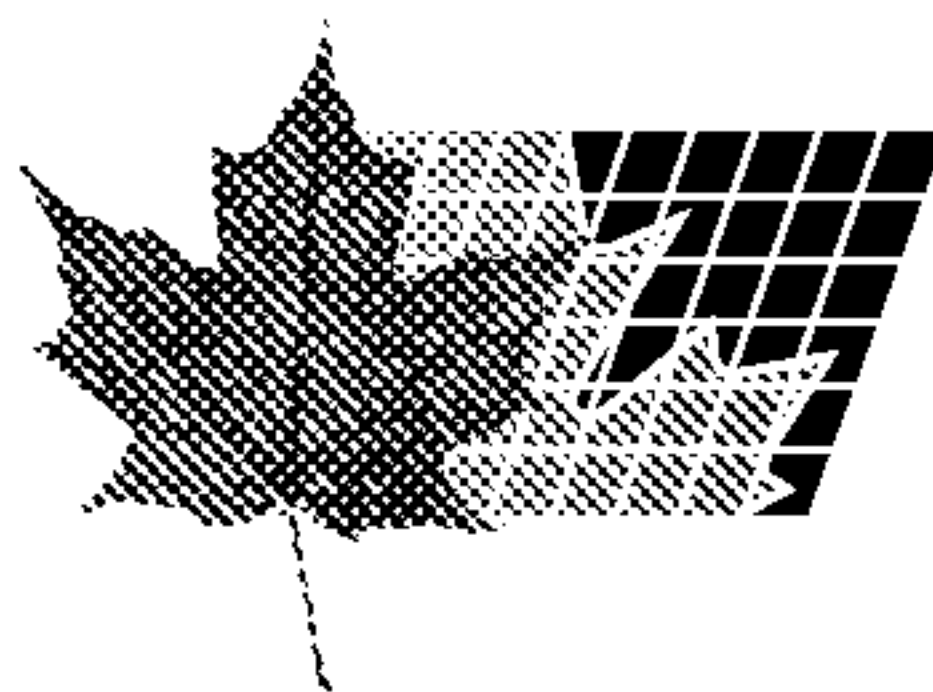




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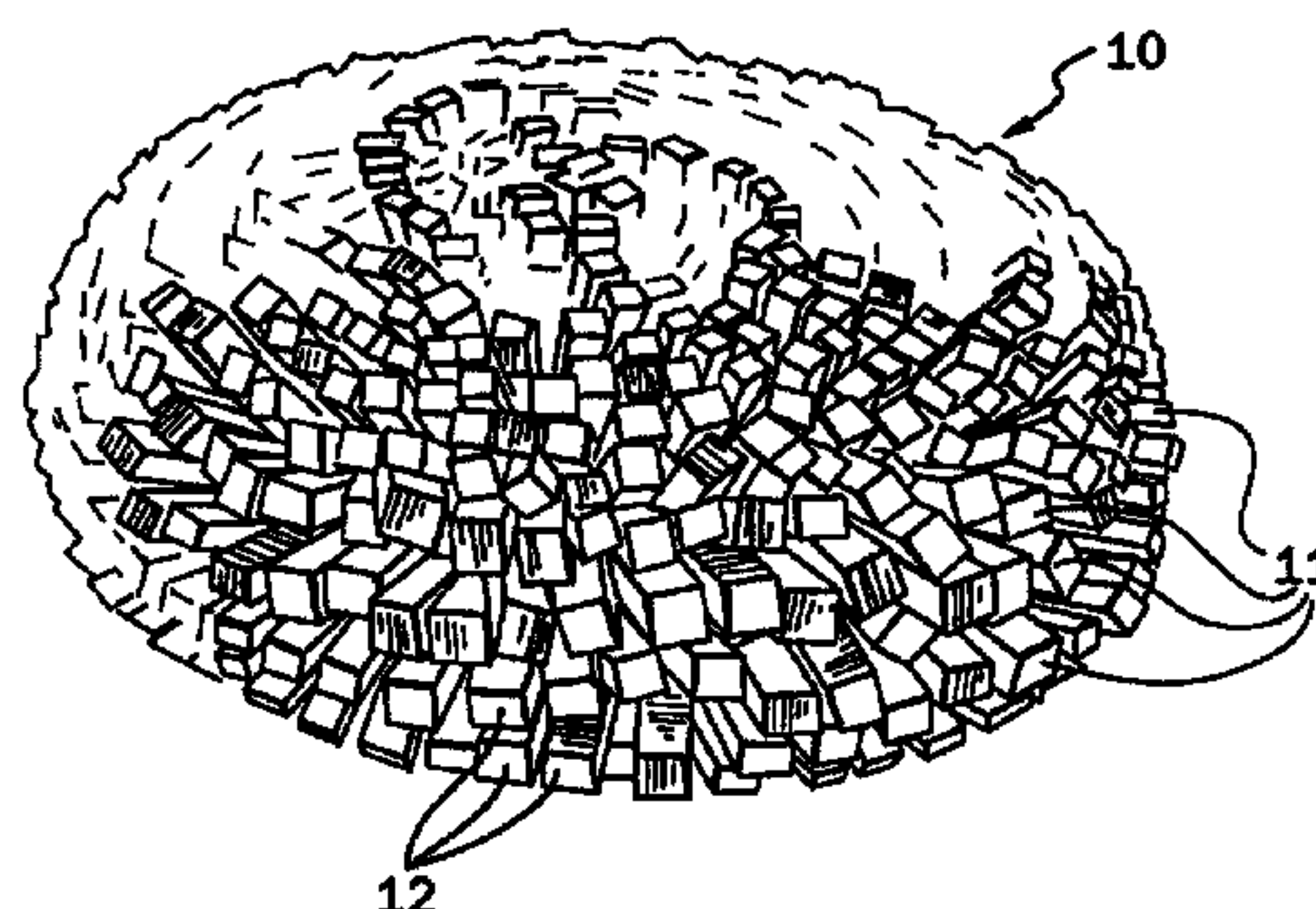
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(54) **TAMPON DE LUSTRAGE EN MOUSSE CONSTITUE
D'ELEMENTS INDIVIDUELS DE TYPE FIL ET SON
PROCEDE DE PRODUCTION**

(54) **FOAM BUFFING PAD OF INDIVIDUAL STRING-LIKE
MEMBERS AND METHOD OF MANUFACTURE THEREOF**



(57) L'invention concerne un tampon (10) de finition en mousse polymère fabriqué par fixation d'un ensemble dense d'éléments (11) individuels en mousse sur un substrat (14) de support approprié. L'élément (11) peut être fixé individuellement au substrat (14) ou fixé au substrat (14) par l'intermédiaire d'une bande (16) de mousse avec laquelle lesdits éléments ne forment qu'une seule pièce. Les éléments (11) en mousse sont, de préférence, insérés individuellement dans le substrat (14) de support et fixés audit substrat par une couche adhésive (35). Chacun de ces éléments (11) est, de préférence, plié et inséré dans une ouverture (46) préformée contenue dans le substrat de support, de sorte que chaque élément forme une paire de doigts (12) qui s'étendent depuis la face avant du substrat (14) de support. La pointe (12) extérieure de chaque doigt en mousse peut être fendue de façon à définir une pluralité de pointes de contact, ce qui augmente la surface de contact entre le tampon de finition (10) et la surface lustrée.

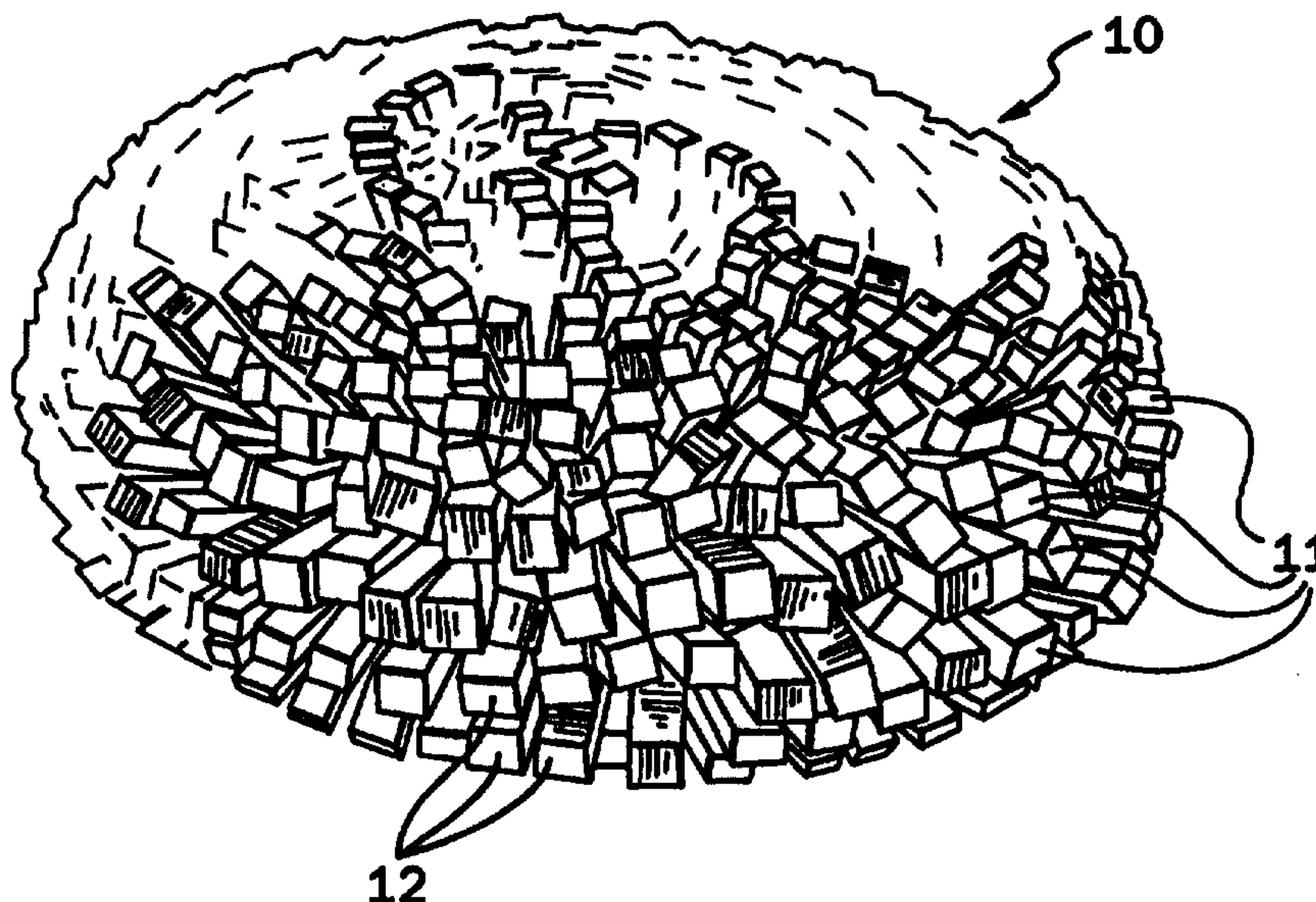
(57) A polymeric foam finishing pad (10) is made by attaching a dense array of individual foam members (11) to a suitable support substrate (14). The member (11) may be individually attached to the substrate (14) or attached to the substrate (14) by an intermediate foam strip (16) to which the members (11) are integrally joined. The foam members (11) are preferably individually inserted into a support substrate (14) and attached to the substrate by an adhesive layer (35). Each of the foam members (11) is preferably folded and inserted into a preformed opening (46) contained in the support substrate (14), such that each foam member (11) forms a pair of fingers (12) that extend from the front face of the support substrate (14). The outer tip (12) of each foam finger may be slit to define a plurality of contact tips, thereby increasing the amount of surface contact between the finishing pad (10) and the surface being finished.

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(54) Title: FOAM BUFFING PAD OF INDIVIDUAL STRING-LIKE MEMBERS AND METHOD OF MANUFACTURE THEREOF



(57) Abstract

A polymeric foam finishing pad (10) is made by attaching a dense array of individual foam members (11) to a suitable support substrate (14). The member (11) may be individually attached to the substrate (14) or attached to the substrate (14) by an intermediate foam strip (16) to which the members (11) are integrally joined. The foam members (11) are preferably individually inserted into a support substrate (14) and attached to the substrate by an adhesive layer (35). Each of the foam members (11) is preferably folded and inserted into a preformed opening (46) contained in the support substrate (14), such that each foam member (11) forms a pair of fingers (12) that extend from the front face of the support substrate (14). The outer tip (12) of each foam finger may be slit to define a plurality of contact tips, thereby increasing the amount of surface contact between the finishing pad (10) and the surface being finished.

FOAM BUFFING PAD OF INDIVIDUAL STRING-LIKE MEMBERS
AND METHOD OF MANUFACTURE THEREOF

Technical Field.

The present invention pertains to the field of foam
5 buffing and pads. More specifically, the invention is a rotary
pad made from foam string material for buffing and polishing
painted or similarly finished surfaces.

Background Art

Foam buffing pads are now used in many buffing and
10 polishing operations where synthetic or natural fiber pads, such
as tufted wool pads, had previously been used. In particular,
open cell polyurethane foam pads, with both reticulated and non-
reticulated cell structures, have become particularly popular.
However, despite certain advantages of polymer foam pads over
15 fibrous and tufted pads, there are still a number of inherent
disadvantages attendant the use of foam pads. These
disadvantages include the "chatter" or jumping of the pad by
excess frictional surface contact between flat working surface
portions of the pad and the surface of the work being finished;
20 splattering of the polish or other finishing compound as a
result of the compound being thrown radially outwardly by
centrifugal force; and, burning of the surface of the work being
finished by the high speed outer edge portions of the rotary
pad.

25 Attempts have been made to minimize or eliminate these
problems by varying the type and density of foam used and by
changing the working surface of the pads. Initially, foam pads
were made of a generally cylindrical disc with a flat planar
working face and, typically, with a radiused outer edge
30 providing the transition between the working face and the outer
cylindrical edge face. However, flat pads are particularly
subject to chatter and provide little deterrent to the splatter
of polish. Flat faced pads also give the operator little
control over variations in the working surface actually in
35 contact with the work surface being finished or polished. One
attempt at solving the problems presented by flat foam buffing
pads was the introduction of buffing pads having working
surfaces with a convoluted or waffle shape. One such pad was
previously made by Lake Country Manufacturing, Inc. Although

this pad provided variable working surface contact by varying operator-applied pressure, surface contact was somewhat difficult to control and the pad did little to prevent splatter. A different approach to solving the prior art problem is shown in U.S. Patent No. 5,527,215 where a cylindrical foam pad has a recessed center portion or portions within which the polishing compound may be trapped against radial splatter. This pad also provides the ability to alter the working surface contact by varying operator-applied pressure. However, neither of the foregoing pads adequately solves all of the prior art problems.

One recent attempt to solve the remaining problems inherent in foam buffing pads has resulted in the introduction of a pad having a working face comprising a concave central contact surface which increases radially inwardly with increasing pad compression by the operator. This pad has helped reduce chatter and improved operator control of the working surface contact area.

However, all of the foregoing foam pads are characterized by their monolithic body construction in which the foam bodies are made of a single uniform layer of foam material and, as a result, have an uninterrupted working face regardless of variations in face contour. As a result, monolithic polymeric foam pads remain subject to pad chatter, relatively rapid working surface contamination, undesirable swirl marks, and susceptibility to tearing out of large pieces of the foam body as a result of contact with obstructions during finishing operation.

As a result, foam buffing and finishing pads have never completely replaced pads made with tufted wool fibers or other natural or synthetic fibers. U.S. Patent 2,690,661 shows an attempt to provide a hybrid pad comprising a tufted construction of cotton strands to which an outer layer of cellulose material is intimately bonded. If a pad of this construction was ever commercialized, its use today is not known.

Disclosure of the Invention

In accordance with the present invention, a surface finishing pad and its method of manufacture are provided which combine all of the best features of foam pads and tufted pads

and, as a result, provides a pad capable of providing a superior finish, substantially extended wear life, superior performance, and substantially extended service time between cleanings.

In a preferred embodiment of the invention, a surface
5 finishing pad includes a support substrate and a plurality of
fingers of polymeric foam material which are disposed in a dense
array, with the fingers having outer tips which define a pad
finishing surface. The fingers may be joined to the support
substrate in one of several manners. In the preferred
10 embodiment for use as a rotary finishing pad, the support
substrate is circular. Preferably, the support substrate is
formed from a plastic material having a plurality of openings.

The polymeric foam material preferably comprises
polyurethane. More preferably, the material is an open cell
15 polyurethane which may or may not be reticulated. The outer
tips of the fingers may be loaded with an abrasive material,
such as abrasive particles. The abrasive particles may be
adhesively attached to the fingers or may be incorporated
directly into the foam material.

20 In a presently preferred embodiment of the subject
invention, a surface finishing pad comprises a support substrate
and a plurality of individual fingers of polymeric foam disposed
in a dense array on the support substrate. Each of the foam
fingers has an attachment portion that extends through the
25 substrate and is affixed to the back face of the support
substrate. Each of the fingers includes an outer tip that
extends from a front face of the support substrate, such that
the outer tips of the fingers define the pad finishing surface.

Preferably, the surface finishing pad is formed from a
30 plurality of individual foam members that are disposed in a
dense array on the support substrate. Each of the foam members
includes a first outer tip and a second outer tip. The foam
member is folded along an attachment portion positioned between
the first and second outer tips. The attachment portion of each
35 foam member is pressed through the support substrate such that
the attachment portion of the foam member extends from the back
face of the support substrate. In the preferred embodiment of
the invention, the attachment portion is adhesively attached to
the back face of the support substrate.

In a preferred embodiment, each of the first and second outer tips of the foam member includes a pair of slits extending into the body of the foam member from the respective outer tip. The pair of slits divide each of the outer tips into
5 four contact tips, thereby increasing the amount of surface contact between the surface finishing pad and the painted surface to be finished.

One embodiment of a method for manufacturing a surface finishing pad, in accordance with the present invention,
10 includes the steps of (1) providing a support substrate having a front face and a back face, (2) forming a plurality of individual foam members each having a first outer tip and a second outer tip, (3) folding each of the foam members to form an attachment portion between the first and second outer tips,
15 (4) pushing the attachment portion of each foam member through an opening in the support substrate, and (5) securing the attachment portion to the back face of the support substrate. The foam members may be attached to the support substrate by an adhesive layer, a series of staples, the friction fit between
20 the foam members and the support substrate, or an equivalent method.

Additionally, the method of manufacturing the surface finishing pad can include the step of slitting the outer tip of each foam finger along a pair of orthogonally disposed slit
25 lines. After each outer tip has been slit, each outer tip will include a plurality of contact tips that can be used in surface finishing.

Various other features, objects and advantages of the invention will be made apparent from the following description
30 taken together with the drawings.

Brief Description of the Drawing Figures

The drawings illustrate the best mode presently contemplated of carrying out the invention.

In the drawings:

35 Fig. 1 is a top perspective view of a surface finishing pad of the present invention made in accordance with the method of a first embodiment.

Fig. 2 is a bottom plan view of the finishing pad shown in Fig. 1.

Fig. 3 is a vertical section taken on line 3-3 of Fig. 2 and additionally showing a backing plate.

Fig. 4 is a view similar to Fig. 3 showing an alternate backing plate attachment.

5 Figs. 5A and 5B are sectional details showing alternate attachment mechanisms for the polymeric foam strip used to make pads of the present invention.

Fig. 6A is a perspective view of a section of the polymeric foam strip of Figs. 5A and 5B.

10 Fig. 6B-6E are generally schematic representations of the method for making the finishing pad shown in Figs. 1-3.

Fig. 7 is a top plan view of an alternate form of the polymeric foam strip used in making finishing pads of the subject invention.

15 Fig. 8 is a top plan view of a finishing pad in accordance with another embodiment of the invention.

Fig. 9 is a side elevation view of the pad shown in Fig. 8.

20 Fig. 10 is a top plan view of a pad showing a further embodiment of the present invention.

Fig. 11 is a side elevation of the pad shown in Fig. 10.

25 Fig. 12 is a top perspective view of a surface finishing pad of the present invention made in accordance with the method of the preferred embodiment.

Fig. 13 is a bottom plan view of the finishing pad shown in Fig. 12.

Fig. 14 is a vertical section taken on line 14-14 of Fig. 13 and additionally showing a backing plate.

30 Fig. 15A is a perspective view of an individual foam member used to make the pads of the present invention.

Fig. 15B is a perspective view of the foam member shown in Fig. 15A, further including a series of slits formed in accordance with the method of the preferred embodiment.

35 Figs. 15C and 15D are sectional details illustrating the method of inserting each individual foam member into the backing member.

Fig. 15E is a sectional detail showing the securing method for the foam member of the present invention.

Fig. 15F is a detailed perspective view of the foam member as inserted through the support substrate.

Fig. 16A is a side elevation view of the support substrate and the individual foam members inserted therethrough.

5 Fig. 16B is an inside view of the finishing pad shown in Fig. 16A as molded in accordance with the preferred embodiment of the invention.

Fig. 16C is an exploded side view of the finishing pad and backing plate.

10 Detailed Description of the Invention

Fig. 1 shows a polymeric foam pad 10 adapted to be used as a buffing or surface finishing pad, such as for automotive paint surface finishing. The pad is comprised of a large number of relatively closely packed foam fingers 11, the individual outer tips 12 of which form the primary active finishing surface of the pad. The base ends 13 of the fingers 11 are attached to a pad substrate 14, as may be seen in the backside view in Fig. 2. The fingers 11 may be formed and attached to the substrate 14 in a number of different ways, as will be described hereinafter. The polymeric foam material is typical of that commonly used in paint finishing pads and may comprise, for example, an open cell polyurethane which may be reticulated or unreticulated. A characteristic difference between finishing pads of the present invention and pads of the prior art is that the pads of this invention are not in the form of a single monolithic layer of foam, but rather are comprised of a dense array of individual fingers.

Finishing pads of the subject invention may be made of either curved or flat construction, both of which are well known in the art. A curved pad is one in which the substrate is formed with a curved outer edge so that the foam wraps around and forms a laterally projecting peripheral buffing or finishing surface, such as shown in Fig. 3. As the name suggests, flat pads simply have a flat substrate, although the surface of the foam pad may be suitably contoured as desired.

35 The pad shown in section in Fig. 3 may be manufactured in accordance with a first method which will be described with respect to Figs. 6A-6E. A long continuous strip 15 of a suitable foam material is formed, as for example in a rotary die

cutter, with an elongate body 16 and a series of integral laterally projecting and longitudinally spaced fingers 17. The strip 15 is sewn to a fabric substrate 18 which, conveniently, may comprise a conventional burlap or jute backing commonly used in the manufacture of tufted wool buffing pads. The strip 15 is sewn to the substrate 18 on a spiral stitch line 20 which extends longitudinally along the body 16 of the strip. The compression of the body 16 along the stitch line 20 causes the fingers 17 to turn upwardly, as shown in Figs. 5A and 6C. Conveniently, stitching may commence at the radial outer edge of the substrate and spiral inwardly to the end of the strip 15 near the center of the substrate, as may best be seen with reference to Fig. 6B.

The flat fabric substrate 18 having the foam strip 15 sewn thereto, as shown in Fig. 6C, may then be processed in a number of different ways to provide the unique foam fingered pad of the present invention. Referring also to Figs. 6D and 6E, the substrate 18 may be curved by heat forming the back face of the substrate to a plastic backing 21 in a suitably shaped mold to provide an upturned peripheral edge 22 on the pad. In addition to the use of a woven natural fiber for the substrate 18, the substrate may also be made from woven synthetic fibers, woven fibers (either natural or synthetic) which are impregnated with a plastic, or solid plastic.

The pad 10 may then be mounted on a buffing machine in any of several alternate ways. As shown in Fig. 6E and in Fig. 3, a sheet 23 of loop material, for a conventional hook and loop type fastening system, may be bonded or otherwise adhesively attached to the exposed face of the plastic backing 21. The loop material sheet 23 then cooperates with a conventional backing plate 24 to the face of which is attached a sheet 25 of hook material to cooperate with the loop material sheet 23 in a known manner. The backing plate 24 includes a central hub 26 which is internally threaded for attachment to the rotary stub shaft of a conventional buffing machine (not shown). Alternately, as shown in Fig. 4, the backing plate 24 may be bonded directly to the plastic backing 21 with a suitable adhesive layer 27. In a further alternate means for mounting, the fabric substrate and plastic backing 21 may be provided with

a central hole 28 for receipt of the rotary buffing machine shaft for direct bolted mounting thereto, using a nut and washer (not shown) attached from the front face of the pad 10.

In Fig. 5B, an alternate means for attaching the foam strip 15 to a substrate is shown. By adhesively bonding the body 16 of the strip directly to a rigid plastic backing, as with a glue line 35, an intermediate fabric substrate may be eliminated. In lieu of a glued connection, alternate methods of attaching the foam strip 15 to the plastic backing 21 may include sonic welding or solvent bonding.

As shown in Fig. 7, an alternate foam strip 30 includes a similar elongate body 31 running the full length of the strip, as in strip 15 of the previously described embodiment. The fingers 32, however, are formed somewhat differently, having a stepped configuration with wider base portions integrally attached to the body 31 and narrower outer ends 34 which define the working tips in the completed pad, as described above. The finishing pad of the present invention lends itself to use of a wide range of sizes and shapes of foam strips which may be readily custom cut for a particular application.

Referring to Figs. 8 and 9, there is shown an alternate construction in which foam fingers 36 are formed in a conventional polyurethane or other foam pad body 37. Thus, an open cell polyurethane foam pad body 37 of conventional construction is attached to a suitable substrate 38 which may, for example, be a plastic backing similar to that previously described. After attachment of the pad body to the substrate, the pad is cut on sets of mutually perpendicular first slit lines 40 and second slit lines 41. Preferably, the slit lines 40 and 41 extend completely through the pad body 37 all the way to the substrate 38. The resulting pad comprises a plurality of fingers 36 disposed in a dense array and having their individual base ends 42 attached to the substrate 38 and their outer tips 43 defining the pad finishing face 43. Some or all of either group of slit lines 40 and 41 may extend only partially into the pad body 37 less than the full thickness thereof.

Referring now to Figs. 10 and 11, a conventional flat faced circular pad body 44, similar to the body 37 of the

previously described embodiment, may have a pattern of fingers 45 slit therein which is substantially different from the fingers 36 of Figs. 8 and 9. In this embodiment, the fingers 45 comprise cylindrical bodies 46 which are individually cut through the foam body 44 generally perpendicular to the pad substrate 47. The pattern as well as the shape and size of the fingers 45 may be varied considerably, as desired for changing the buffing characteristics of the pad. In the particular construction shown in Fig. 10, the pad is provided with a large circular slit 48 near the outer periphery. This has been found to add to the pad flexibility and to also provide an outer containment ring to reduce splatter of finishing compound. As with the embodiment of Figs. 8 and 9, the slit lines preferably extend the full depth of the pad body 44, but any or all of the slit lines may be limited to less than the full depth.

Description of the Best Mode

Referring now to Figs. 12-14, there is shown a preferred embodiment of a polymeric foam pad 50 adapted to be used as a buffing or surface finishing pad, such as for automotive paint surface finishing. As with the previously described embodiments, the pad 50 is comprised of a large number of relatively closely packed foam fingers 52. Each of the individual foam fingers 52 includes an outer tip 54. The plurality of outer tips 54 combine to form a pad finishing surface 56 for the foam pad 50. Each of the foam fingers 52 is attached to a support substrate 58, as may be seen in the backside view in Fig. 13. The foam fingers 52 may be formed and attached to the support substrate 58 in a number of different ways, as will be described hereinafter. The polymeric foam material used to construct each of the foam fingers 52 is typically of that commonly used in paint finishing pads and may comprise, for example, an open cell polyurethane which may be reticulated or unreticulated.

As with the previous embodiments, the foam pad 50 of the preferred embodiment may be made of either curved or flat construction, both of which are well known in the art. A curved foam pad is one in which the support substrate is formed with a curved outer edge so that the foam wraps around and forms a laterally projecting peripheral buffing or finishing surface,

such as shown in Fig. 14. As the name suggests, flat pads simply have a flat support substrate, although the surface of the foam pad may be suitably contoured as desired.

The foam pad 50 shown in section in Fig. 14 may be manufactured in accordance with one presently preferred method that will be described with respect to Figs. 15A-15F. Initially, a plurality of individual foam members 60 of a suitable foam material are formed in the shape as shown in Fig. 15A. Each of the foam members 60 includes an elongated body 62 and a pair of outer tips 54. In the preferred embodiment of the invention, each of the foam members 62 has a generally rectangular profile, although other profiles could be used while operating within the scope of the present invention.

In a preferred embodiment of the invention, a first slit 64 and a second slit 66 are formed in each end of the foam member 60, such that each of the slits 64 and 66 extend longitudinally from one of the respective outer tips 54, as shown in Fig. 15B. As can be seen in Fig. 15B, the first slit 64 and the second slit 66 are orthogonally disposed with respect to each other such that the first slit 64 and the second slit 66 form a plurality of contact tips 68 along each of the outer tips 54. By dividing each outer tip 54 into a plurality of contact tips 64, the amount of contact between the foam pad 50 and the surface being finished is increased to provide more effective finishing. Each of the first and second slits 64, 66 extend inward from one of the outer tips 54 and terminates at a point spaced from the center of the foam member 60. Although the preferred embodiment is described as including the first slit 64 and the second slit 66, it should be understood that the foam pad 50 of the present invention could be constructed in an identical manner as described below without the inclusion of the first slit 64 and the second slit 66.

After the foam member 60 has been formed as shown in Fig. 15B, the foam member 60 is folded generally in half to form a folded portion 70, as shown in Fig. 15C. When the foam member 60 has been folded as shown in Fig. 15C, the foam member 60 forms a pair of foam fingers 52. Each of the foam fingers 52 generally extends from one of the outer tips 54 to the folded portion 70.

After the foam member 60 has been folded as described, the foam member 60 is pressed through an opening 72 formed in the support substrate 58, as shown by arrow 74. In the preferred embodiment of the invention, each of the foam members 60 is pressed through the support substrate 58 using a modified brush filling method and machine in a manner similar to the formation of a tufted wool buffing pad. After the foam member 60 has been pressed through the opening 72, as shown in Fig. 15D, an attachment portion 76 of the foam member 60 extends from a back face 78 of the support substrate 58. In the preferred embodiment of the invention, each of the openings 72 formed in the support substrate 58 is sized slightly smaller than the folded portion 70 of the foam member 60, such that the compression of the folded portion 70 when pressed through the opening 72 causes each of the foam fingers 52 to turn upwardly, as shown in Fig. 15D. Additionally, the compression of the foam member 60 causes each of the plurality of contact tips 68 to separate, as best shown in Figs. 15D and 15F. Positive separation of the contact tips 68 aids in increasing the amount of contact between each of the fingers 52 and the surface being finished.

In the preferred embodiment of the invention, the support substrate 58 is formed from a plastic material having openings 72 preformed therein in a pattern as can be partially seen in Fig. 13. Alternatively, the opening 72 may be formed by a punch included on the brush filling machine, such that the openings 72 would be formed just before the foam members 60 are pressed through the openings 72 by the brush filling machine. Additionally, the support substrate 58 could be formed from a fabric material similar to that used in tufted wool buffing pads and the foam members 60 pressed therethrough without the requirement of preformed holes.

After each of the foam members 60 has been folded and pressed through one of the openings 72, each of the foam members 60 forms a pair of foam fingers 52. Each of the foam fingers 52 extends from a front face 80 of the support substrate 58. Thus, the outer tip 54 of each foam member 60, which is divided into four contact tips 68 in the preferred embodiment, forms the pad finishing surface 56 for the foam pad 50.

Once the plurality of foam members 60 have been inserted into the plurality of openings 72 contained in the support substrate 58 in a dense array, the attachment portion 76 of each foam member 60 is secured to the back face 78 of the support substrate 58. In the preferred embodiment of the invention, a layer of adhesive 82 is formed along the entire back face 78 of the support substrate 58, as shown in Fig. 15E. The adhesive layer 82 securely bonds the attachment portion 76 of each foam member 60 to the support substrate 58. After the adhesive layer 82 has been formed, the completed foam pad 50 includes the securely attached foam fingers 52 extending from the front face 80 of the support substrate 58, as is best shown in Fig. 15F.

In a contemplated alternate embodiment, the attachment portion 76 of each foam member 60 could be secured to the support substrate 58 by a mechanical attachment means, such as a conventional staple. Alternatively, each of the foam members 60 could remain secured to the support substrate 58 by only the friction fit between the attachment portion 76 and the opening 72 through which it is pressed. In a surface finishing pad constructed without the use of a separate attachment means, the size of the openings 72 in the support substrate 58 could be decreased to increase the strength of the friction fit between the foam member 60 and the support substrate 58.

Although the foam pad 50 of the present invention has been described as being formed by a plurality of foam members 60 folded generally in half and inserted into the support substrate 58 to define a pair of foam fingers 52, in an alternate embodiment the length of the foam member 60 could be shortened and one of the outer tips 54 pressed through an opening in the support substrate 58. With one of the outer tips 54 pressed through one of the openings 72, the adhesive layer 82 would then hold the outer tip 54 to the back face 78 of the support substrate 58. In this manner, each of the foam members 60 would define only one foam finger 52, rather than the pair of foam fingers 52 described above.

The flat support substrate 58 having the plurality of foam members 60 adhered thereto, as shown in Fig. 16A, may then be processed in a number of different ways to provide the unique

foam fingered pad 50 of the present invention. Referring also to Figs. 16B and 16C, since the support substrate 58 is preferably formed from a plastic material, the support substrate 58 may be curved by heat forming in a suitably shaped mold to provide an upturned peripheral edge 84 on the pad 50. Alternatively, if a woven natural fiber is utilized for the support substrate 58, the substrate may be curved by heat forming the substrate to a plastic backing (not shown) and subsequently the plastic backing may be heat molded as described above.

The foam pad 50 may then be mounted on a buffing machine in any of several alternative ways. As shown in Figs. 14 and 16C, a sheet 86 of loop material, for a conventional hook and loop-type fastening system, may be bonded or otherwise adhesively attached to the adhesive layer 82. The loop material sheet 86 then cooperates with the conventional backing plate 24 to the face of which is attached the sheet 25 of hook material to cooperate with the loop material sheet 86 in a known manner. The backing plate 24 includes the central hub 26 which is integrally threaded for attachment to the rotary stub shaft of a conventional buffing machine (not shown). Alternatively, the backing plate 24 may be bonded directly to the adhesive layer 82 with a suitable layer of adhesive.

The foam fingers of any of the pad embodiments described above may have abrasive particles embedded therein or attached thereto to provide a more aggressive finishing pad. The abrasive particles may be attached to the tips of the fingers by an adhesive or some other bonding process, or the abrasive particles may be incorporated directly into the foam material when it is manufactured.

Various alternatives and embodiments are contemplated as being within the scope of the following claims particularly pointing out and distinctly claiming the subject matter regarded as the invention.

Claims

1. A surface finishing pad comprising:
a support substrate having a front face and a back
face;

5 a plurality of individual fingers of polymeric foam
material disposed in a dense array on the support substrate,
each finger having an attachment portion extending through the
support substrate and an opposed outer tip extending from the
front face, such that the outer tips of the plurality of fingers
define a pad finishing surface.

2. The surface finishing pad of claim 1 wherein the
attachment portion of each finger is adhesively attached to the
back face of the support substrate.

3. The surface finishing pad of claim 1 wherein each
finger includes at least one slit extending from the outer tip
toward the attachment end.

4. The surface finishing pad of claim 1 wherein the
support substrate includes a plurality of openings extending
between the front face and the back face, each opening receiving
one of the fingers.

5. The surface finishing pad of claim 1 wherein the
polymeric foam material comprises polyurethane.

6. The surface finishing pad of claim 1 wherein said
plurality of individual foam fingers each comprises a body
extending between a first outer tip and a second outer tip, and
wherein each foam member is folded to provide said attachment
5 portion positioned between the first and second outer tips and
pressed through the support substrate.

7. The surface finishing pad of claim 11 further
comprising a backing member securely attached to at least a
portion of the back face of the support substrate.

8. A method of manufacturing a surface finishing pad
comprising the steps of:

providing a support substrate having a front face and
a back face;

5 forming a plurality of individual foam fingers each
having an outer tip;

arranging the foam fingers in a dense array along the
support substrate; and

10 pushing an attachment portion of each foam finger through the support substrate such that the attachment portion of each foam finger extends from the back face of the support surface, wherein the outer tips of the foam fingers extend from the front face of the support substrate to define a pad finishing surface.

9. The method of claim 8 further comprising the step of securing the attachment portion of each foam finger to the back face of the support substrate.

10. The method of claim 8 wherein each foam finger is secured to the back face by an adhesive layer.

11. The method of claim 8 further comprising the steps of:

forming a plurality of holes in the support substrate between the front face and the back face; and

5 pushing one of the foam fingers into each of the holes formed in the support substrate.

12. The method of claim 8 further comprising the steps of slitting the outer tip of each foam finger such that the outer tip of each foam finger includes a plurality of contact tips..

13. The method of claim 8 further comprising the steps of:

forming said plurality of individual foam fingers with a first outer tip and a second outer tip; and,

5 folding each of the foam fingers to form an attachment portion between the first and second outer ends, such that each foam finger defines a first foam finger extending from the attachment portion to the first outer tip a second foam finger extending from the attachment portion to the second outer tip.

14. A surface finishing pad comprising:

a supporting substrate; and,

5 a plurality of fingers of a polymeric foam material disposed in a dense array and having inner base ends attached to the substrate and outer tips defining a pad finishing face.

15. The finishing pad as set forth in claim 16 and further comprising:

an elongate foam body to which the base ends of said fingers are integrally joined; and,

5 means for securing said body along substantially its full length to the substrate.

16. The pad as set forth in claim 15 wherein said substrate is circular and said body is secured thereto along a spiral connecting line extending between an outer edge of the substrate and a central region of the substrate.

17. The finishing pad as set forth in claim 14 wherein said fingers are glued to said substrate.

18. The finishing pad as set forth in claim 14 wherein said fingers are fused to said substrate.

19. The finishing pad as set forth in claim 16 wherein the substrate is made from a material selected from the group consisting of woven natural fiber, woven synthetic fiber, plastic impregnated woven fiber, and solid plastic.

20. The finishing pad as set forth in claim 16 wherein said body and integral fingers are made from a thin strip of foam formed with a central body portion extending generally along the centerline of said strip and a plurality of
5 finger portions extending laterally from said body portion in opposite directions.

21. A method of manufacturing a surface finishing pad comprising the steps of:

- (1) providing a circular supporting substrate;
- (2) forming a strip of polymeric foam material with
5 an elongate body and a plurality of laterally extending fingers;
- (3) attaching the strip to the substrate with a substantially continuous spiral seam.

22. The method of set forth in claim 21 wherein said attaching step comprises sewing.

23. The method as set forth in claim 22 wherein said attaching step comprises gluing.

24. The method as set forth in claim 22 wherein said attaching step comprising fusing.

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FIG. 1

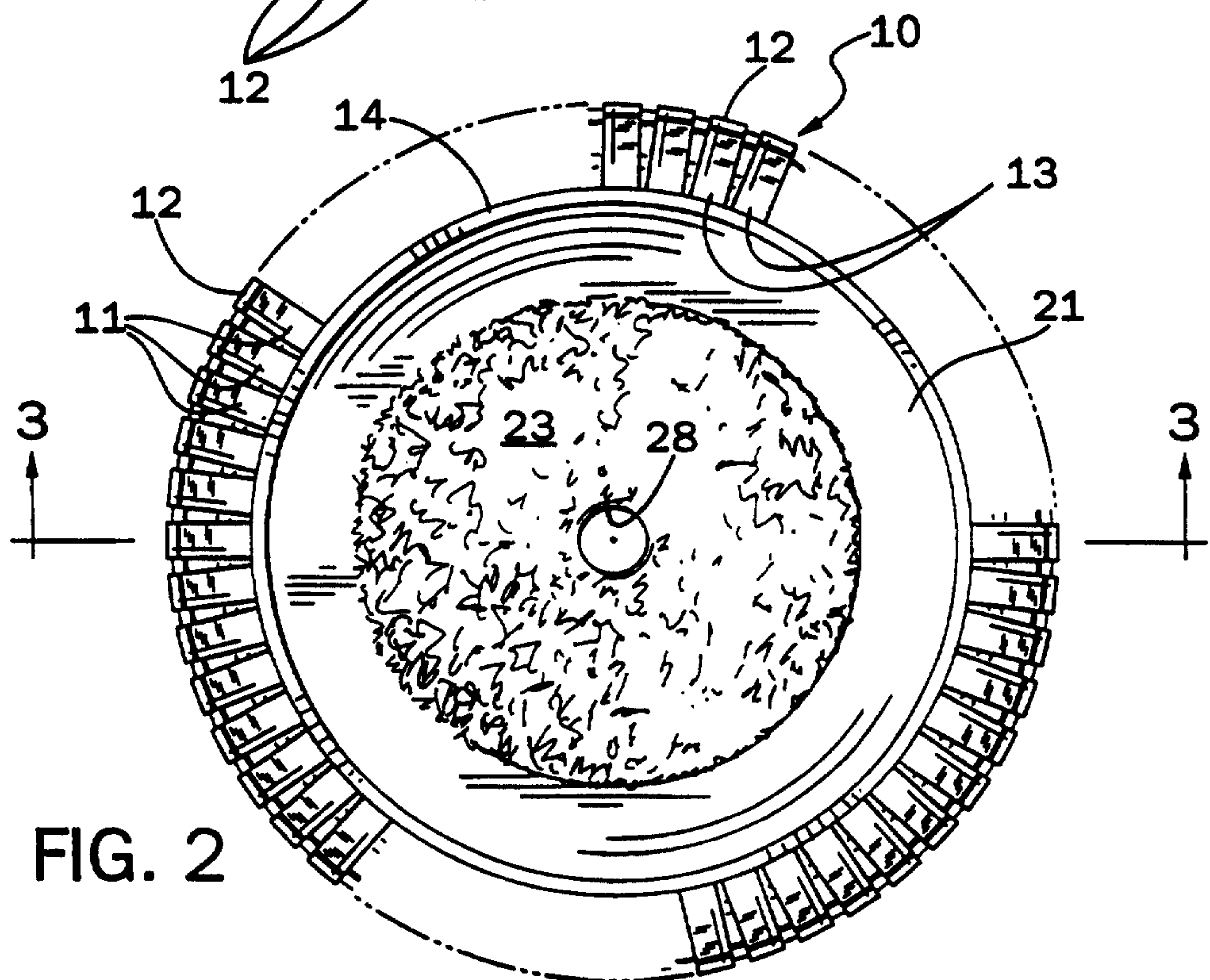
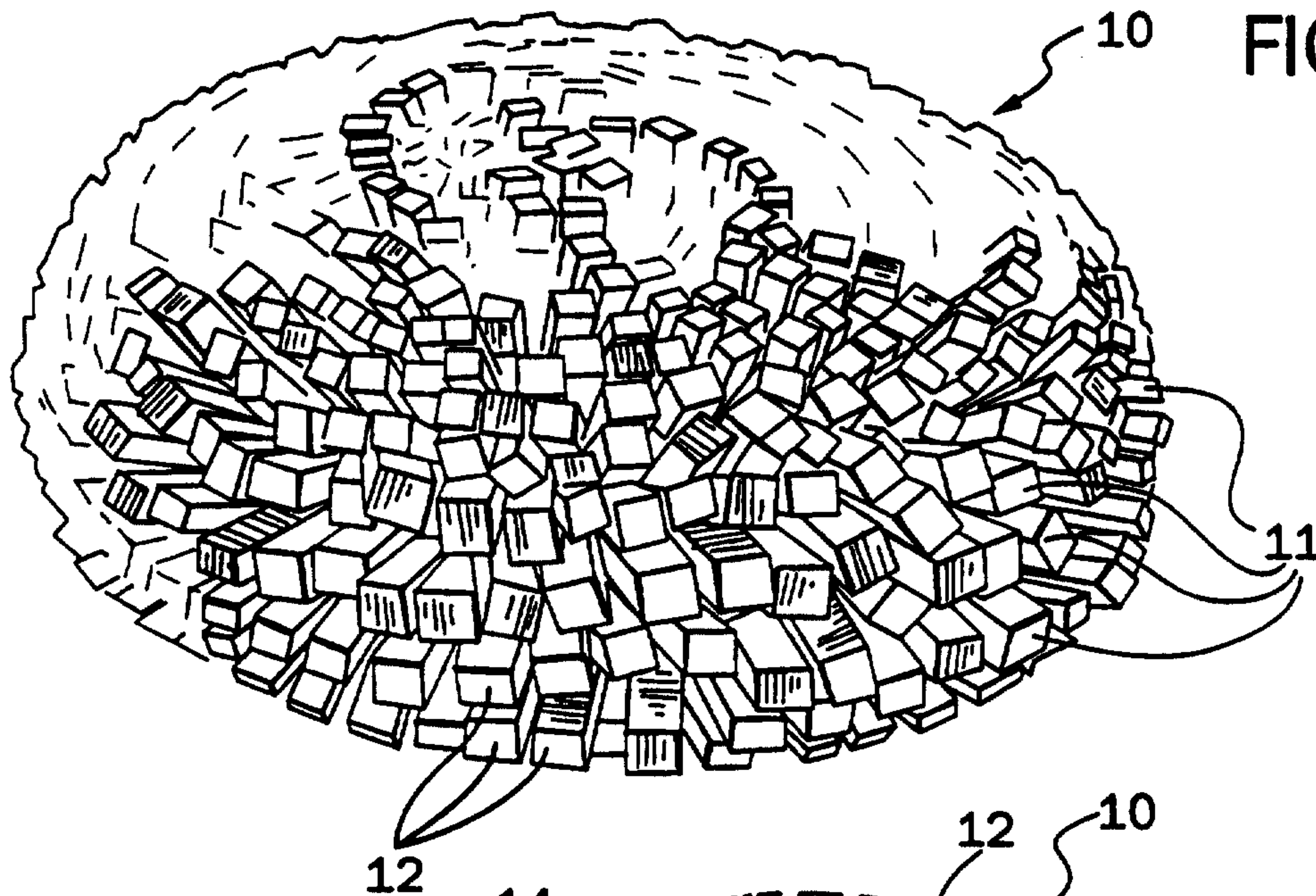


FIG. 2

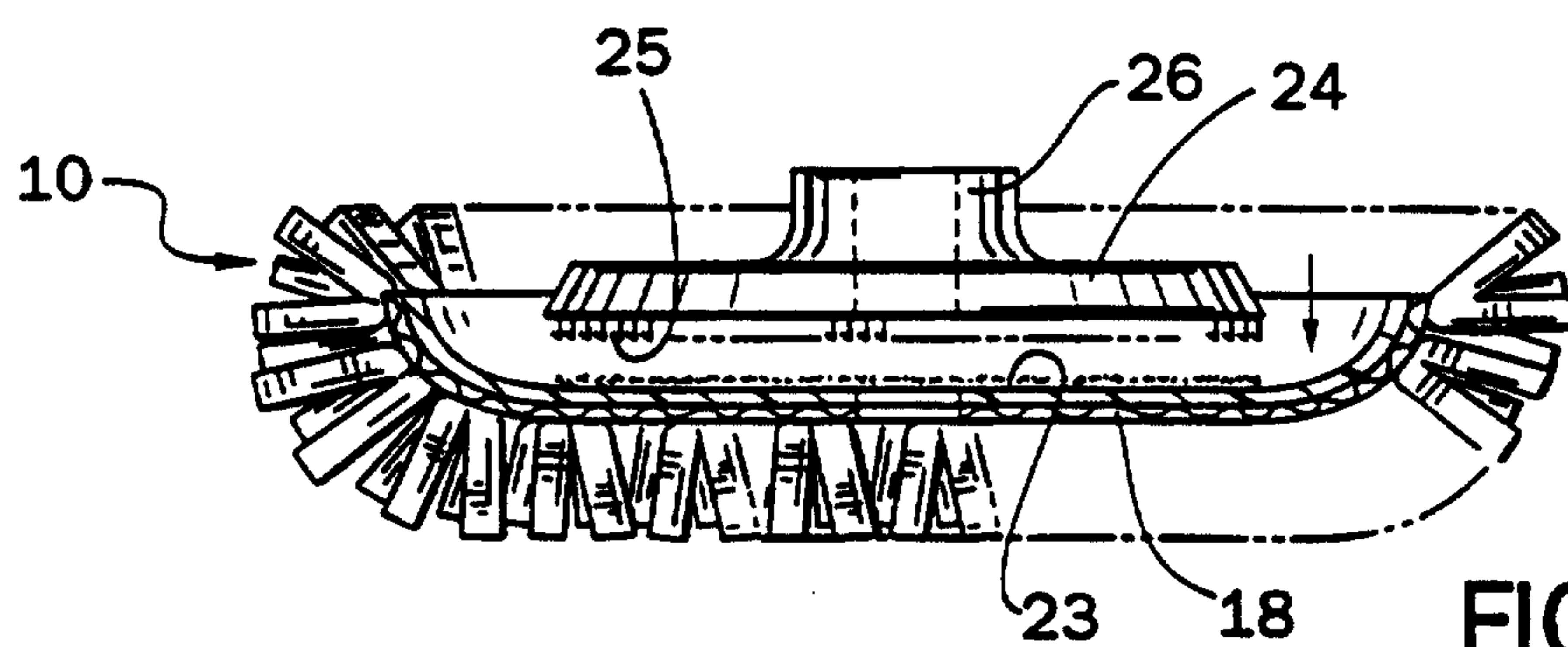
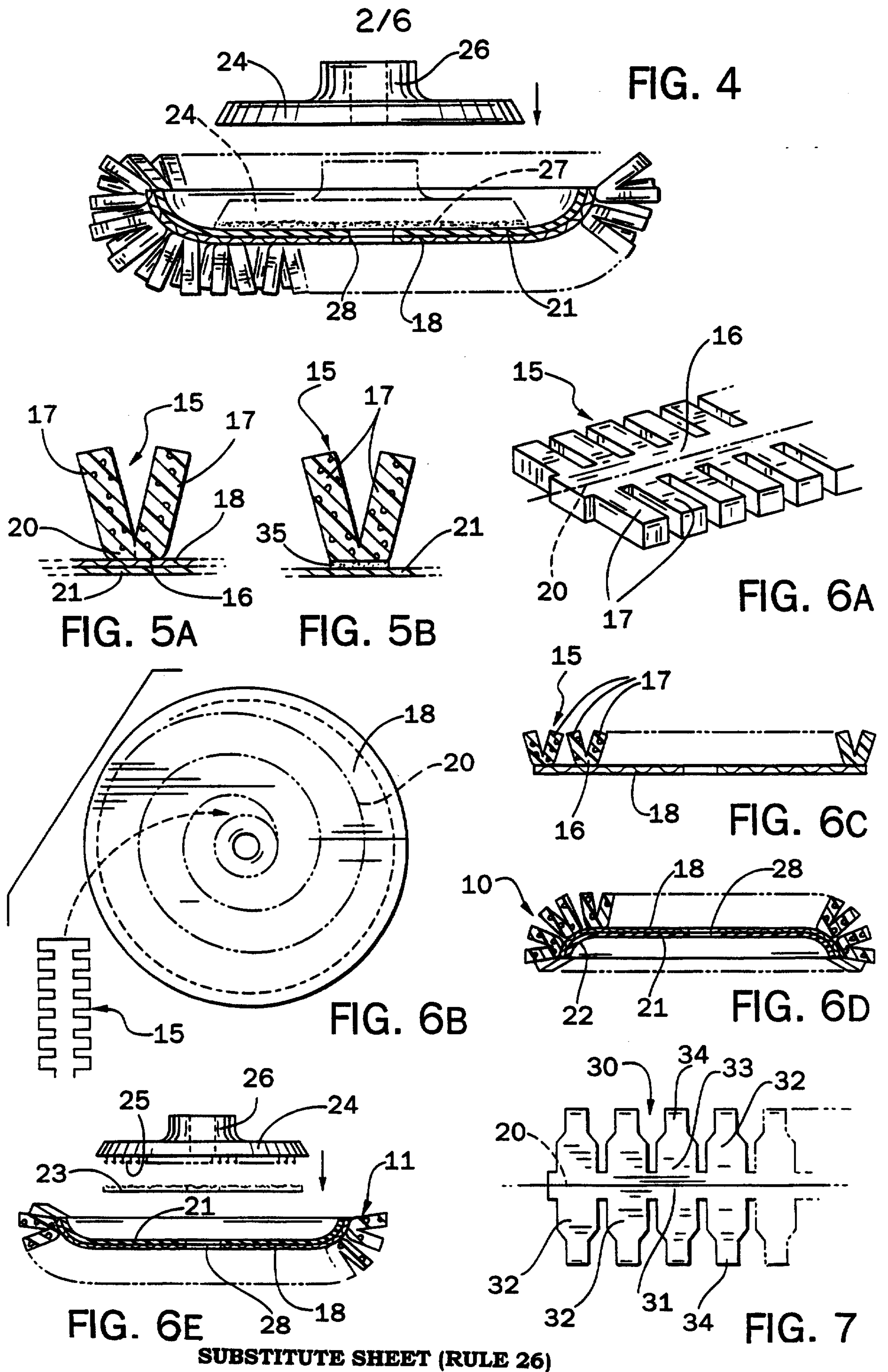
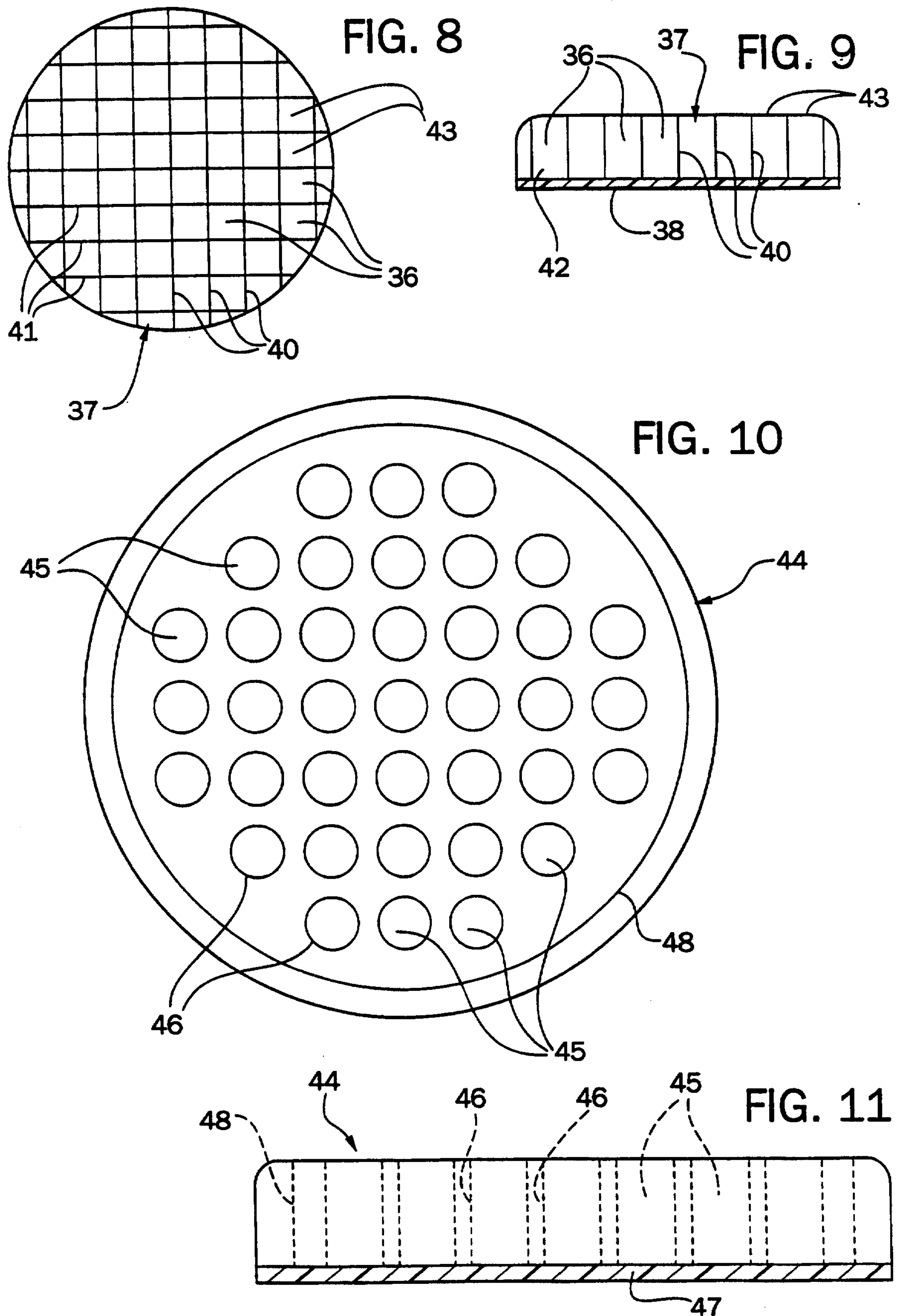


FIG. 3

SUBSTITUTE SHEET (RULE 26)



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FIG. 12

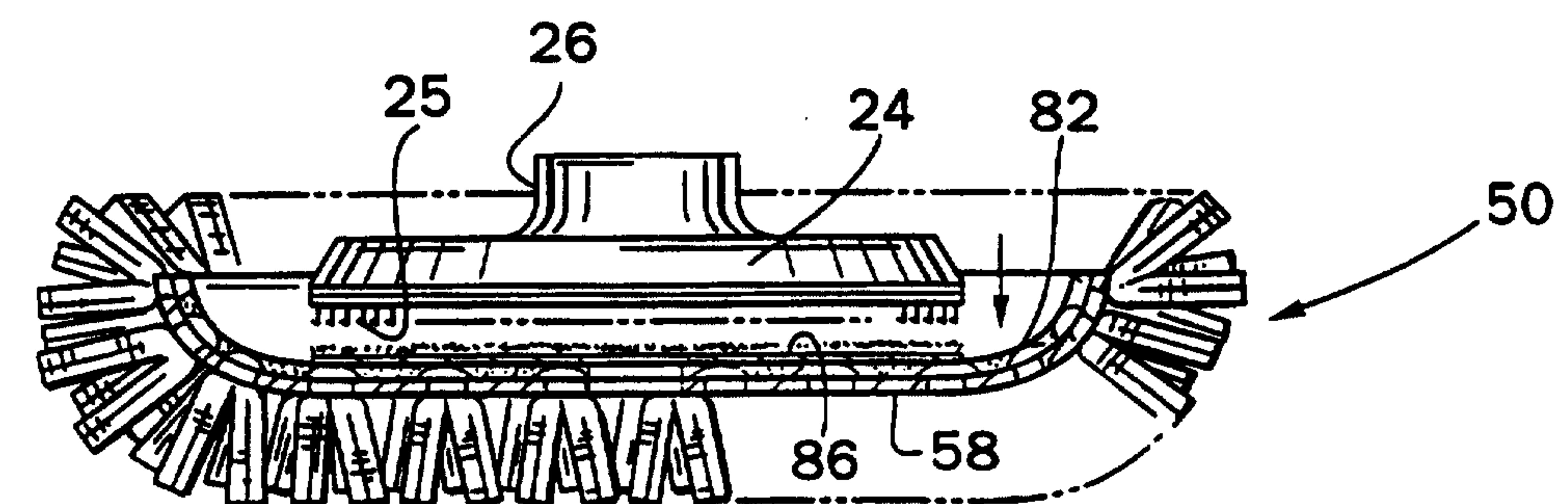
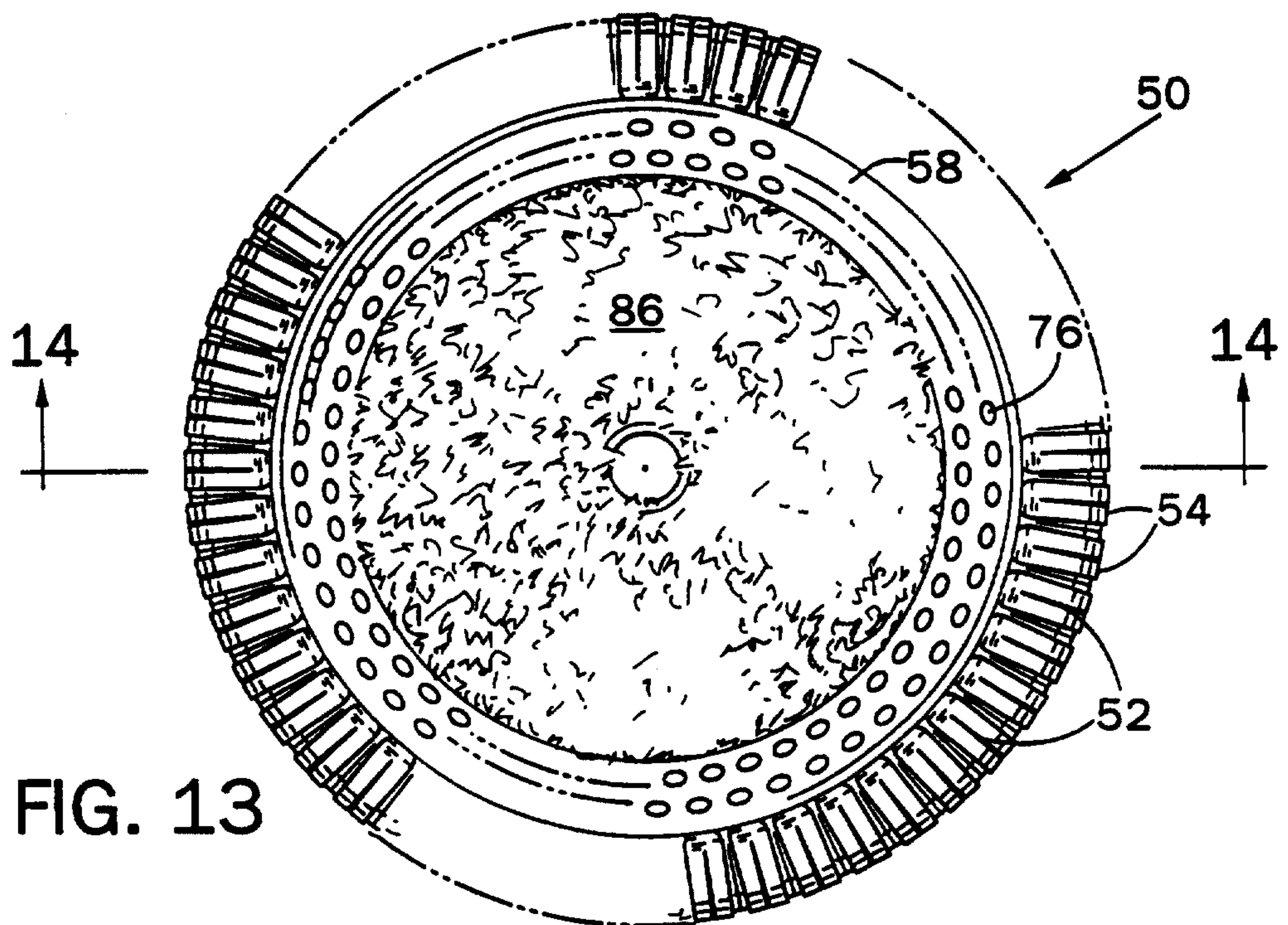
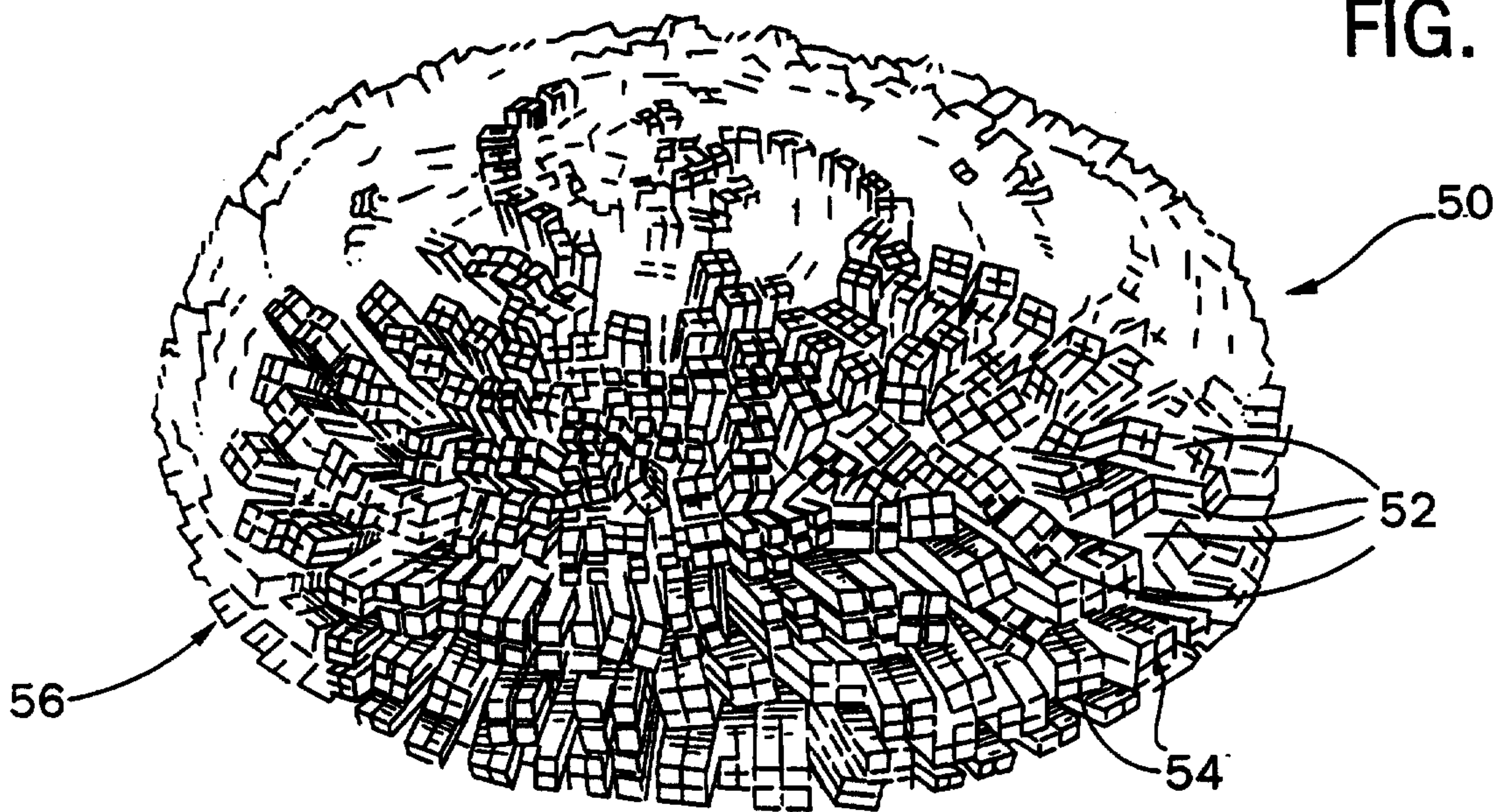


FIG. 14

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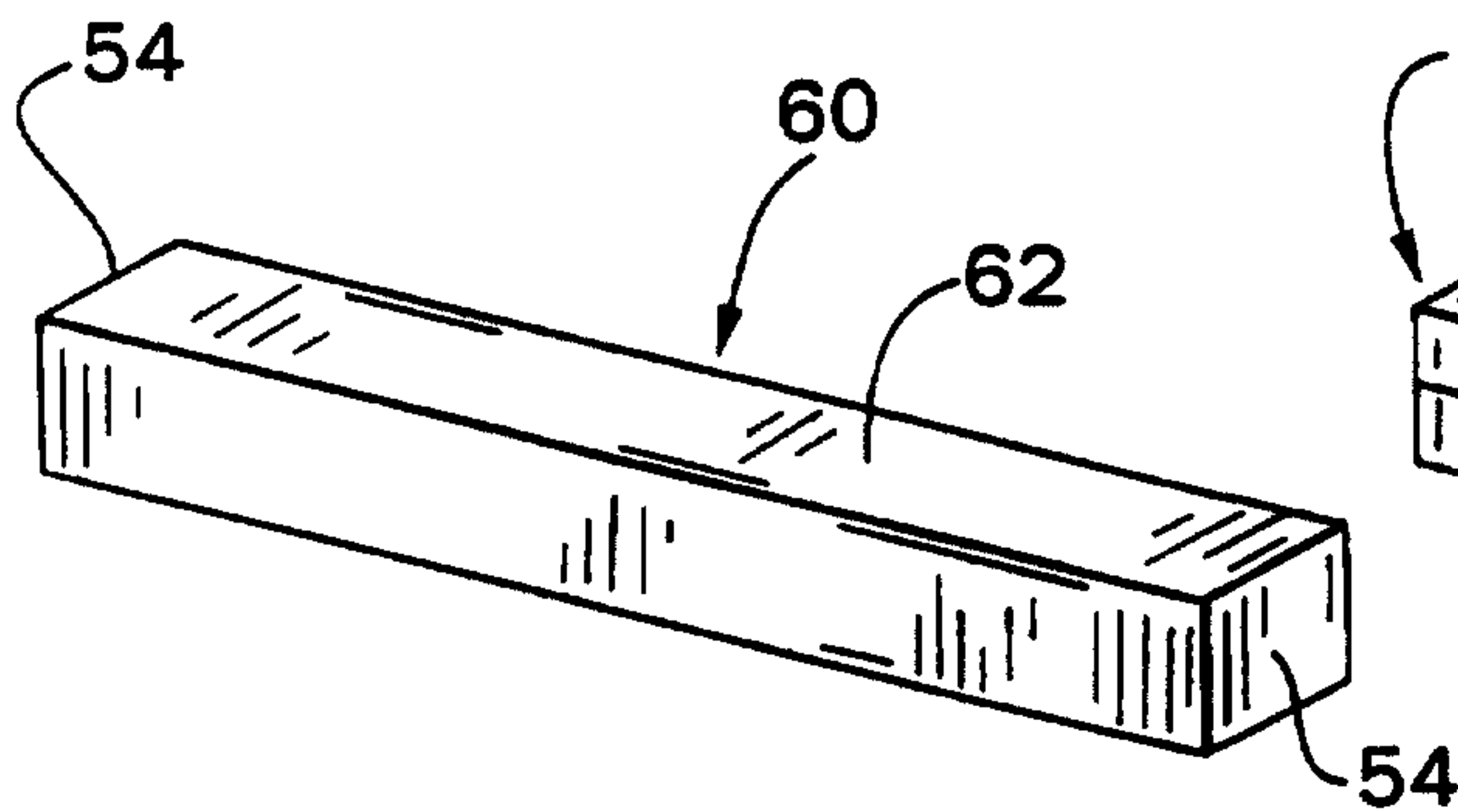


FIG. 15A

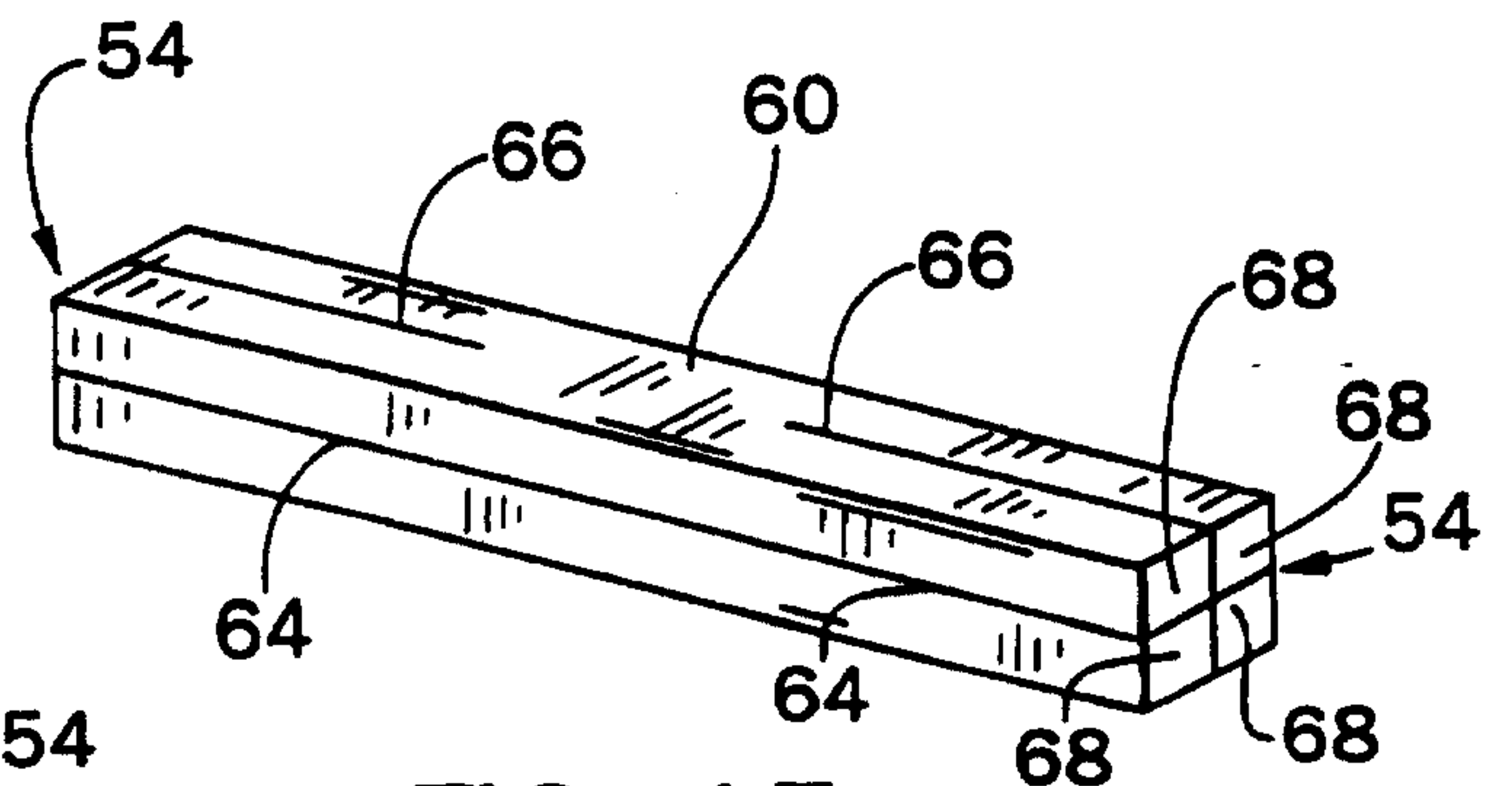


FIG. 15B

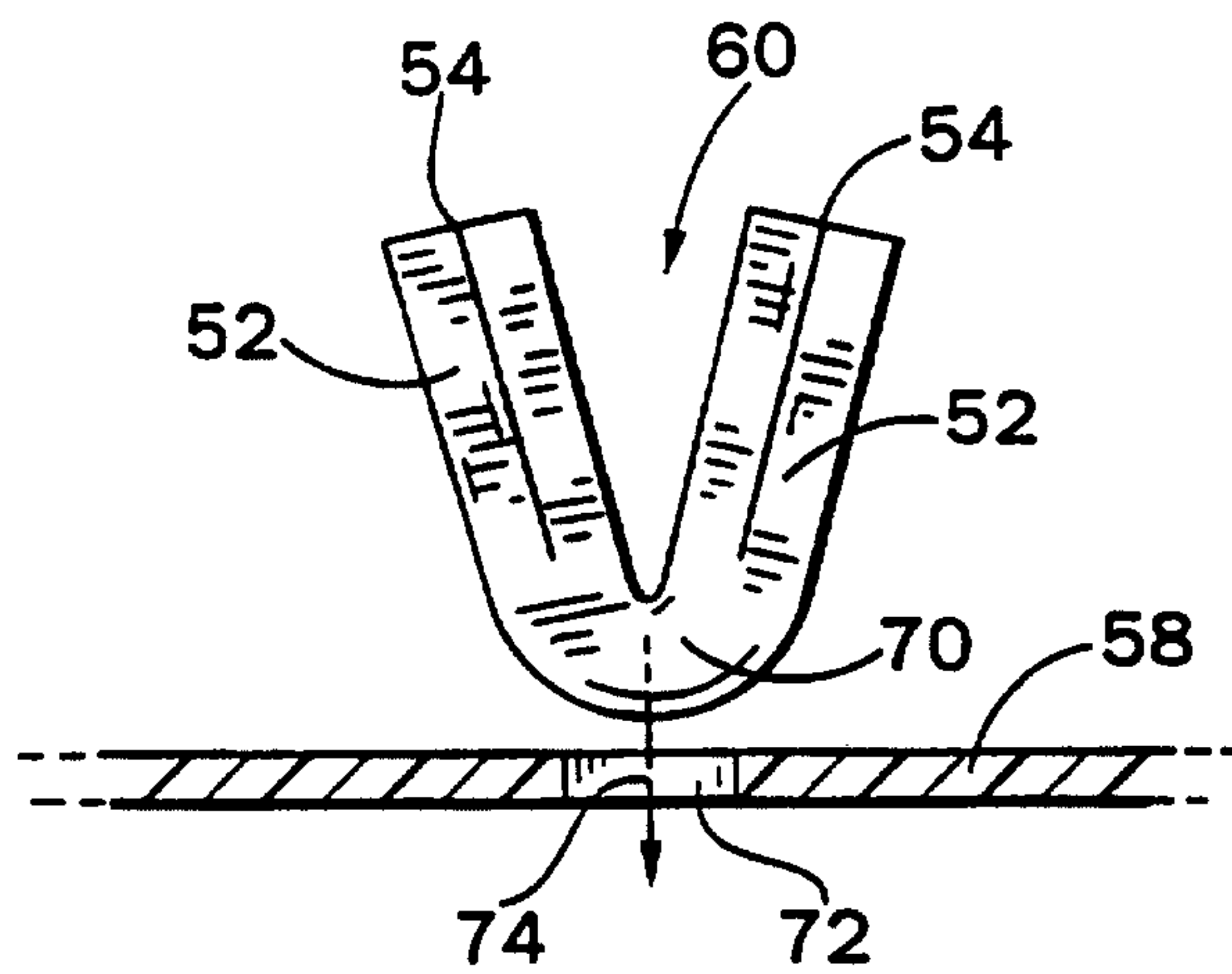


FIG. 15C

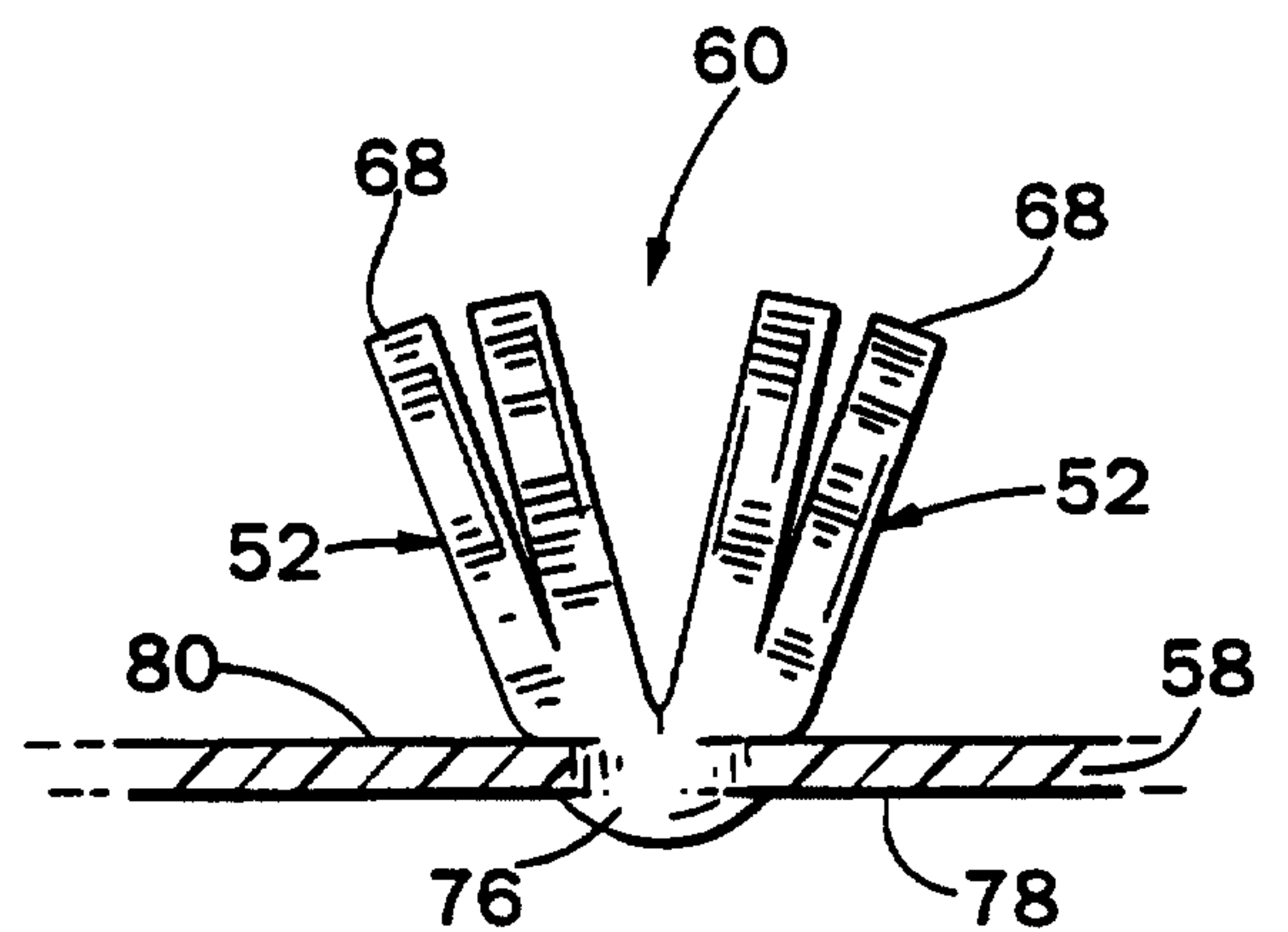


FIG. 15D

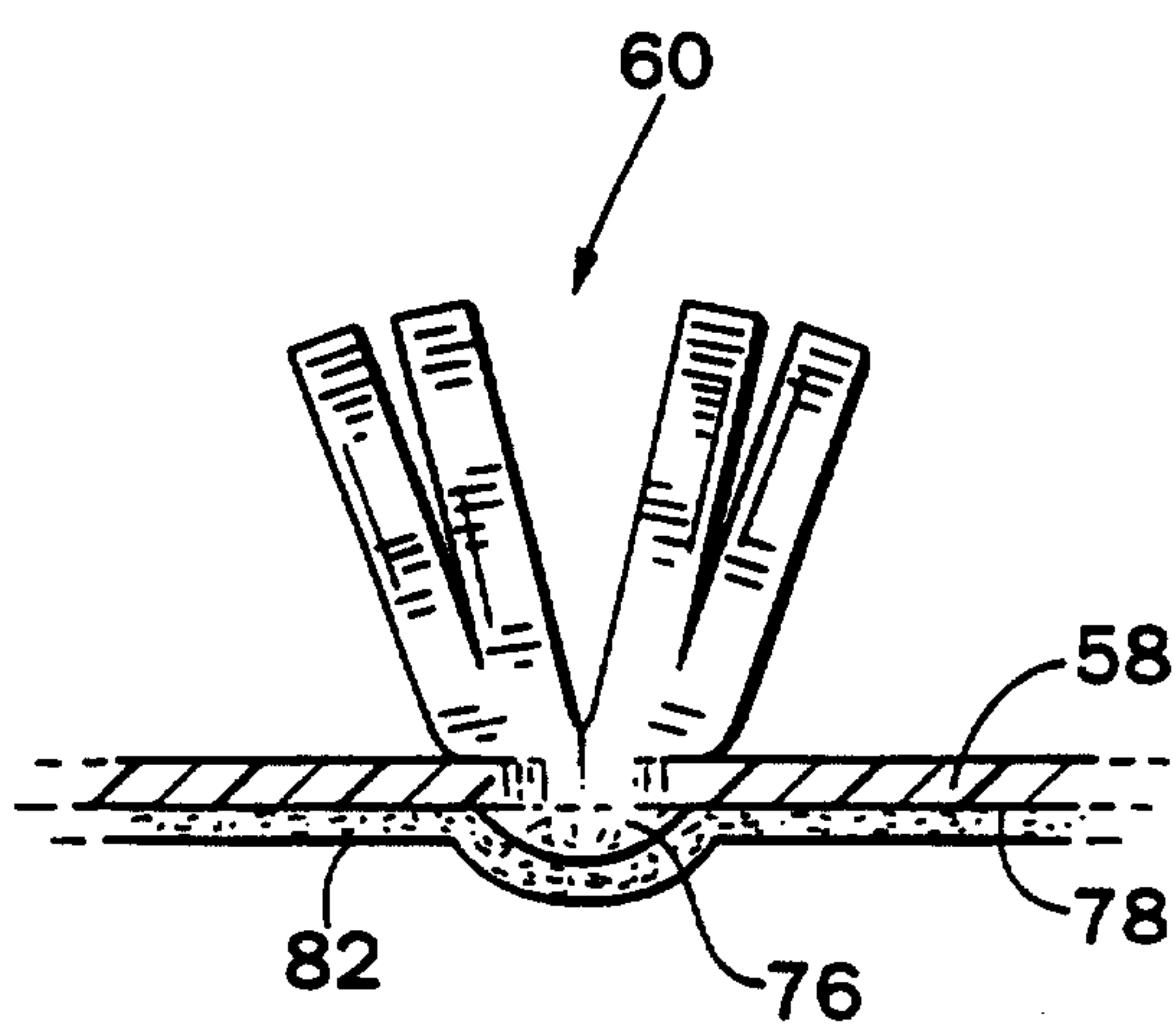


FIG. 15E

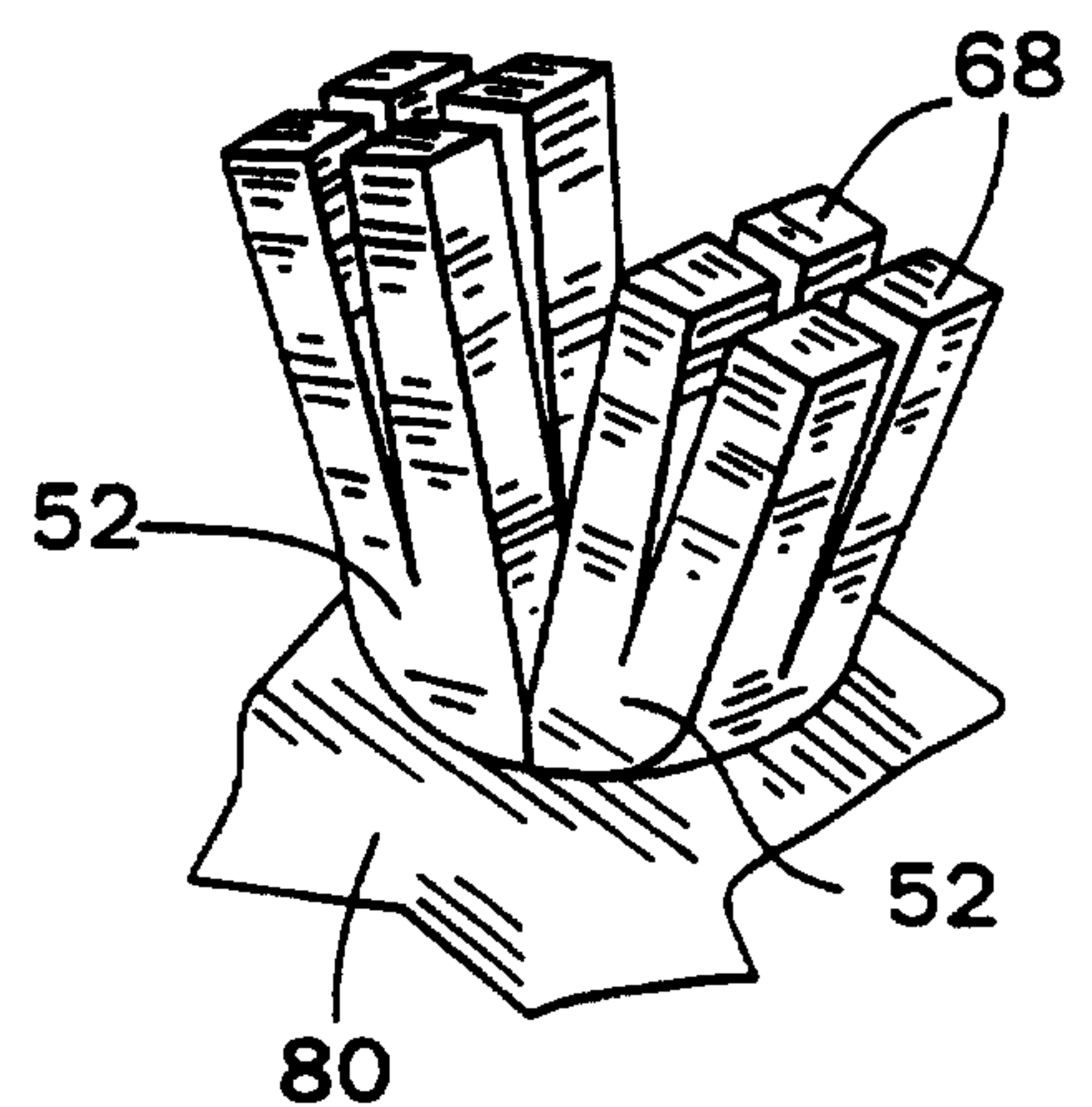


FIG. 15F

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FIG. 16A

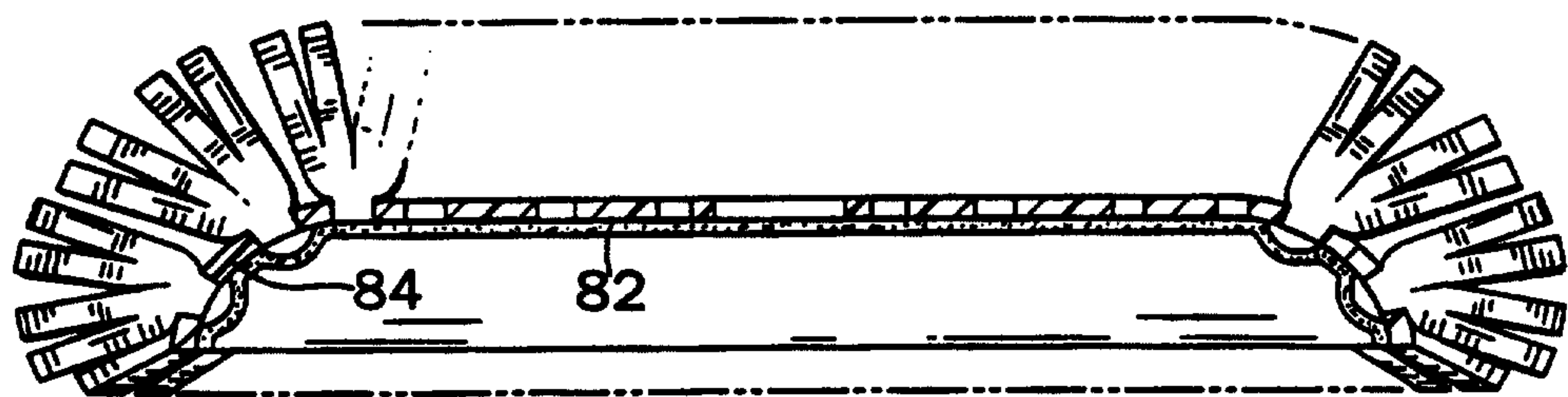
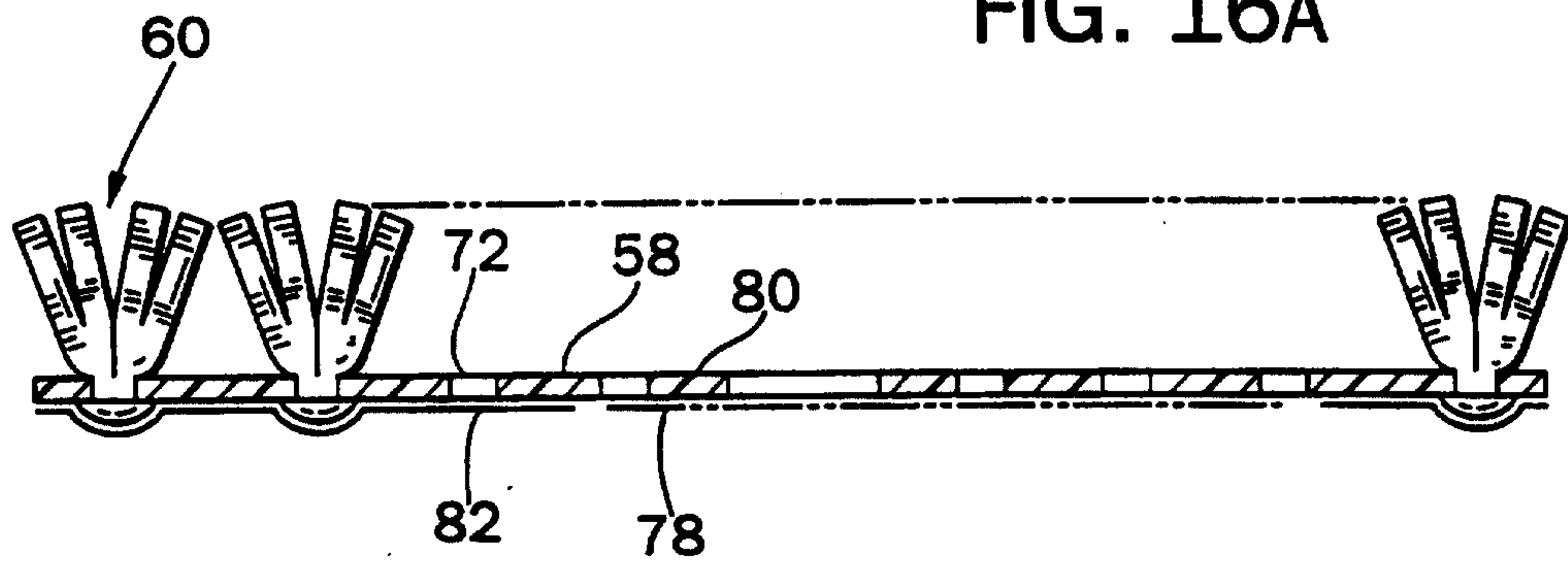


FIG. 16B

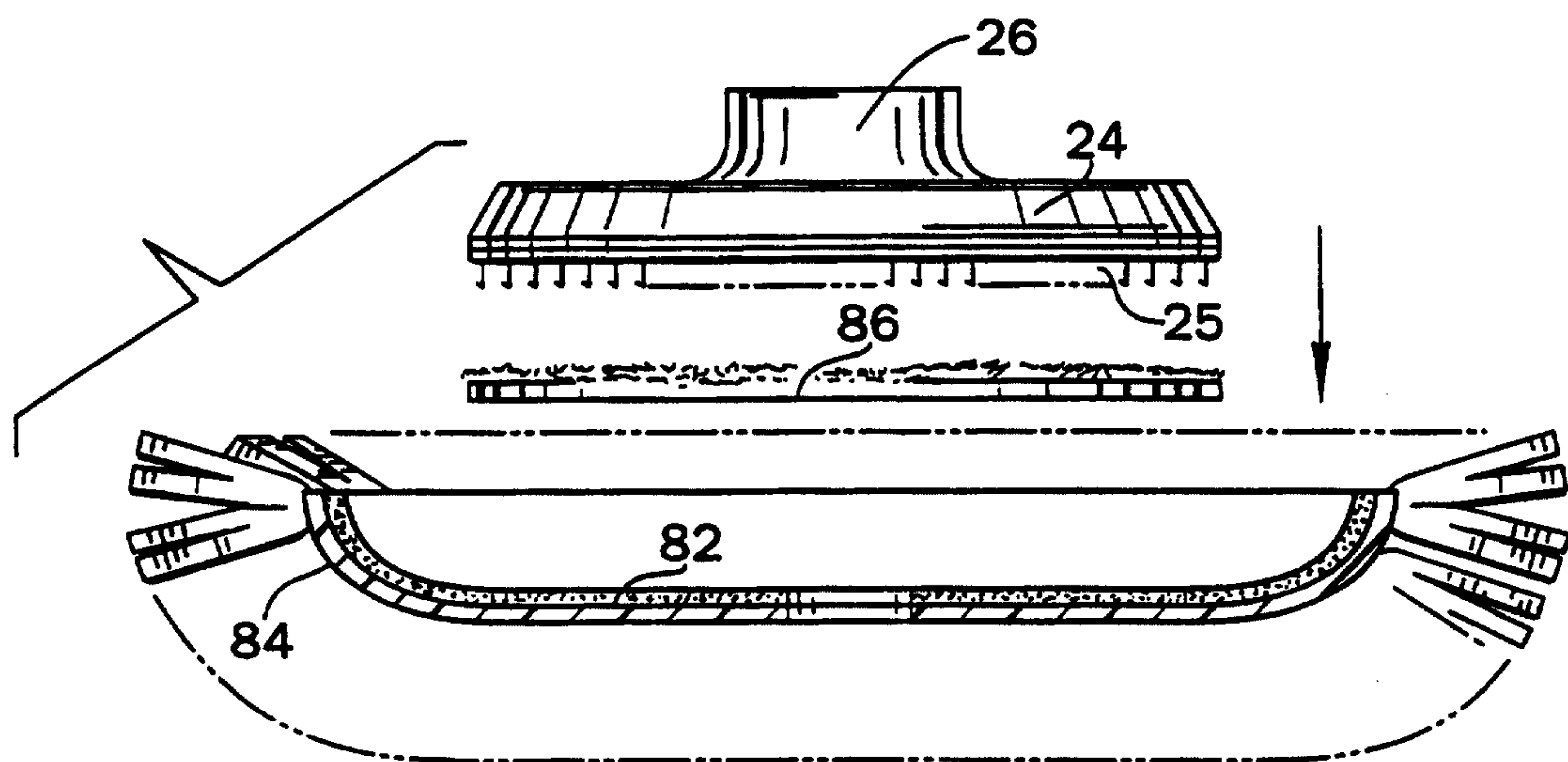


FIG. 16C