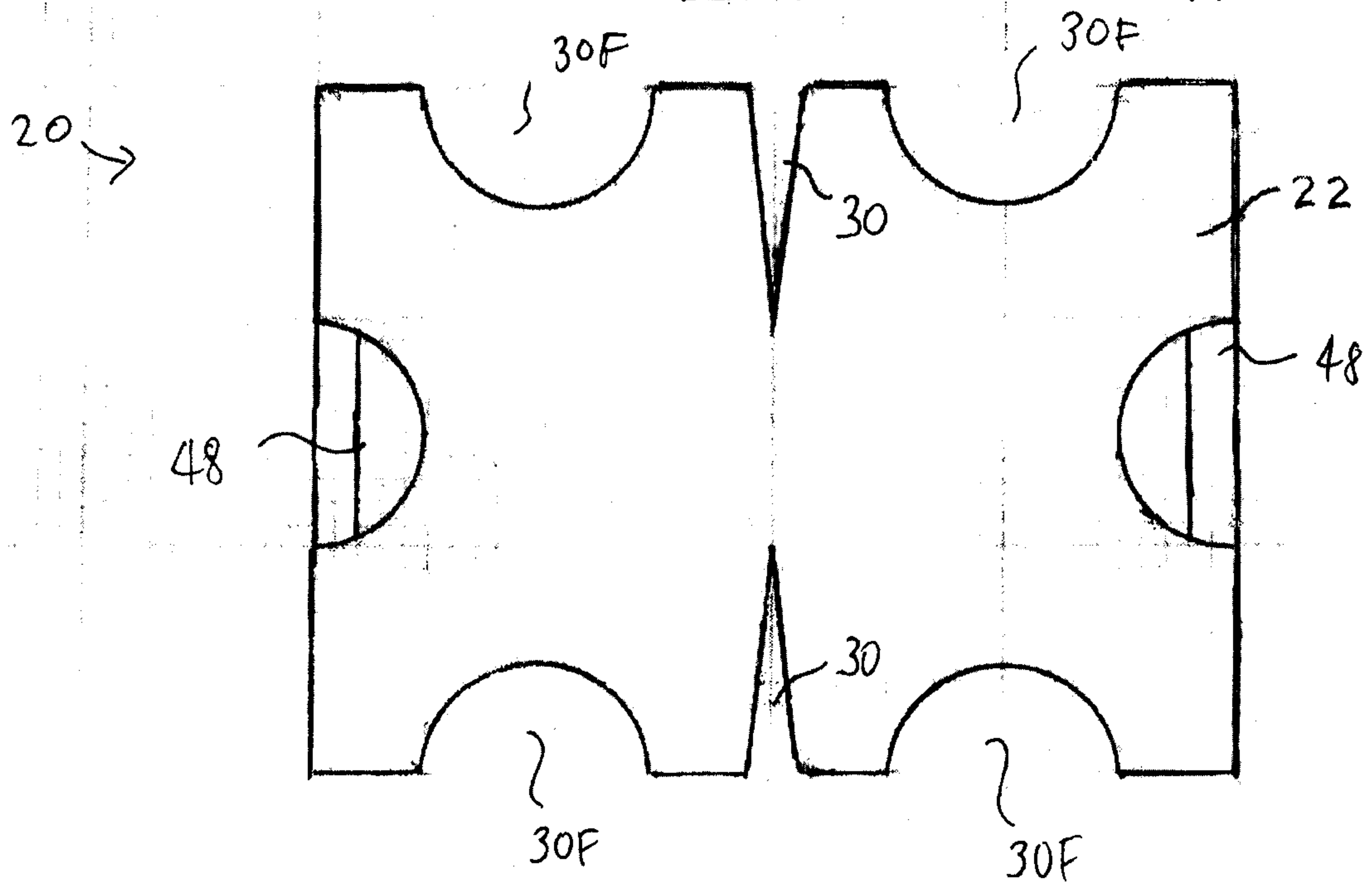
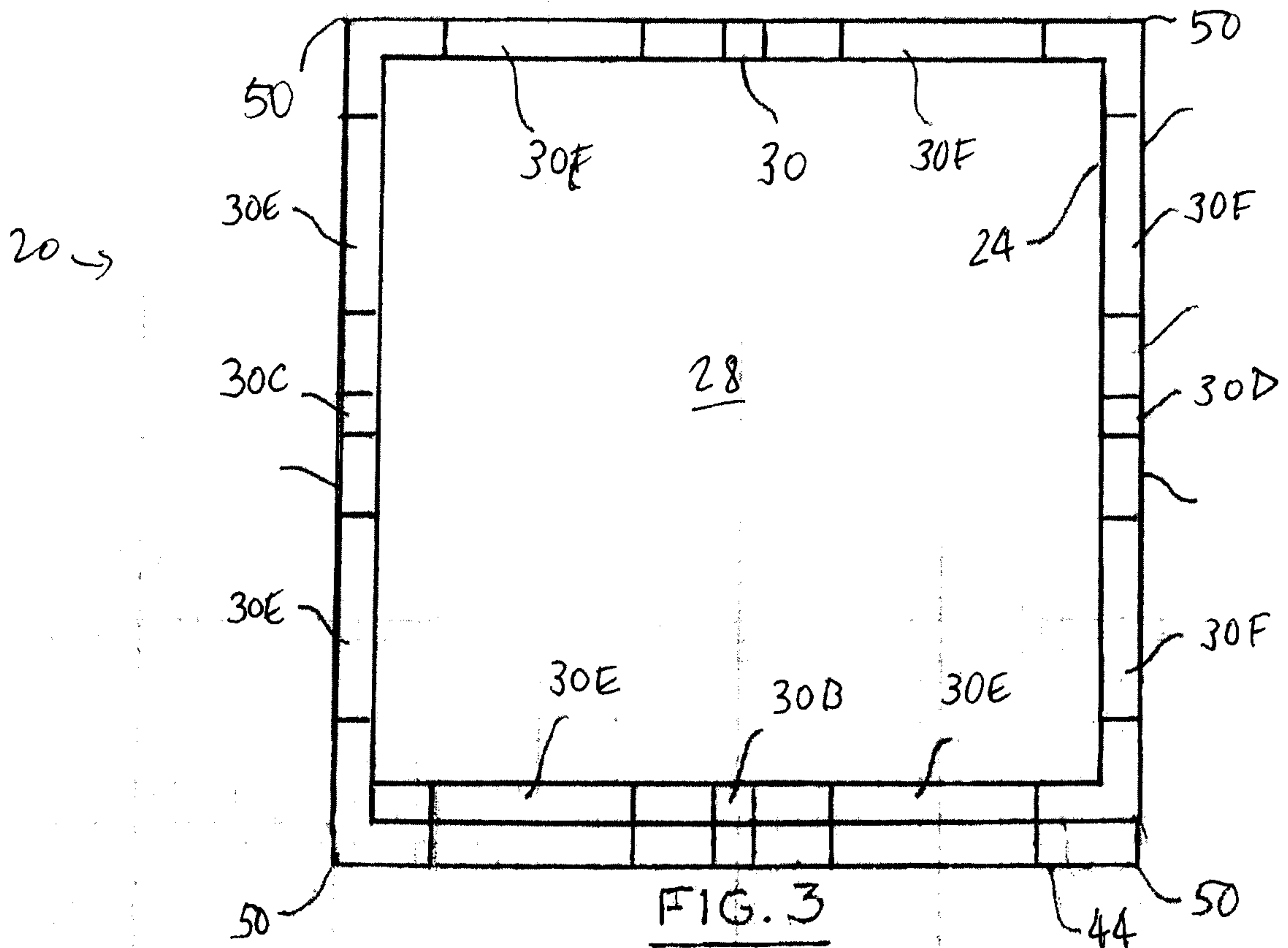
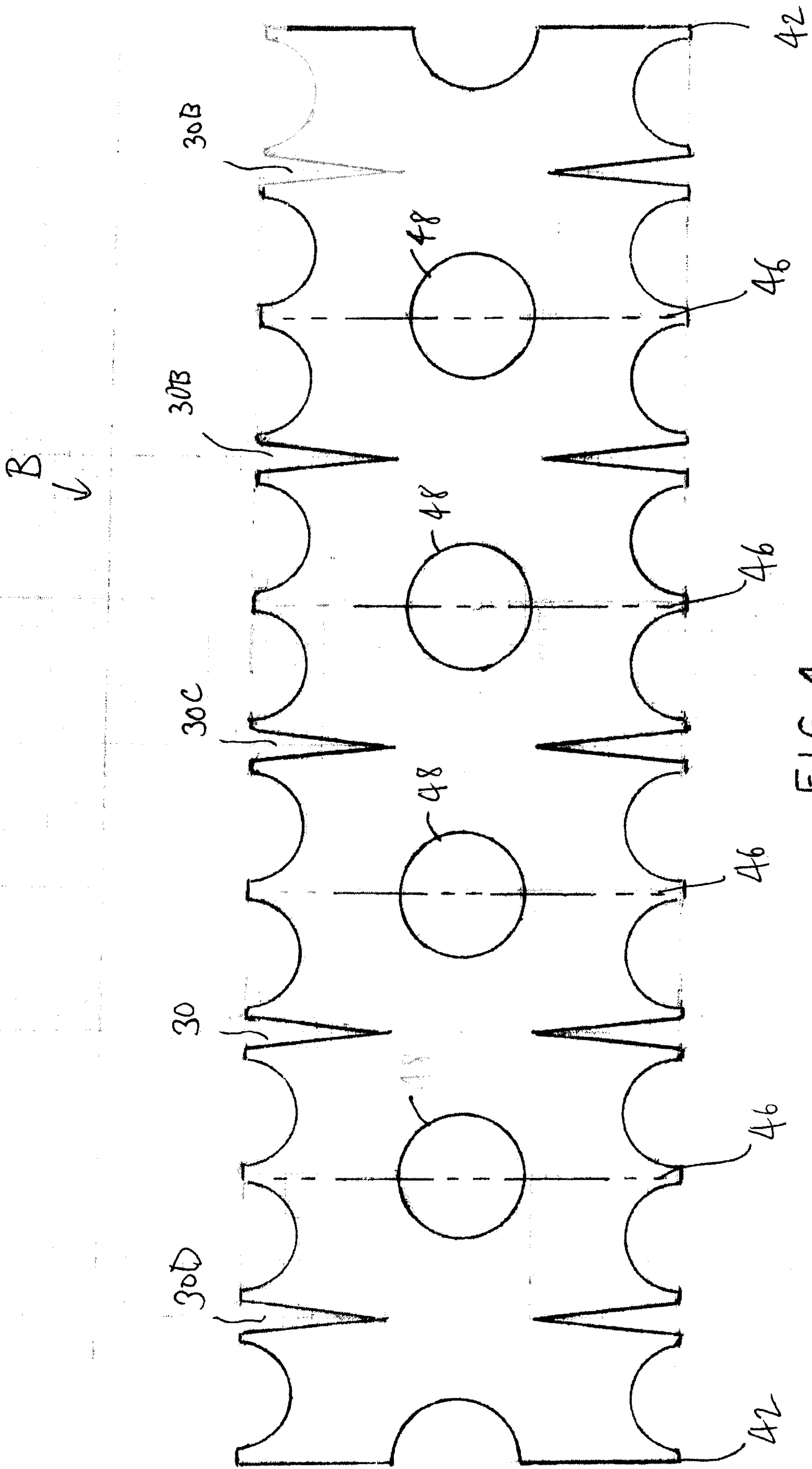
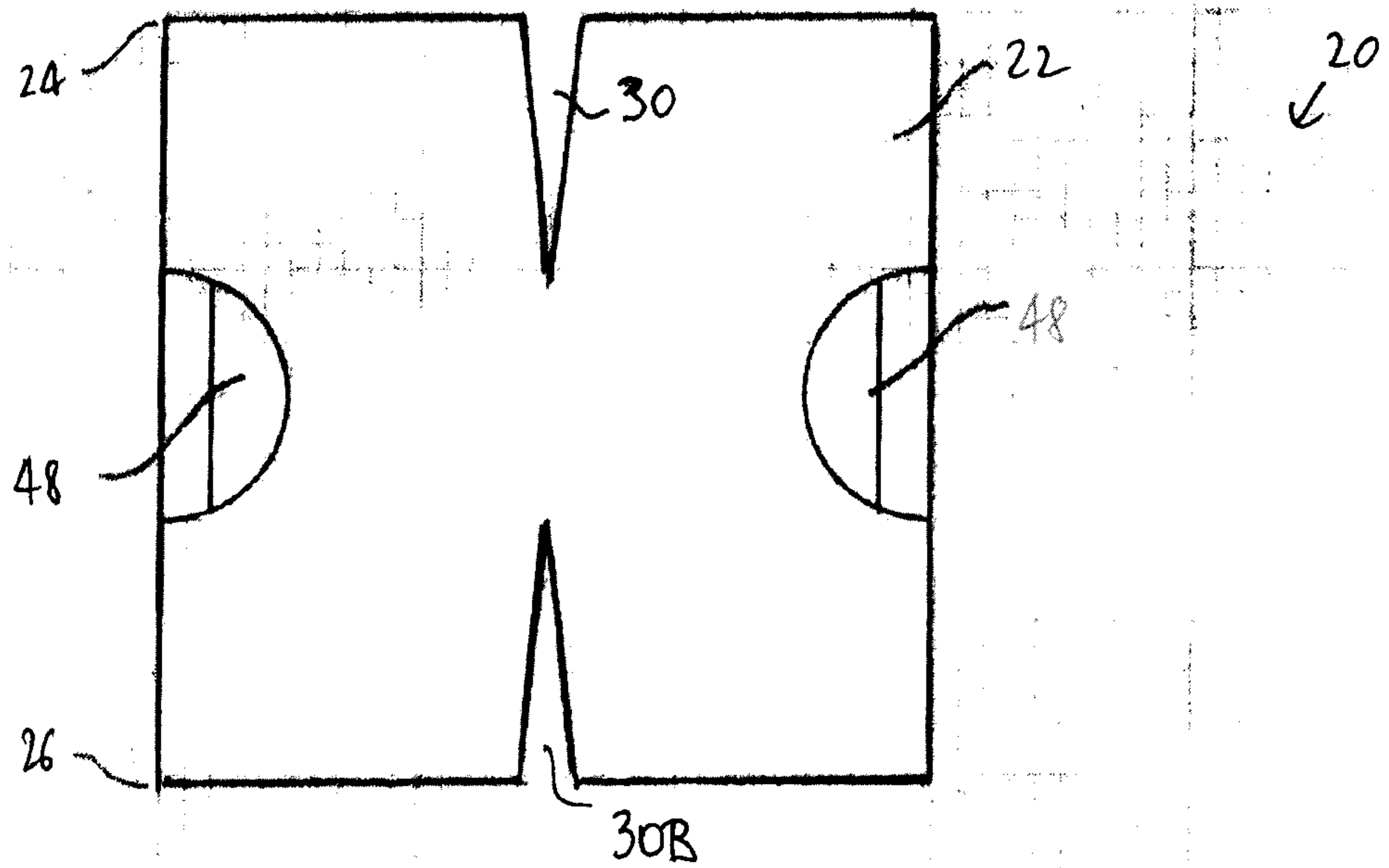
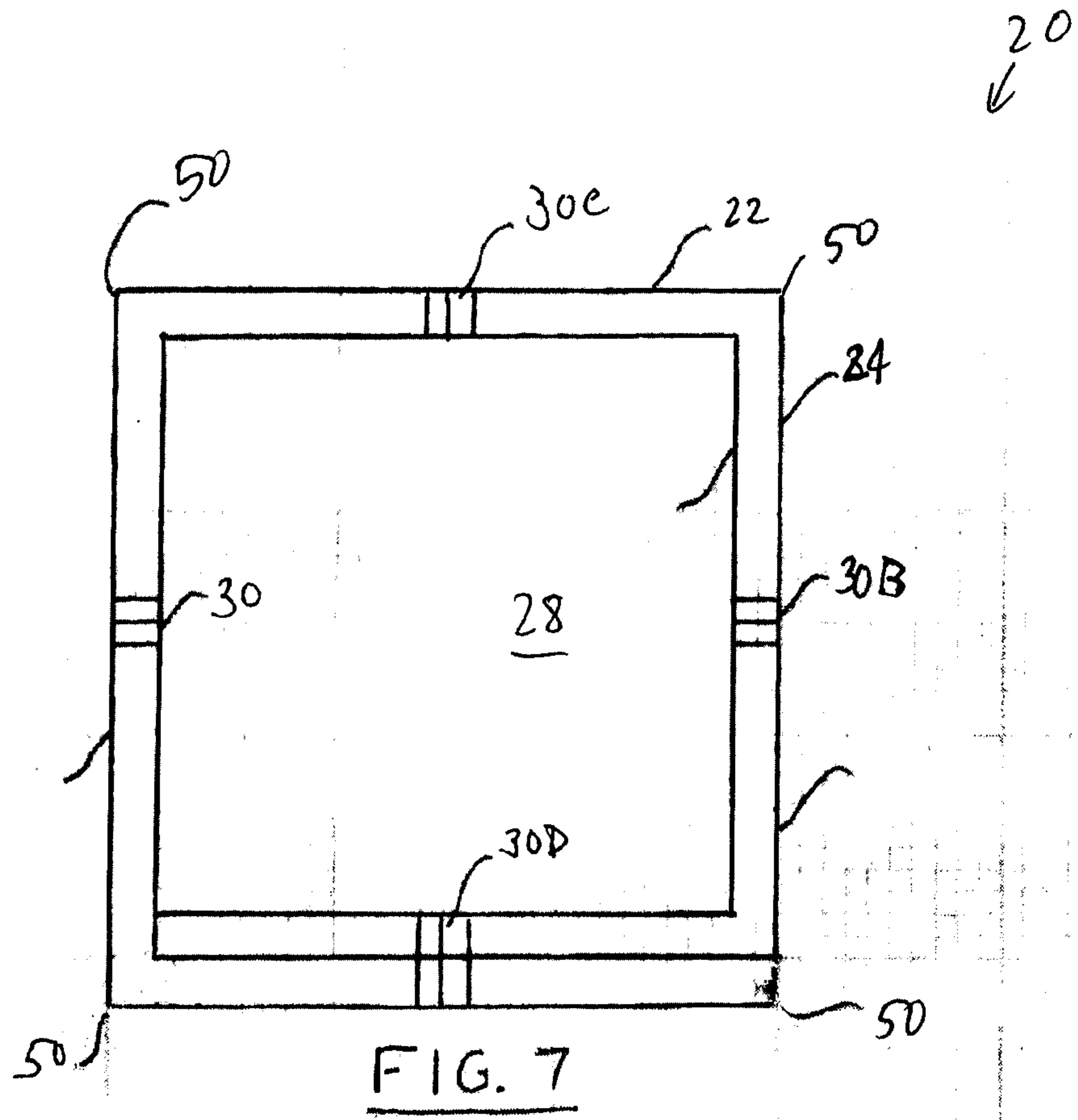


FIG. 1







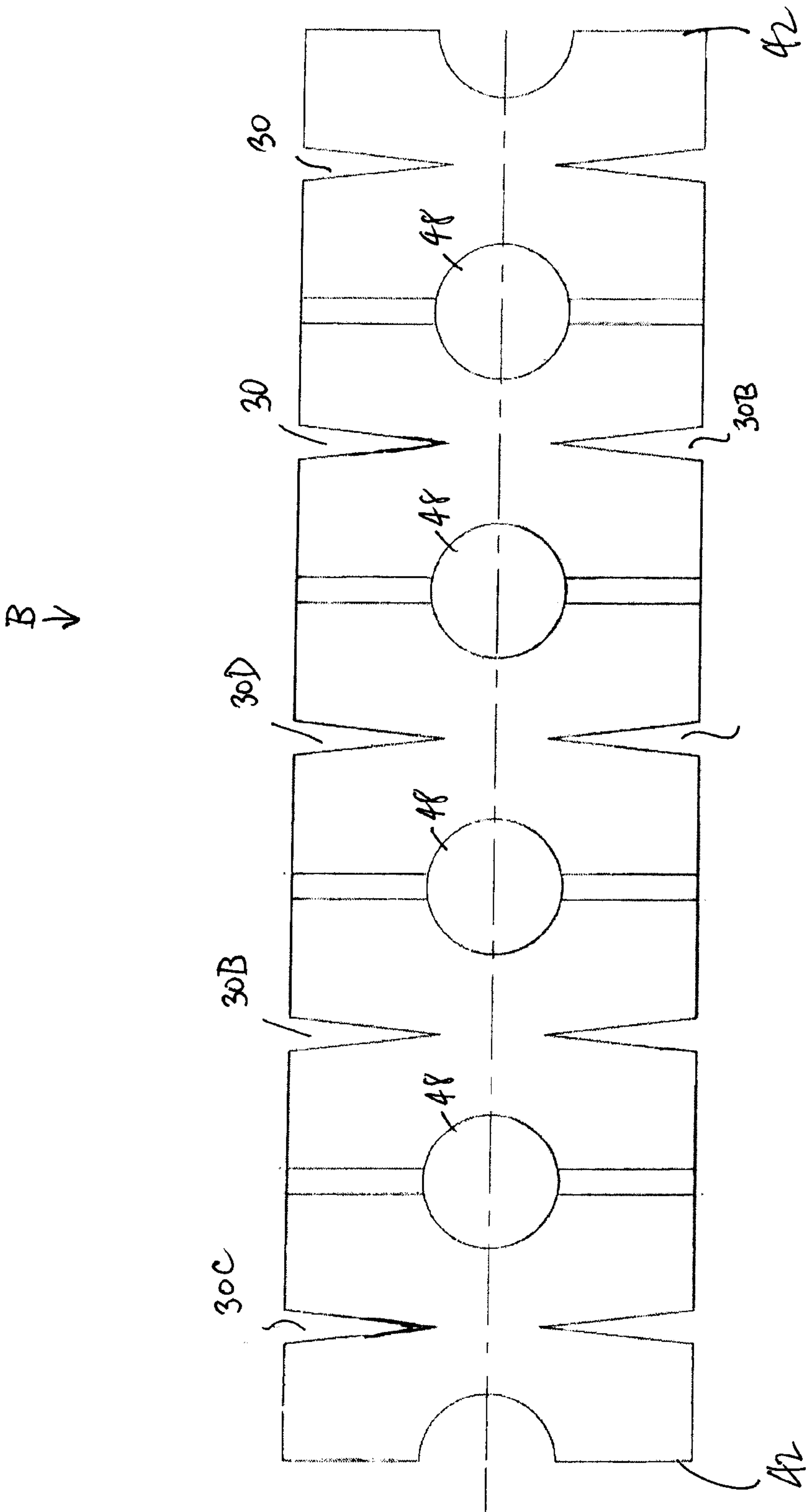


FIG. 8

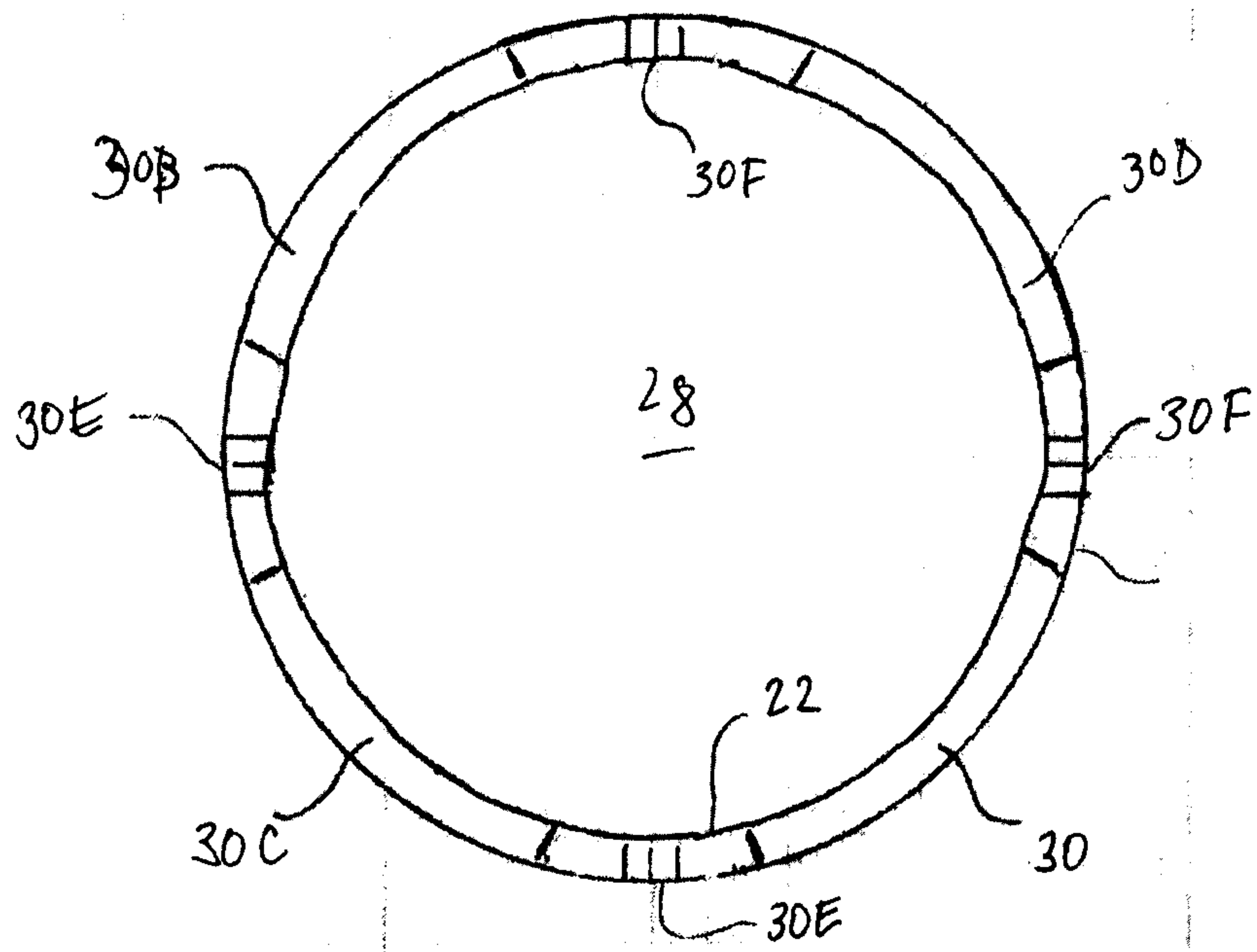


FIG. 11

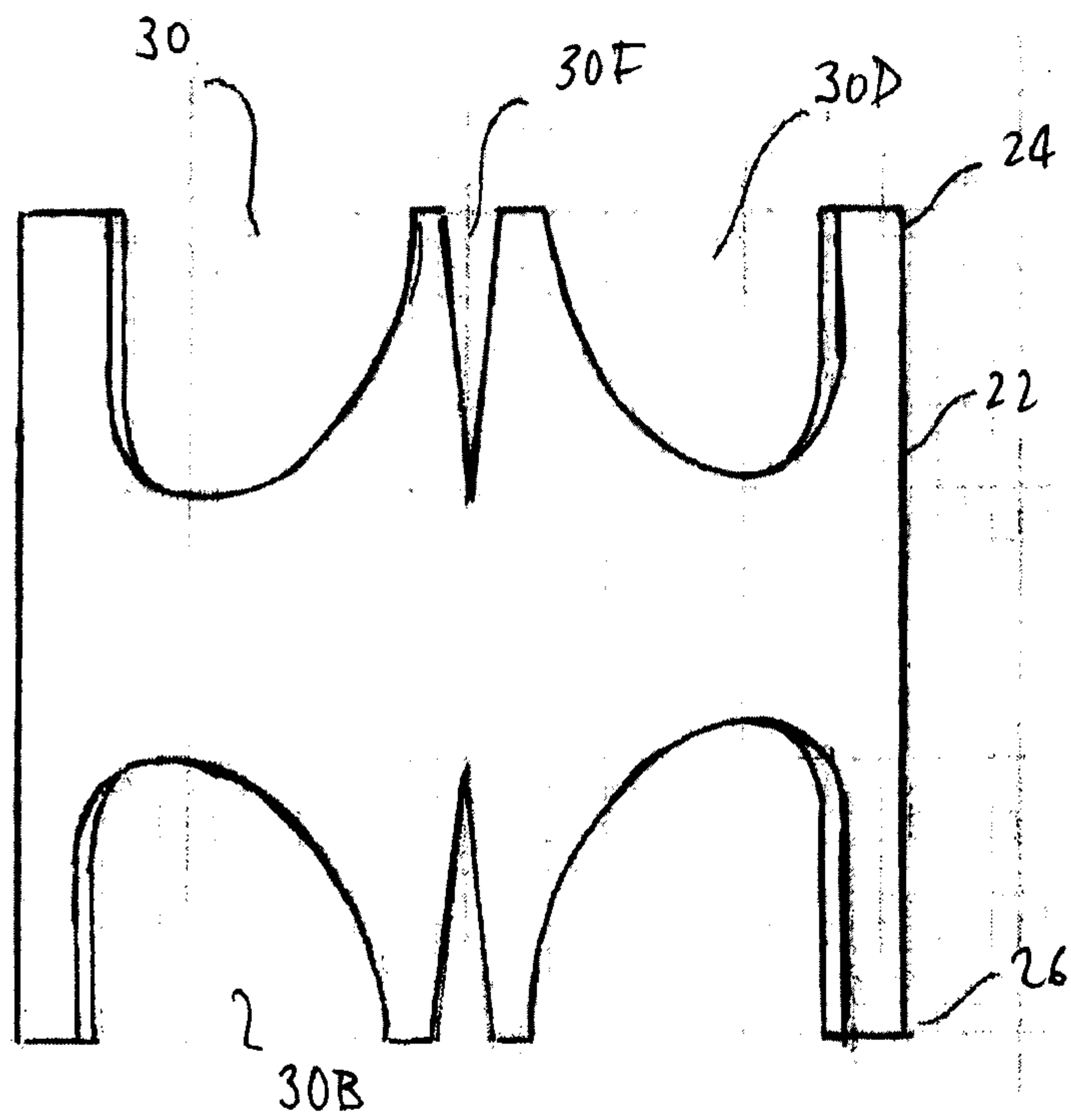


FIG. 10

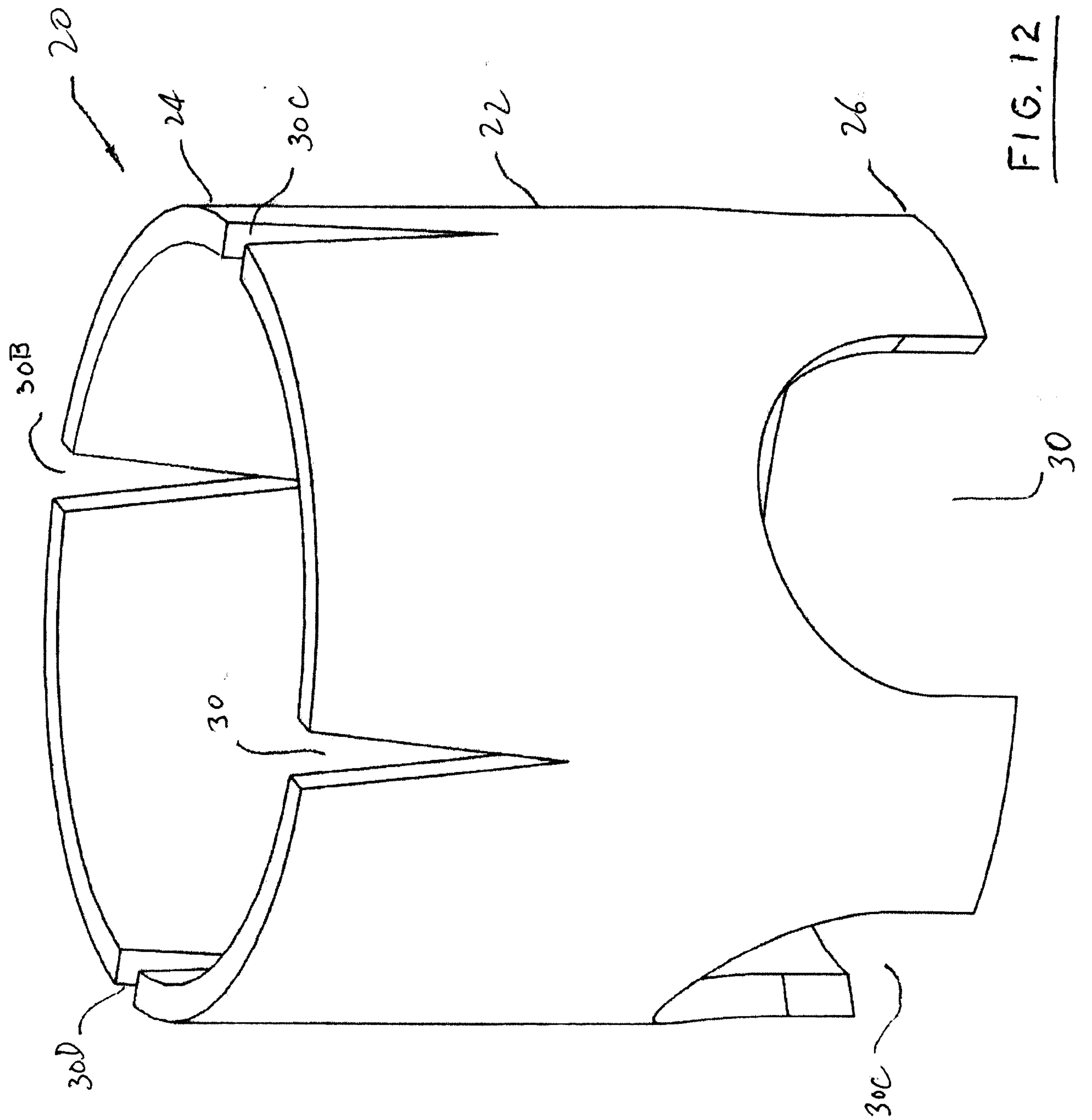


FIG. 12

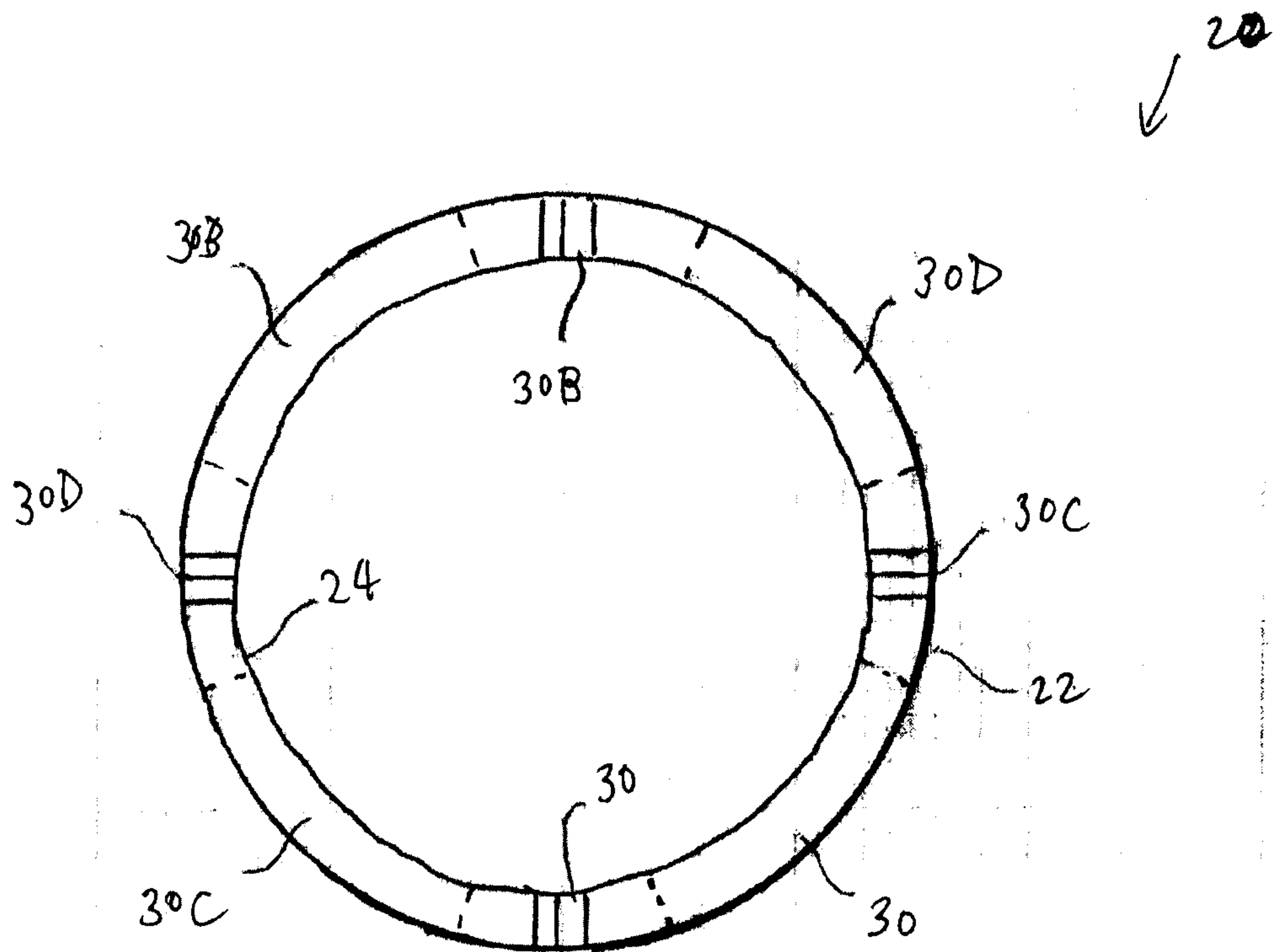


FIG. 14

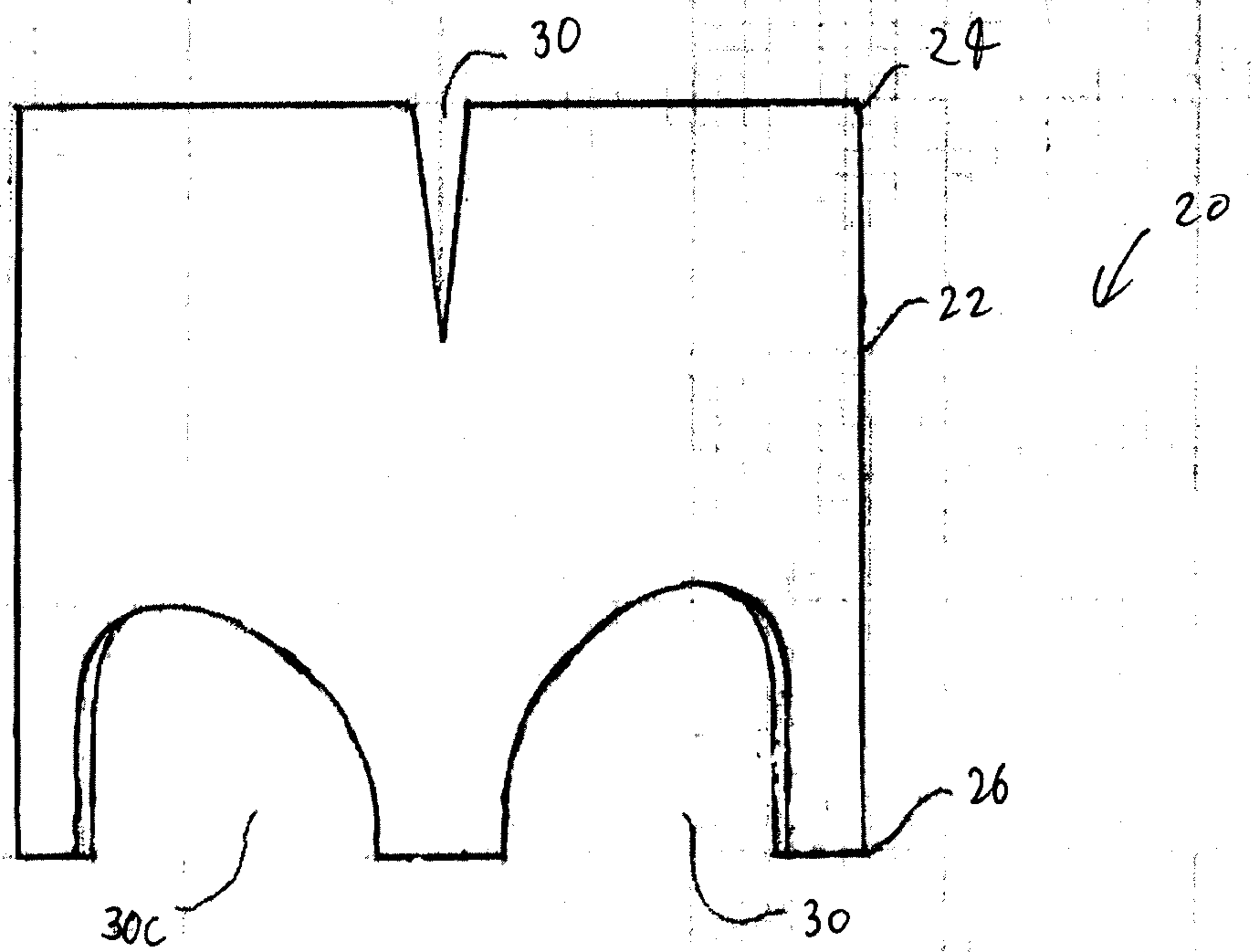


FIG. 13

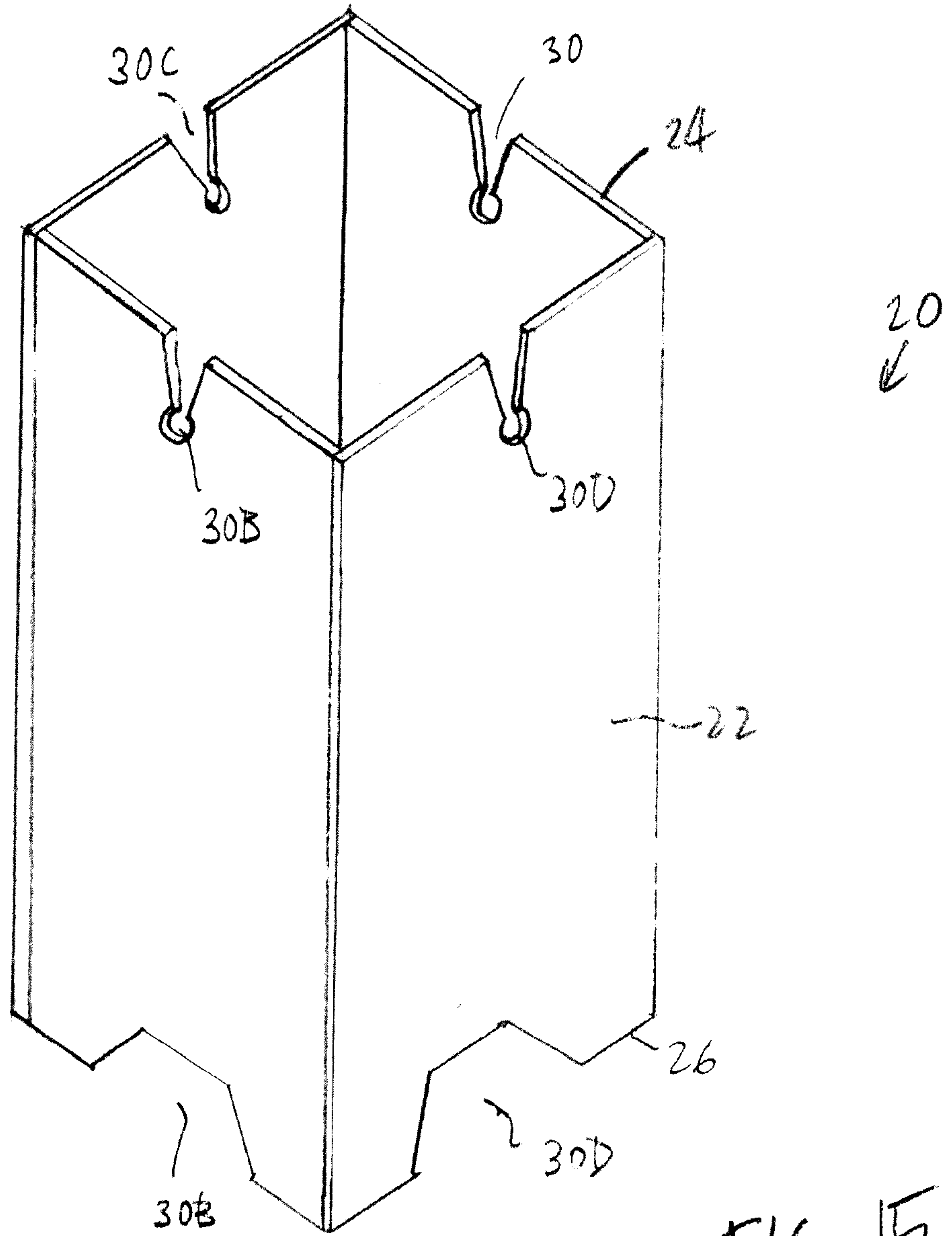


FIG. 15

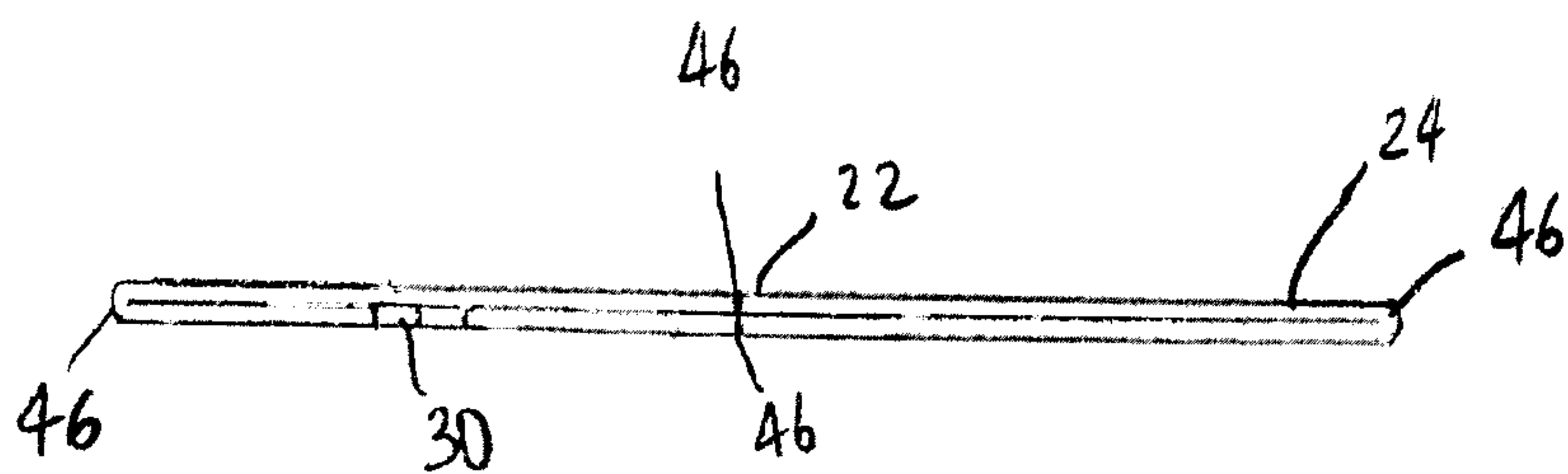


FIG. 16

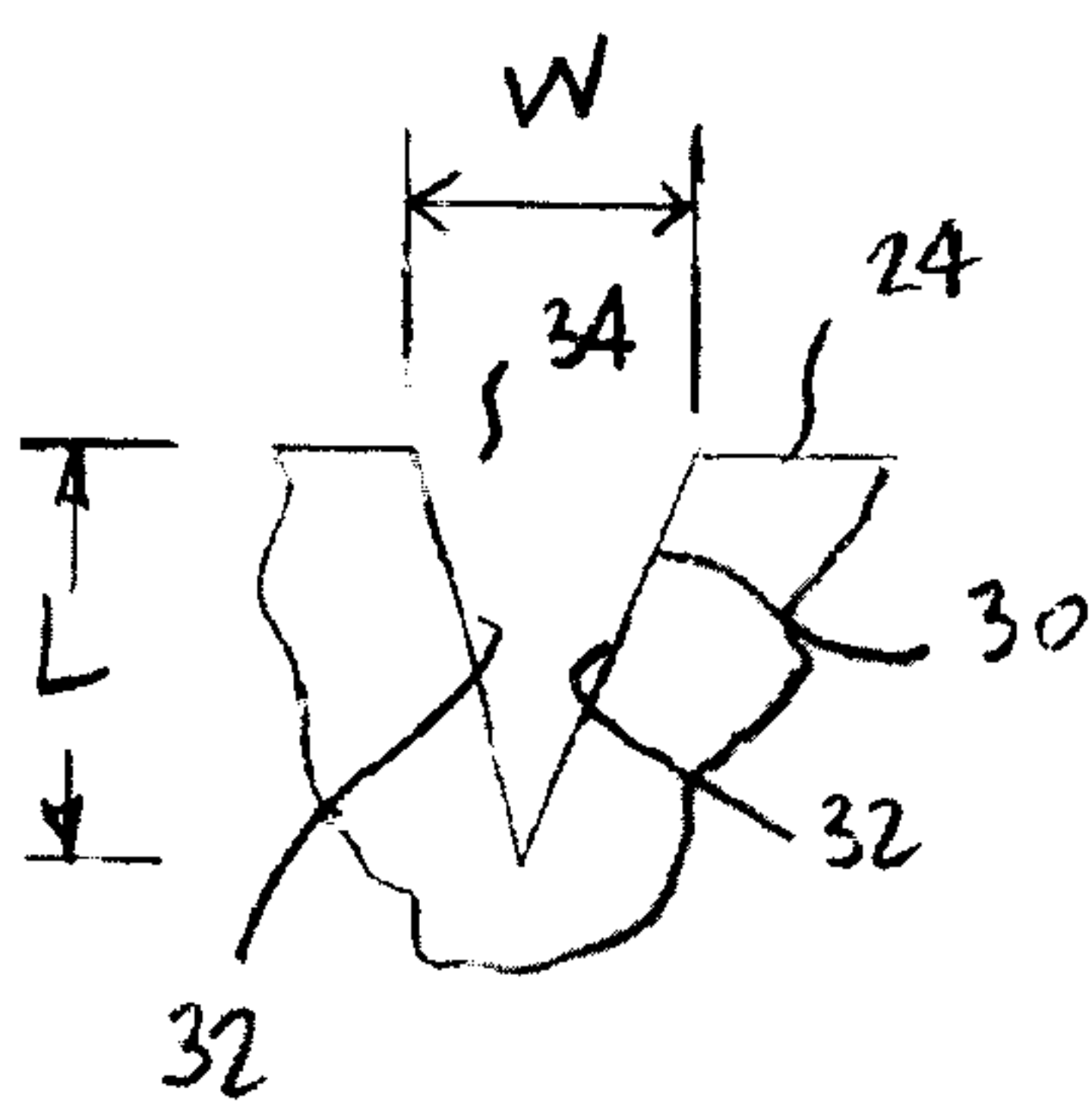


FIG. 17

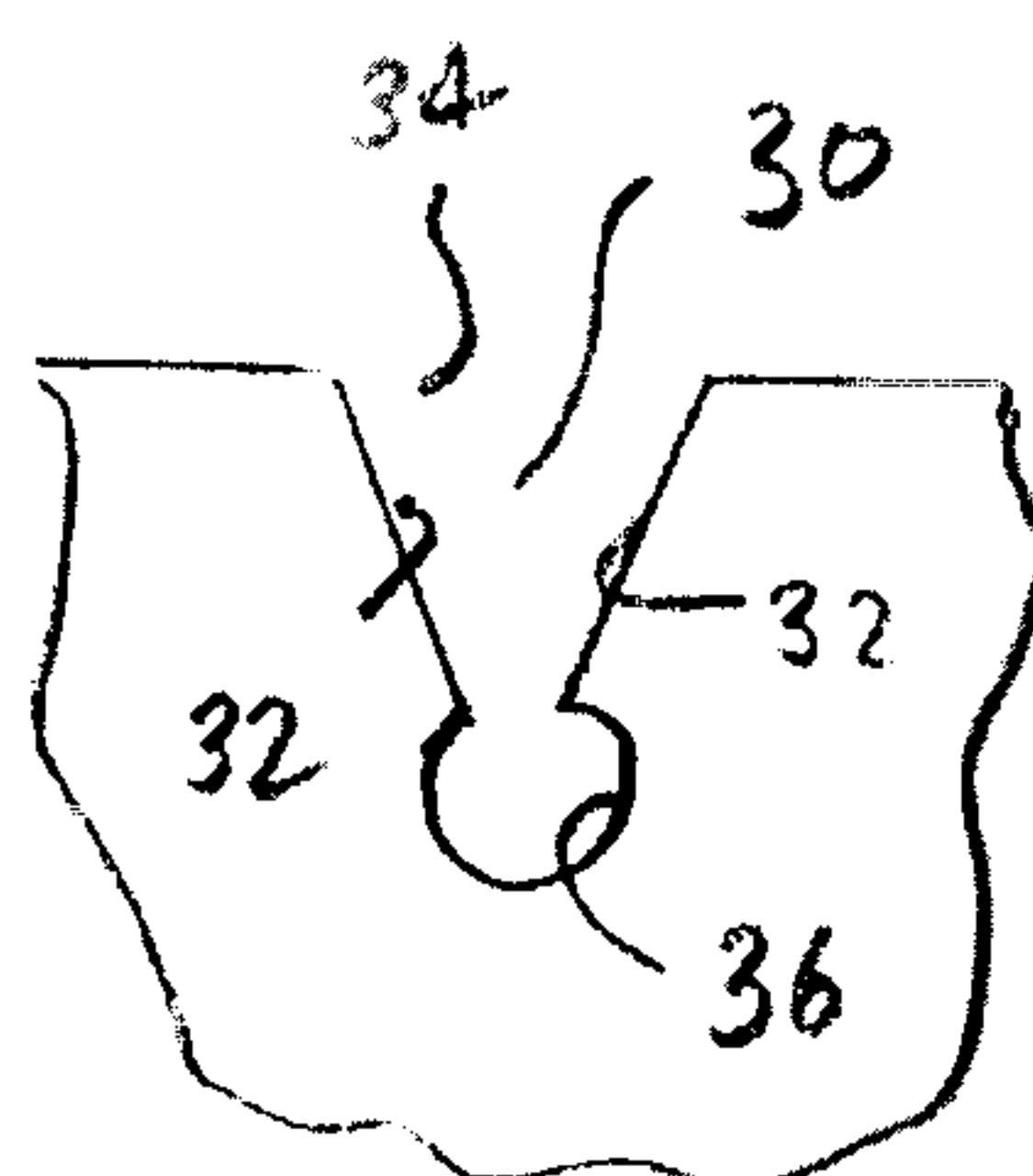


FIG. 18

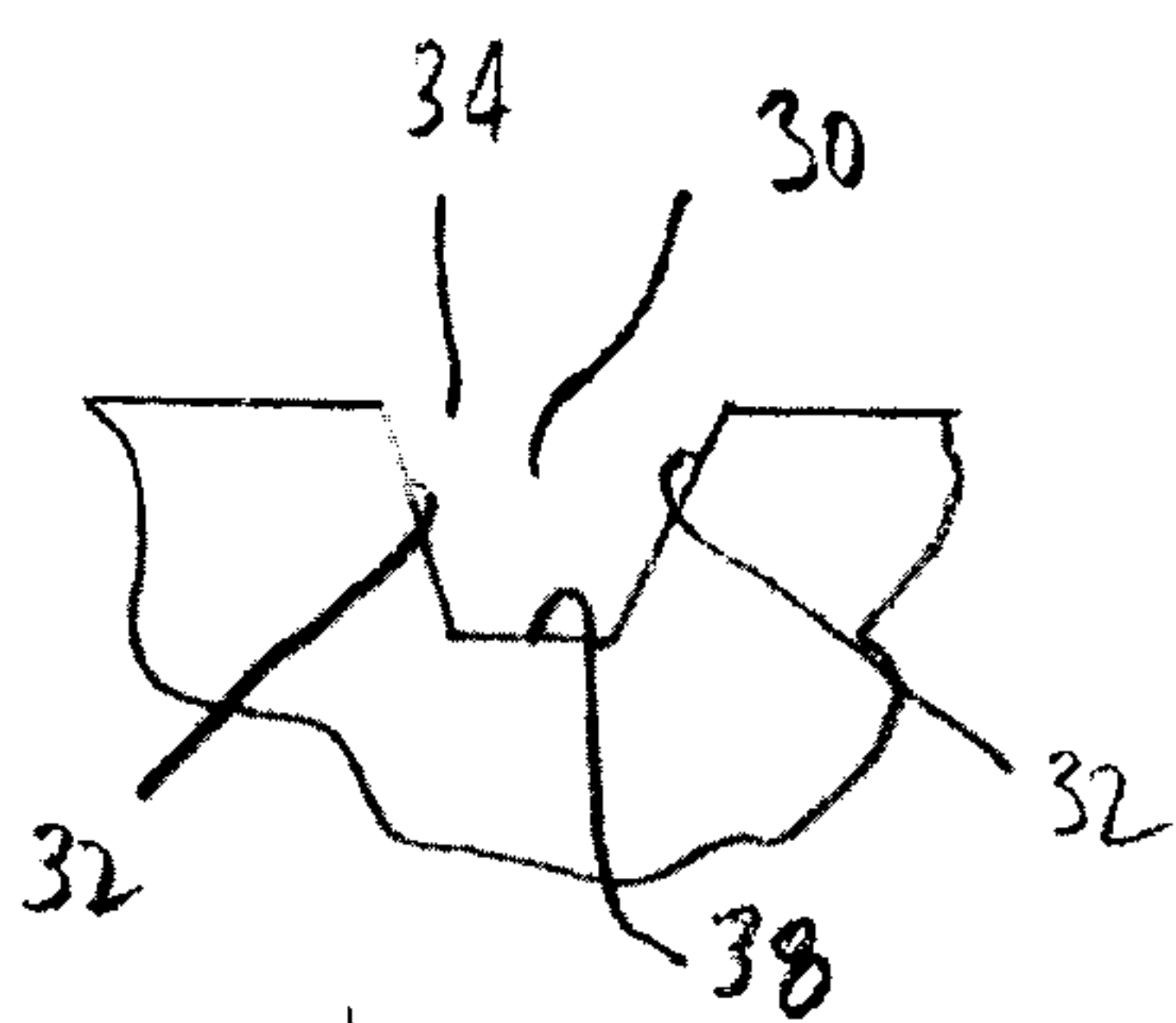


FIG. 19

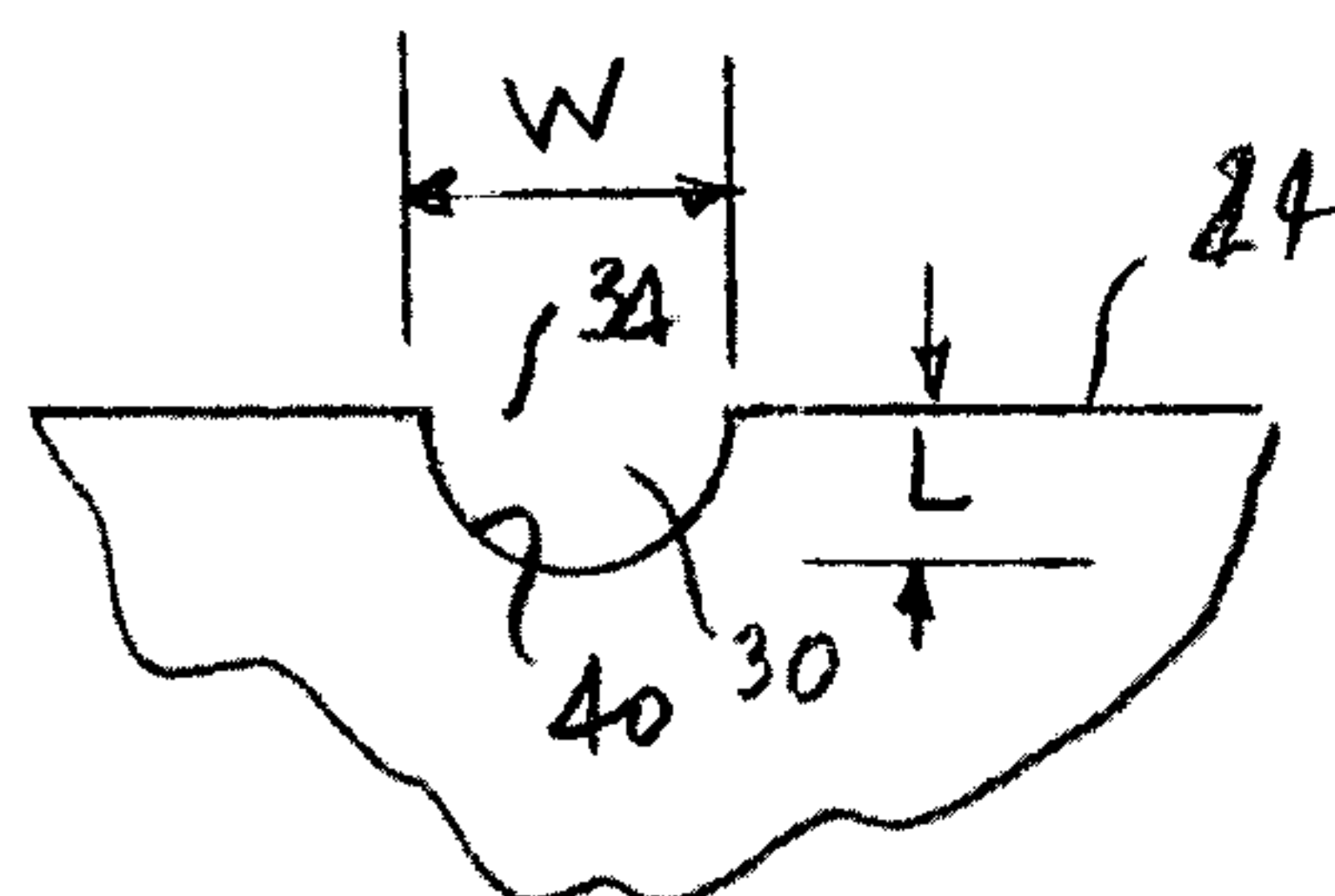


FIG. 20

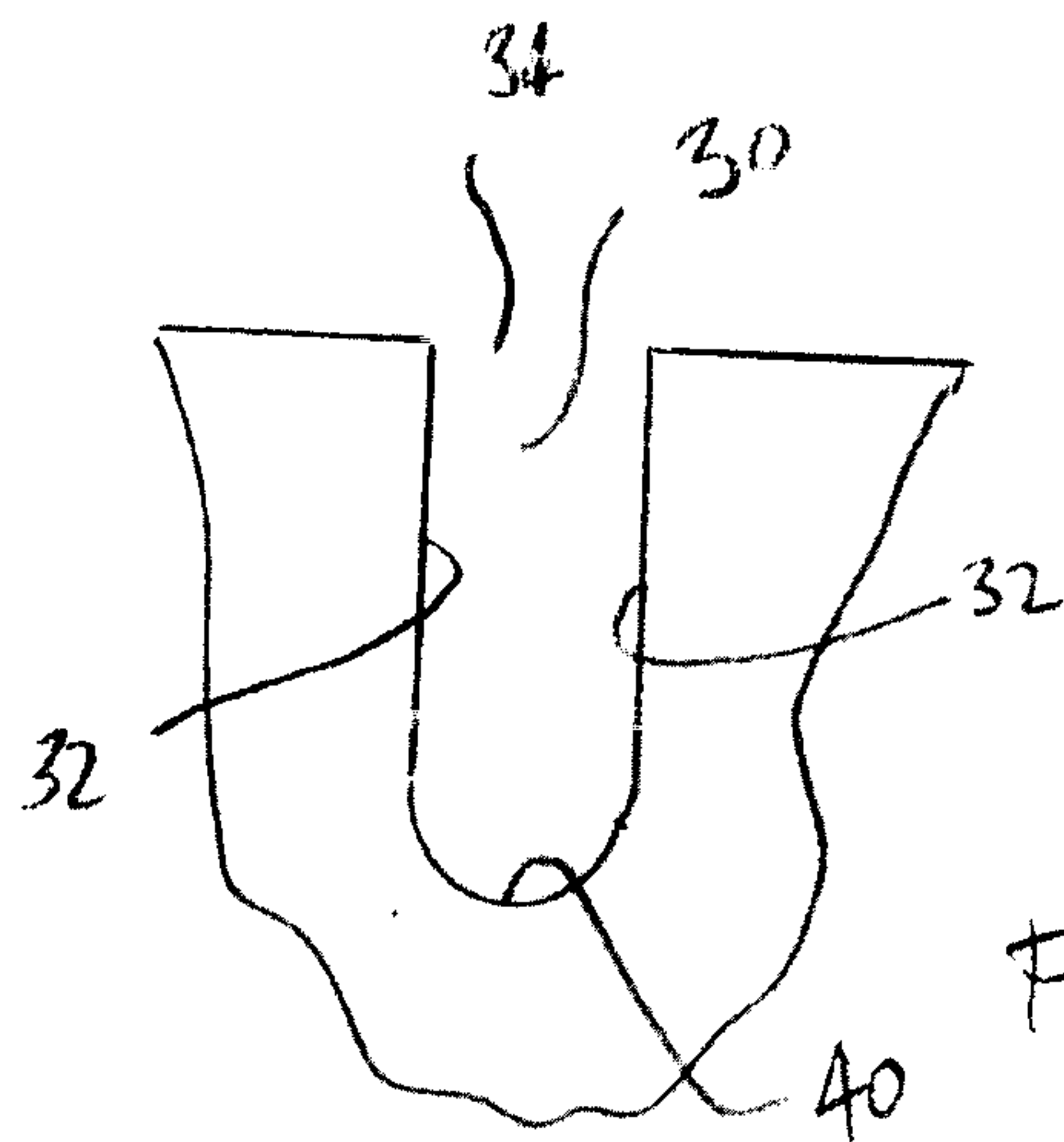


FIG. 21

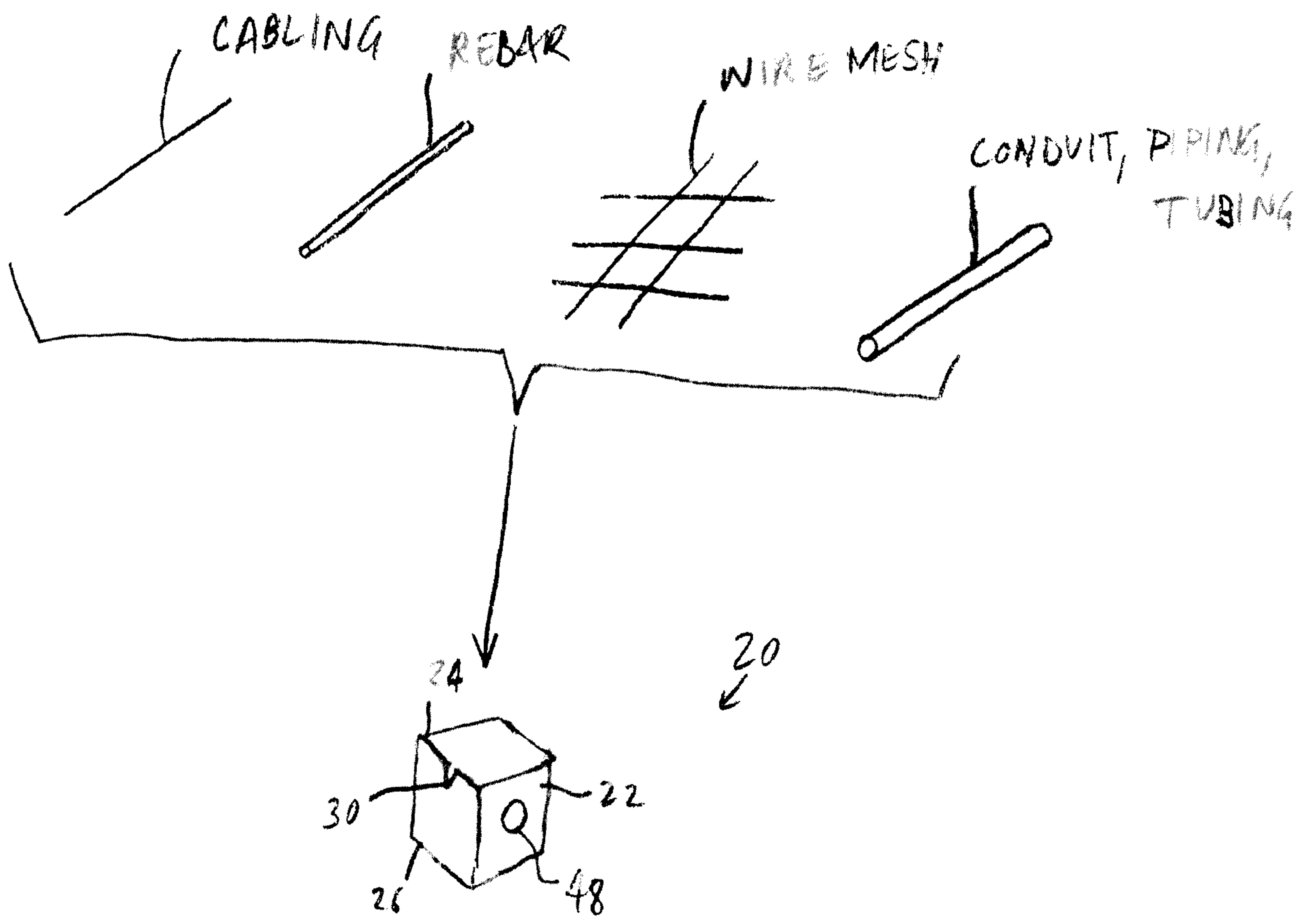


FIG. 22

