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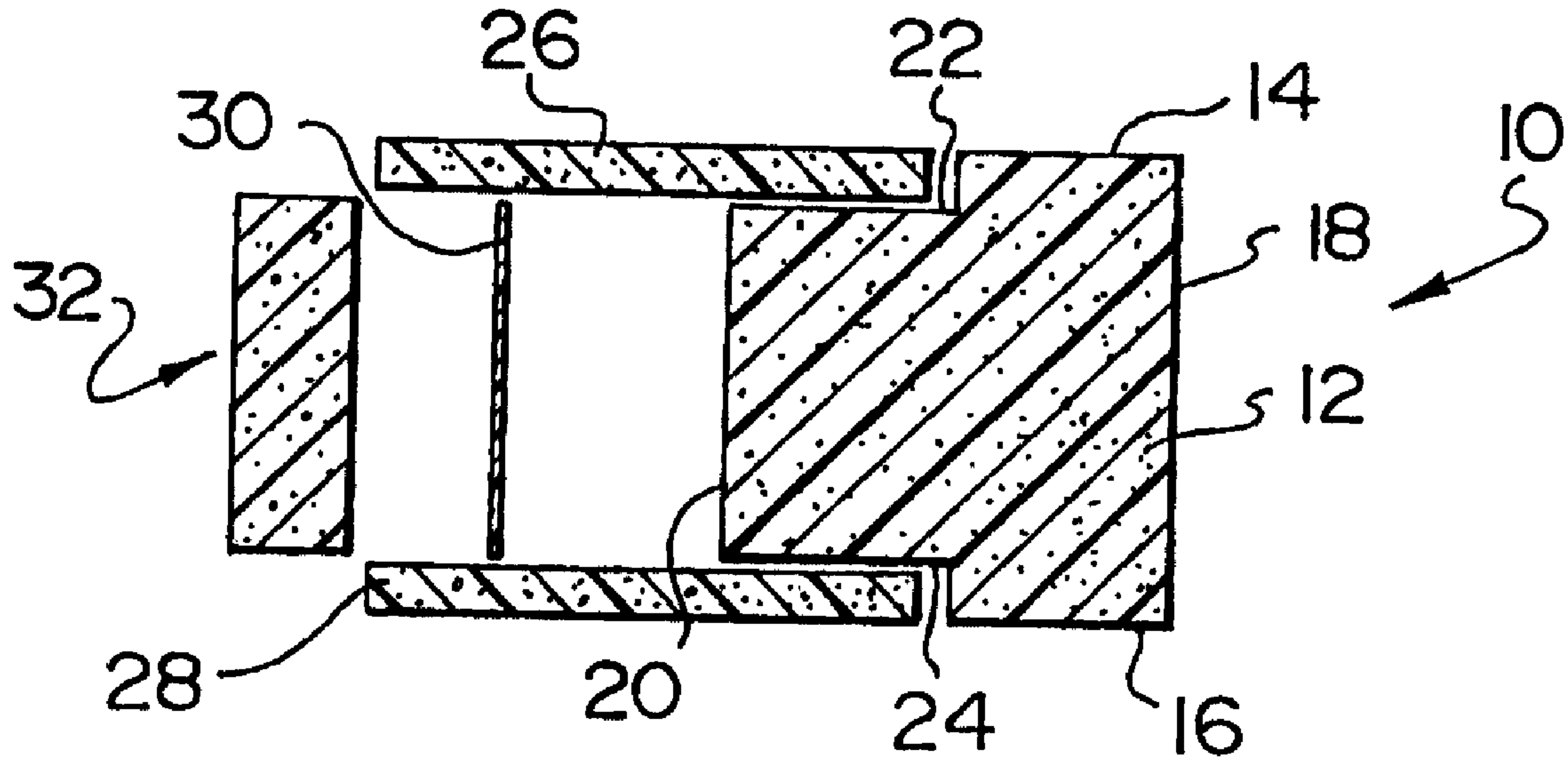

(57) Abrégé/Abstract:
An insulating spacer for use in glazing assemblies is provided. The spacer comprises a foamed insulating body and further includes a second sealant material. The insulating body partially contacts the substrates as does the sealant to provide a double seal when used in a glazing assembly. In other embodiments the spacer is a composite of foam, sealant material, rigid plastics and desiccated matrices. A further embodiment discloses an undulating foam spacer body for easy manipulation about the corner in glazing assemblies. The result of incorporation of the foam is a substantially energy efficient spacer and assembly.

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ABSTRACT

An insulating spacer for use in glazing assemblies is provided. The spacer comprises a foamed insulating body and further includes a second sealant material. The insulating body partially contacts the substrates as does the sealant to provide a double seal when used in a glazing assembly. In other embodiments the spacer is a composite of foam, sealant material, rigid plastics and desiccated matrices. A further embodiment discloses an undulating foam spacer body for easy manipulation about the corner in glazing assemblies. The result of incorporation of the foam is a substantially energy efficient spacer and assembly.

INSULATED ASSEMBLY INCORPORATING A THERMOPLASTIC BARRIER MEMBER

This invention relates to a composite spacer for use in an insulated glass assembly and further relates to an insulated glass assembly incorporating such a spacer.

Insulated assemblies presently known in the art incorporate the use of various polymeric substances in combination with other materials. One such assembly includes a butylated polymer in which there is embedded an undulating metal spacer. Although useful, this type of sealant strip is limited in that the metal spacer, over time, becomes exposed to the substrates which results in a drastic depreciation in the efficiency of the strip. The particular difficulty arises with moisture vapour transmission when the spacer becomes exposed and contacts the substrates.

Further, many of the butylated polymers currently used in insulated glass assemblies are impregnated with a desiccant. This results in a further problem, namely decreased adhesiveness of the butylated sealant.

Glover, et al. in U.S. Patent No. 4,950,344, provide a spacer assembly including a foam body separated by a vapour barrier and further including a sealant means about the periphery of the assembly. Although this arrangement is particularly efficient from an energy point of view, one of the key limitations is that the assembly must be fabricated in a number of steps. Generally speaking, the sealant must be gunned about the periphery in a subsequent step to the initial placement of the spacer. This has ramifications during the manufacturing phase and is directly related to increased production costs and, therefore, increased costs in the assembly itself.

It has been found particularly advantageous to incorporate, as a major component of the spacer, a soft, resilient insulated body, having a low thermal conductivity. Examples of materials found to be useful include natural and synthetic elastomers (rubber), cork, EPDM, silicones, polyurethanes and foamed polysilicones, urethanes and other suitable foamed materials. Significant benefits arise from the choice of these materials since not only are they excellent insulators from an energy point of view but additionally, depending on the materials used, the entire spacer can maintain a certain degree of resiliency. This is important where windows, for example, engaged with such a strip experience fluctuating pressure forces as well as a thermal contraction and expansion. By making use of a resilient body, these stresses are alleviated and accordingly, the stress is not transferred to the substrates as would be the case, for example, in assemblies incorporating rigid spacers.

The foam body may be manufactured from thermoplastic or thermosetting plastics. Suitable examples of the thermosets include silicone and polyurethane. In terms of the thermoplastics, examples include silicone foam or elastomers, one example of the latter being, SANTOPRENE™. Advantages ascribable to the aforementioned compounds include, in addition to what has been included above, high durability, minimal outgassing, low compression, high resiliency and temperature stability, inter alia.

Of particular use are the silicone and the polyurethane foams. These types of materials offer high strength and provide significant structural integrity to the assembly. The foam material is particularly convenient for use in insulating glazing or glass assemblies since a high volume of air can be incorporated into the material without sacrificing any structural integrity of the body. This is convenient since air is known to be a good insulator and when the use of foam is combined with a material having a low thermal conductivity together with the additional features of the spacer to be set forth hereinafter, a highly efficient composite spacer results. In addition, foam is not susceptible to contraction or expansion in situations where temperature fluctuations occur. This clearly is beneficial for maintaining a long-term uncompromised seal in an insulated substrate assembly.

It would be desirable to have a composite spacer which overcomes the limitations of desiccated butyl as well as requiring the addition of sealant material in a subsequent procedure. The present invention is directed to satisfying the limitations in the known art.

One object of the present invention is to provide an improved spacer for use in insulated glass or glazing assemblies.

According to a first aspect of the present invention, there is provided a composite spacer for spacing substrates in a glazing assembly comprising an insulating body having spaced apart sides, a front face and a rear face, each side including a recess therein, each side having a first substrate engaging surface; and sealant material in each recess forming a second substrate engaging surface coplanar with the first substrate engaging surface.

As an attendant advantage, it has been found that the desiccated matrix, the insulating body and the sealant material may be simultaneously extruded in a one-piece integral spacer depending upon the type of material chosen for the insulating body. This is useful in that it prevents subsequent downstream processing related to filling or gunning sealant material in a glazing unit and other such steps. In this manner, the spacer, once extruded can be immediately employed in a glazing unit.

In accordance with one embodiment of the present invention, it has been found that by making use of a generally T-shaped insulating body which is received within a generally C-shaped configuration including sealant and a desiccated matrix, the result is that the assembly can have at least two sealing surfaces derived from the sealant material and the projecting portions on the foam body as a result of the T-shape. This is not only advantageous from a sealing point of view, but additionally precludes formation of a thermal bridge effect in view of the fact that there are at least two different materials employed in the spacer.

As will be appreciated by those skilled in the art, in the assembly, polyisobutylene (PIB), butyl or other suitable sealant or butylated material may extend about the periphery of the assembly and therefore, provides a further sealed surface. Sealing or other adhesion for the insulating body projections may be achieved by providing special adhesives, e.g. acrylic adhesive in this area. Further, the insulating body at the projections may be uncured so that on application of heat, the body adheres directly to the substrate. This is effective where the body is composed of, for example, an ultra-violet curable material.

In accordance with a further aspect of the present invention, there is provided a composite spacer for use in insulated glazing assembly, comprising a body of insulating material having opposed sides and opposed faces, each side having a portion of material removed therefrom to provide a recess and projection, each projection for sealing a respective substrate; sealant material in each recess coplanar with each projection for sealing a respective substrate; and a desiccant matrix separate from and associated with the spacer. The desiccant material may be in the form of a matrix of a semi-permeable material, e.g. various silicones with the desiccant material dispersed therein. As is well known in the art, any suitable desiccant material may be incorporated in the matrix. Where a matrix is not elected for use in the spacer, a sealant material may include a desiccant material. This will depend on the intended application of the spacer.

In situations where it is desirable not to sever or otherwise interrupt the spacer in an insulated assembly, it is desirable to have an insulating spacer body which subscribes to an undulating or sinusoidal profile. This facilitates easy bending about corners and thus clearly circumvents the energy consequences associated with severing the spacer.

In yet a further aspect of the present invention, there is provided a composite spacer for spacing substrates in a glazing assembly, comprising an undulating body of insulating material; and sealant material adhesively engaged with the undulating body.

Another aspect of the present invention according to one embodiment provides a composite spacer for spacing substrates in a glazing assembly comprising - an insulating body having spaced apart sides, a front face and a rear face, each side including a recess therein open to said rear face, the rear face being adapted to face an enclosed space in the assembly, each side having a first substrate engaging surface; and sealant material in each recess forming a second substrate engaging surface coplanar with the first substrate engaging surface.

In a further embodiment of the present invention, there is provided a composite integral pre-formed spacer for use in an insulated glazing assembly, which comprises a body of insulating material having opposed sides and opposed faces, each side having a portion of material removed therefrom to provide a recess and projection, each projection being adapted for sealing a respective substrate, and including sealant material in each recess coplanar with each projection for sealing a respective substrate; and a desiccant matrix separate from and positioned against the body and the sealant.

In a still further embodiment of the present invention, there is provided a composite spacer for use in insulated glazing assembly, which comprises a body of insulating material having opposed sides, a front face and a rear face, each side having a portion of material removed therefrom to provide a recess and projection, each said projection for sealing a respective substrate; sealant material in each recess coplanar with each projection for sealing a respective substrate, the sealant and recess being proximate the rear face of the body, the rear face being adapted to face an enclosed space of the assembly; and a desiccant matrix separate from and associated with the spacer.

In yet a further embodiment of the present invention, there is provided a one-piece composite spacer for spacing substrates, the spacer having opposed substrate engaging surfaces, which comprises

- a foam body, the foam body having a pair of first surfaces, each of the first surfaces adapted for sealing engagement with a substrate;
- a pair of second substrate engaging surfaces of a second material different from the foam, the second surfaces being coplanar with the first surfaces of the foam body; and
- a pair of third substrate engaging surfaces of a third material different from the foam material, the third surfaces being coplanar with the first and second surfaces, whereby the spacer provides opposed substrate engaging surfaces each having a plurality of discrete sealing surfaces adapted to seal with the substrates and with the first surfaces in a position to be non-adjacent a space enclosed by the substrates on assembly.

Another aspect of the present invention relates to an insulated glass assembly including a first glass substrate and a second glass substrate; the assembly comprising: a first length of sealant means and a second length of sealant means in spaced facing relation defining a space therebetween, each length contacting a glass substrate; a continuous polymeric self-supporting support layer contacting the first and second lengths of the sealant means, the continuous self-support layer and the sealant means being arranged between the glass substrate for forming an axial channel between the substrates; and desiccant means positioned within the space and separate from the sealant means and the support layer. Desiccant means is provided between the first and second lengths of the sealant means.

In a further embodiment of the present invention, there is provided an insulated glass assembly including a first glass substrate and a second glass substrate, the assembly comprises:

- a first length of sealant means and a second length of sealant means in spaced facing relation defining a space therebetween, each length contacting a glass substrate;
- a continuous moisture and air impermeable polymeric self-supporting support layer contacting first and second lengths of the sealant means; and
- desiccant means positioned within the space and separate from the sealant means and the self-supporting layer, the desiccant means is provided between the first and second lengths of the sealant means.

In a still further embodiment of the present invention, there is provided a composite spacer for spacing substrates in an insulating glass assembly, which comprises:

- an insulating spacer core having spaced apart generally flat substrate engaging surfaces, and a pair of opposed faces, one being a front face for facing the interior of the assembly; and the other a rear face opposed to the front face; the spacer core comprises an essentially linear array of linked members, one of the faces of the spacer core is characterized by generally regularly spaced indentations, pairs of the indentations defining a separate one of the members.

In yet a further embodiment of the present invention, there is provided a method of forming an insulated glass assembly which comprises the following:

- providing an adhesive continuous length sealant strip having a pair of glass lite engaging surfaces and a pair of opposed surfaces and a continuous channel extending inwardly from one of the opposed surfaces;
- providing a continuous self supporting integral layer;
- positioning the layer between the glass lite engaging surfaces and in contact with the channel;
- providing a pair of glass lites; and
- mounting a glass lite to each of the glass lite engaging surfaces.

Further, in another aspect of the present invention, there is provided a composite spacer for spacing substrates in an insulating glass assembly, which comprises:

an insulating spacer having spaced-apart substrate engaging surfaces, and a pair of opposed faces, one being a front face for facing the interior of the assembly; and the other a rear face opposed to the front face;

the spacer has a plurality of interconnected segments in an essentially linear array, and the segments of the array have points of joinder which are recessed or indented and which extend inwardly between the engaging surfaces and extending from one face to a point generally adjacent the other face.

In yet a further embodiment of the present invention, there is provided a composite spacer for spacing substrates in an insulating glass assembly, which comprises:

an insulating spacer having spaced-apart substrate engaging surfaces, and a pair of opposed faces, one being a front face for facing the interior of the assembly; and the other a rear face opposed to the front face;

the spacer has a plurality of interconnected segments in an essentially linear array, the segments of the array have points of joinder which are recessed or indented and which extend inwardly between the engaging surfaces and extending from both faces to approximately midway of the spacer.

As mentioned hereinabove, both front and rear faces of the composite spacer according to this aspect may be of undulating or sinusoidal profile. This feature presents at least one advantage. The body of the spacer may be bent readily about corners during the formation of insulted glass assemblies. Additionally, the body, when bent, stays substantially uniform in dimension, thus ensuring even substrate engaging surfaces and therefore an effective seal.

Having thus generally described the invention, reference will now be made to the accompany drawings illustrating preferred embodiments, and in which:

Figure 1 is an end exploded view of one embodiment of the present invention;

Figure 2 is an end view of a second embodiment of the present invention;

Figure 3 is a perspective view of a composite spacer according to a further embodiment of the present invention;

Figure 4 is a perspective view of an alternate embodiment of the spacer illustrated at Figure 3; and

Figure 5 is a perspective view of a glazing assembly illustrating the disposition of a spacer therein.

Similar numerals in the drawings denote similar elements.

Detailed Description of the Preferred Embodiments

Referring now to Figure 1, shown is a composite spacer according to one embodiment of the present invention, the composite spacer being globally denoted by numeral 10. As is illustrated, the spacer 10 includes an insulating body 12 subscribing to a generally "T-shaped" configuration. The body 12 described hereinafter with respect to page 5, Figures 3 and 5, includes spaced-apart sides 14 and 16 and opposed faces 18 and 20. Each of sides 14 and 16 include a recess 22 and 24, respectively. The depth of the recess will vary from application to application, but typically the depth will comprise from approximately 2% to, for example, 25% of the depth of the body 12. As is illustrated Figure 1, the overall size of the body is a significant portion of the entire size of the composite spacer. Sides 14 and 16 act as substrate engaging surfaces each for sealing engagement with a substrate (not shown). To this end, each of the sides 14 and 16 may include an adhesive (not shown) to assist in the sealing and adhering engagement of a substrate with a respective side. Secondly, as a further possibility, the sides may comprise uncured material where the body 12 is formed of a material capable of bonding with, for example, glass substrates. In order to further assist in supporting a substrate engaged with sides 14 and 16, the recesses 22 and 24 accommodate sealant (e.g. adhesive) material 26 and 28 (on the upper and lower substrate engaging surfaces) which contact each of the recesses and when in contact, maintain a coplanar relationship with each side 14 and 16, respectively. By maintaining the coplanar relationship, there is provided an even surface upon which a substrate may be engaged. Further, the combination of 14, 26 and 16, 28 provides discrete sealing surfaces for engaging a substrate, the surfaces being integral with the spacer 10.

As an optional feature, the composite spacer 10 as illustrated in Figure 1 may include a fluid barrier 30 for contact with face 20 of body 12. In one possible embodiment, the fluid barrier may comprise a PET (polyethylene terephthalate) film which may further include an aluminum or other suitable metal. In addition, other either metallized or non-metallized films are contemplated for use in this capacity.

As a further feature, the composite spacer 10 may include a desiccant matrix, globally denoted by numeral 32. Suitable desiccant matrices are well known in the art and can include zeolite beads, silica gel, calcium chloride, etc., all of which may be matrixed within a semi-permeable flexible material such as a polysilicone or other suitable semi-permeable substance. This may be positioned between the strips of sealant 26 and 28. As a further option, the desiccant material may be incorporated into a continuing body of butyl material as opposed to a separate matrix associated with the composite spacer.

Reference will now be made to Figure 2 where in the above generally mentioned embodiment has been discussed. In the embodiment shown in Figure 2, the body 12 is simply engaged with a body of sealant material, globally denoted by numeral 34. In the embodiment shown in Figure 2, the body of sealant material generally subscribes to a "C-shaped" configuration with full engagement of the sealant with the recesses 22 and 24 of the body 12.

Of particular convenience, it has been found that the insulating body, the sealant and the desiccated matrix can be simultaneously extruded into a one piece integral unit. This is possible when the insulating body is composed of a material capable of being extruded. Clearly, this is advantageous since it avoids the step of gunning in sealant material etc., which was previously required in earlier arrangements. Referring now to Figure 3, shown is a further embodiment of the present invention wherein the insulating body 12 is in the form of an undulating arrangement. More specifically, body 12 in Figure 3 provides a first face 36 having an undulating or sinusoidal profile and a smooth non-undulating or planar opposed face 38. In the embodiment shown, the smooth planar face 38 may additionally include a vapour barrier 30 and desiccated matrix 32 as set forth with respect to Figure 1. The spacer 10 would be positioned within an insulating assembly (not shown) such that the smooth planar face 38 would be within the atmosphere of the assembly (not shown).

It has been found that by providing an undulating face 36 in the body that the same may be bent readily about corners during the formation of insulated glass assemblies. This is particularly attractive in view of the fact that there is no severance of the strip which would otherwise be encountered in arrangements not specifically including the undulating face. By retaining the spacer in a continuous form, less energy loss occur at the corners of an insulated assembly. A concomitant advantage of the sinusoidal/undulating profile is that, the body, when bent does not “buckle” or “bulge” at the substrate engaging surfaces or elsewhere but rather stays substantially uniform in dimension thus further ensuring even substrate engaging surfaces and therefore an effective seal.

As noted above, the insulating body 12 is illustrated in the form of an undulating arrangement, having a generally sinusoidal profile. Further, as illustrated in Figures 3 and 4, the insulating body 12 is of a generally linear array or linked members, wherein at least the rear face is of a generally sinusoidal, or wave like in profile. The linked members of the insulating body 12 as illustrated in Figures 3 and 4, are of a generally cylindrical form, and are shown as having interconnected segments in an essentially linear array , the segments of the linear array having points of joinder 39 which are recessed or indented from the outer face 36 and which extends inwardly between the substrate engaging surfaces 14 and 16. As will be seen, the spacer core has regularly spaced indentations whereby adjacent pairs of the indentations define a separate one of the members.

With respect to Figure 4, the rear face is illustrated as having spaced apart indentations, with an indentation (of a suitable shape) at each point of joinder 39, connecting adjacent members in a linear or undulating arrangement. In this arrangement, the points of joinder are spaced from the front and rear faces (36 and 38). The interconnected segments are of generally cylindrical shape.

Turning to Figure 4, shown is an alternate embodiment of Figure 3 where face 38 additionally is of an undulating form. Depending on the application, either the embodiments set forth with respect to Figure 3 or 4 may be employed.

Referring now to Figure 5, shown is a side elevational view of an insulated glass assembly or glazing assembly where the spacer of Figure 1 is positioned between two opposed substrates 40 and 42. Thus as shown in Figure 5, there is provided an adhesive continuous length sealant strip having a pair of glass lite engaging surfaces and a pair of opposed surfaces and a continuous channel extending inwardly from one of said opposed surfaces; a continuous self supporting integral layer. Thé continuous self supporting layer is positioned between said glass lite engaging surfaces and in contact with said channel. There is also provided a pair of glass lite, each of which is mounted to each of said glass lite engaging surfaces. Sealant material 44, having opposed sides 46 and 48 seals the perimeter of the assembly and contacts face 18 of body 12. Sealant may be co-extruded with the spacer 10 to provide a "sandwiched" or encapsulated foam body 12 as illustrated. In this embodiment, the spacer provides a multitude of discrete sealing surfaces, namely those created from elements 26, 28 and 14, 16 as well as from 46, 48.

As described above, adhesive, if required, can be employed to at least partially cover the upper and lower substrate engaging surfaces.

In this system, in the event of a breach or compromise of one of the seals, any one of the auxiliary seals prevents the assembly from becoming energy ineffective.

It will be appreciated by those skilled in the art, although only a double pane glazing assembly is illustrated, that the spacer assembly as set forth in the disclosure can readily be employed in multiple pane assemblies.

As those skilled in the art will realize, these preferred illustrated details can be subjected to substantial variation without affecting the function of the illustrated embodiments. Although embodiment of the invention have been described above, it is not limited thereto and it will be apparent to those skilled in the art that numerous modifications form part of the present invention insofar as they do not depart from the spirit, nature and scope of the claimed and described invention.

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

1. A composite spacer for spacing substrates in a glazing assembly comprising:
   - an insulating body having spaced apart sides, a front face and a rear face, each side including a recess therein open to said rear face, said rear face being adapted to face an enclosed space in the assembly, each said side having a first substrate engaging surface; and
   - sealant material in each said recess forming a second substrate engaging surface coplanar with said first substrate engaging surface.

2. The composite spacer as set forth in claim 1, wherein said sealant includes desiccant therein.

3. The composite spacer as set forth in claim 2, wherein said rear face includes a desiccant containing matrix.

4. The composite spacer as set forth in claim 1, 2 or 3, further including fluid barrier means between said rear face and said sealant.

5. The composite spacer as set forth in claim 1, 2, 3 or 4, further including fluid barrier means between said rear face and said desiccant.

6. The composite spacer as set forth in claim 1, 2, 3, 4 or 5, wherein said body comprises foam.

7. The composite spacer as set forth in claim 6, wherein said foam comprises polyurethane foam.

8. The composite spacer as set forth in any one of claims 1, 2, 3, 4 or 5,

wherein said insulating body is selected from the group comprising EPDM and cork.

9. The composite spacer as set forth in any one of claims 1, 2, 3, 4 or 5, wherein said foam comprises polysilicone foam,

10. The composite spacer as set forth in any one of claims 1 to 9, wherein said sealant comprises a butyl sealant.

11. The composite spacer as set forth in claim 10, wherein said sealant is a C-shaped body of butyl material.

12. The composite spacer as set forth in any one of claims 1 to 11, wherein said body comprises a T-shaped body.

13. The composite spacer as set forth in claim 1, said sealant being in a form selected from:
    i) a C-Shape, the C-Shape including both said portions and extending over said body; and
    ii) portion filling strips extending past said body to cover the ends of a further layer, said further layer comprising at least one of a fluid barrier, and a desiccant-containing matrix.

14. An insulated glazing assembly including a pair of substrates engaged with the spacer as set forth in any one of claims 1 to 13.

15. A composite integral pre-formed spacer for use in an insulated glazing assembly, comprising:
- a body of insulating material having opposed sides and opposed faces, each side having a portion of material removed therefrom to provide a recess and projection, each said projection being adapted for sealing a

respective substrate;

- sealant material in each said recess coplanar with each said projection for sealing a respective substrate; and

- a desiccant matrix separate from and positioned against said body and said sealant.

16. The composite spacer as set forth in claim 15, wherein said body comprises a foam material.

17. The composite spacer as set forth in claim 15, wherein each said projection includes means for adhesively engaging a substrate.

18. The composite spacer as set forth in claim 17, wherein said means for adhesively engaging a substrate comprises pressure sensitive adhesive.

19. The composite spacer as set forth in claim 17, wherein said means for adhesively engaging a substrate comprises uncured material capable of adhesively engaging a substrate.

20. The composite spacer as set forth in claim 19, wherein said uncured material comprises uncured silicone.

21. The composite spacer as set forth in claim 19, wherein said uncured material comprises uncured foam.

22. A glazing assembly comprising a pair of substrates engaged with the spacer of any one of claims 15 to 21.

23. Use of the spacer according to any one of claims 1 to 13 or 15 to 21 to produce an insulated glazing assembly.

24. A composite spacer for use in insulated glazing assembly, comprising:
- a body of insulating material having opposed sides, a front face and a rear face, each side having a portion of material removed therefrom to provide a recess and at least one projection, each projection being for sealing a respective substrate;
- sealant material in each said recess coplanar with each said projection for sealing a respective substrate, said sealant and recess being proximate said rear face of said body, said rear face being adapted to face an enclosed space of said assembly; and
- a desiccant matrix separate from and associated with said spacer.

25. The composite spacer as set forth in claim 24, wherein said body comprises a foam body.

26. The composite spacer as set forth in claim 24 or 25, wherein said spacer is an integral, one-piece spacer.

27. The composite spacer as set forth in claim 24, 25 or 26, wherein each said projection includes means for adhesively engaging a substrate.

28. The composite spacer as set forth in claim 24, 25, 26 or 27, wherein said sealant adhesively engages said substrate and comprises acrylic adhesive.

29. The composite spacer as set forth in claim 27, wherein said sealant adhesively engages said substrate and comprises pressure sensitive adhesive.

30. The composite spacer as set forth in claim 26, wherein said means for adhesively engaging said substrate comprises uncured material capable of adhesively engaging a substrate.

31. The composite spacer as set forth in claim 30, wherein said uncured material comprises uncured silicone.

32. The composite spacer as set forth in claim 30, wherein said uncured material comprises uncured foam.

33. A glazing assembly comprising a pair of substrates engaged with the spacer of any one of claims 24 to 32.

34. Use of the spacer according to any one of claims 24 to 32 to produce an insulated glazing assembly.

35. A one-piece composite spacer for spacing substrates, said spacer having opposed substrate engaging surfaces, comprising a foam body having
(a) a pair of opposed first surfaces, each said first surface adapted for sealing engagement with a substrate;
(b) a pair of second substrate engaging surfaces of a second material different from said foam, said second surfaces being coplanar with said first surfaces of said foam body; and
(c) a pair of third substrate engaging surfaces of a third material different from said foam material, said third surfaces being coplanar with said first and second surfaces, whereby said spacer provides opposed substrate engaging surfaces each having a plurality of discrete sealing surfaces adapted to seal with said substrates and with said first surfaces in a position to be non-adjacent a space enclosed by said substrates on assembly.

36. A composite space as set forth in claim 35, wherein said sealing surfaces are coplanar.

37. A composite spacer as set forth in claim 35, wherein said foam body comprises an ultra-violet curable foam.

38. A composite spacer as set forth in claim 35, wherein said second material and said third material are selected from a group comprising polyurethane, butyl, polyisobutylene or mixtures thereof.

39. A composite spacer as set forth in claim 35, including at least one additional layer selected from a fluid barrier and a desiccant containing matrix.

40. A composite spacer for spacing substrates according to claim 35, in the form of an extruded body.

41. A glazing assembly comprising a pair of substrates engaged with the spacer of any one of claims 35 to 40.

42. Use of the spacer according to any one of claims 35 to 40 to produce an insulated glazing assembly.

43. An insulated glass assembly including a first glass substrate and a second glass substrate, said assembly comprising:
- a first length of sealant means and a second length of sealant means in spaced facing relation defining a space therebetween, each of said first and second lengths contacting said glass substrate;
- a continuous polymeric self-supporting support layer contacting said first and second lengths of said sealant means, said continuous self-support layer and said sealant means being arranged between said glass substrate for forming an axial channel between said substrates; and
- desiccant means positioned within said space and separate from said sealant means and said support layer, said desiccant means being between the first and second lengths of said sealant means.

44. The insulated glass assembly as set forth in claim 43, wherein said continuous self-supporting support layer comprises a poly-ethylene terephthalate.

45. The insulated glass assembly as set forth in claim 44, wherein said desiccant means comprises a continuous elongate length of desiccant material.

46. The insulated glass assembly as set forth in claim 45, wherein said desiccant is disposed in a carrier matrix.

47. An insulated glass assembly including a first glass substrate and a second glass substrate, said assembly comprising:
- a first length of sealant means and a second length of sealant means in spaced facing relation defining a space therebetween, each said length contacting a glass substrate;
- a continuous moisture and air impermeable polymeric self-supporting support layer contacting first and second lengths of said sealant means; and
- desiccant means positioned within said space and separate from said sealant means and said self-supporting layer, said desiccant means being between the first and second lengths of said sealant means.

48. A composite spacer for spacing substrates in an insulating glass assembly, comprising:
- an insulating spacer core having spaced apart generally flat substrate engaging surfaces, and a pair of opposed faces, one face being a front face for facing the interior of said assembly; and the other face a rear face opposed to said front face, said spacer core comprising an essentially linear array of linked members, one of said faces of said spacer core having generally regularly spaced indentations, adjacent pairs of said indentations defining a separate one of said members.

49. A composite spacer as defined in claim 48, wherein said rear face is generally sinusoidal, wave-like or undulating in profile.

50. A composite spacer as defined in claim 48, wherein said indentations are formed by an undulating wall.

51. A composite spacer as defined in any one of claims 48 to 50, formed from a natural or synthetic elastomer.

52. A composite spacer, comprising a spacer core as claimed in any one of claims 48 to 51, at least partly encapsulated with a sealant material.

53. A composite spacer, as defined in claim 52, wherein said front face of said spacer core is generally within fluid barrier means at said front face.

54. A composite spacer as defined in claim 53, wherein there is bonded to said fluid barrier means a desiccant containing matrix.

55. A composite spacer as defined in claim 48, wherein said substrate engaging surfaces are at least partly covered by an adhesive.

56. A composite spacer as defined in claim 49, wherein both of said front and rear faces have an undulating, wave-like or sinusoidal profile forming an essentially linear array of linked generally cylindrical forms, each of said generally cylindrical forms defining one of said members.

57. An insulated glass assembly, comprised of spaced apart substrates and a spacer core as defined in any one of claims 48 to 56 extending around the periphery of said assembly.

58. Use of the spacer according to any one of claims 48 to 56 to produce an insulated glazing assembly.

59. A composite spacer as defined in claim 48, wherein said members are generally rectangular in cross-section and spaced apart from each other, said members having a support matrix forming said front face of said spacer core.

60. A glazing assembly comprising a pair of substrates engaged with the spacer of any one of claim 59.

61. Use of the spacer according to claim 59 to produce an insulated glazing assembly.

62. A method of forming an insulated glass assembly comprising:
- providing a composite spacer including an adhesive continuous length sealant strip having a pair of glass lite engaging surfaces and a pair of opposed surfaces and a continuous channel extending inwardly from one of said opposed surfaces;
- providing a continuous self supporting integral layer;
- positioning said layer between said glass lite engaging surfaces and in contact with said channel;
- providing a pair of glass lites; and
- mounting a glass lite to each of said glass lite engaging surfaces.

63. The method as defined in claim 62, said self supporting layer comprising polyethylene terephthalate.

64. The method as defined in claim 62, further including the step of providing a desiccant in said spacer.

65. The method as defined in claim 64, further including the step of positioning said desiccant within said channel.

66. A composite spacer for spacing substrates in an insulating glass assembly, comprising:

an insulating spacer having spaced-apart substrate engaging surfaces, and a pair of opposed faces, one being a front face for facing the interior of said assembly; and the other a rear face opposed to said front face;

said spacer having a plurality of interconnected segments in an essentially linear array, the segments of the array having points of joinder which are recessed or indented and which extend inwardly between said engaging surfaces and extending from one said face to a point generally adjacent the other of said faces.

67. A composite spacer according to claim 66, wherein at least said rear face has spaced-apart indentations with an indentation at each point of joinder.

68. A spacer as defined in claim 66, wherein both of said front face and said rear face include said indentations.

69. An insulated glass assembly comprising the spacer of claim 66 together with a glass substrate.

70. An insulated glass assembly comprising the spacer of claim 66, together with glass substrate, wherein said rear face has a generally sinusoidal or wave shaped profile.

71. An insulated glass assembly as defined in claim 66, formed from a natural or synthetic elastomer.

72. An insulated glass assembly as defined in claim 66, wherein said spacer core is at least partially encapsulated with a sealant material.

73. An insulated glass assembly as defined in claim 66, wherein said front face of said spacer core is generally flat with a fluid barrier means at said front face.

74. An insulated glass assembly as defined in claim 66, wherein said fluid barrier means includes a desiccant containing matrix bonded thereto.

75. An insulated glass assembly as defined in claim 66, wherein said substrate engaging surfaces are at least partly covered by an adhesive.

76. An insulated glass assembly as defined in claim 67, wherein both of said front and rear faces have an undulating profile to form said essentially linear array.

77. An insulated glass assembly as defined in claim 76, wherein both of said front and rear faces have a wave-shaped or generally sinusoidal profile to form an essentially linear array of linked members.

78. A composite spacer for spacing substrates in an insulating glass assembly, comprising:

an insulating spacer having spaced-apart substrate engaging surfaces, and a pair of opposed faces, one being a front face for facing the interior of said assembly; and the other a rear face opposed to said front face;

said spacer having a plurality of interconnected segments in an essentially linear array, the segments of the array having recessed or indented points of joinder which extend inwardly between said engaging surfaces and which extend interiorly from both faces to approximately midway therebetween.

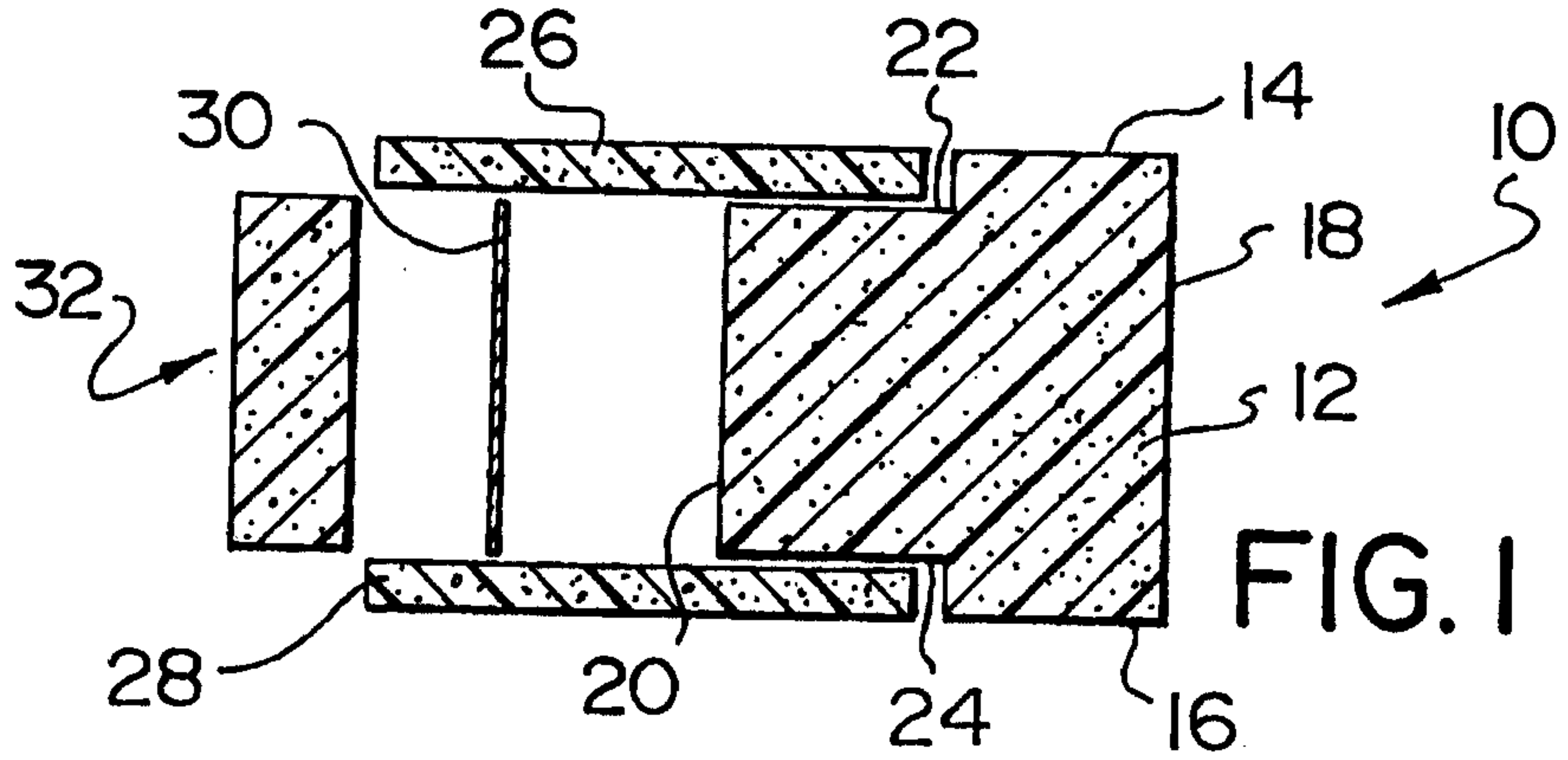


FIG. 1

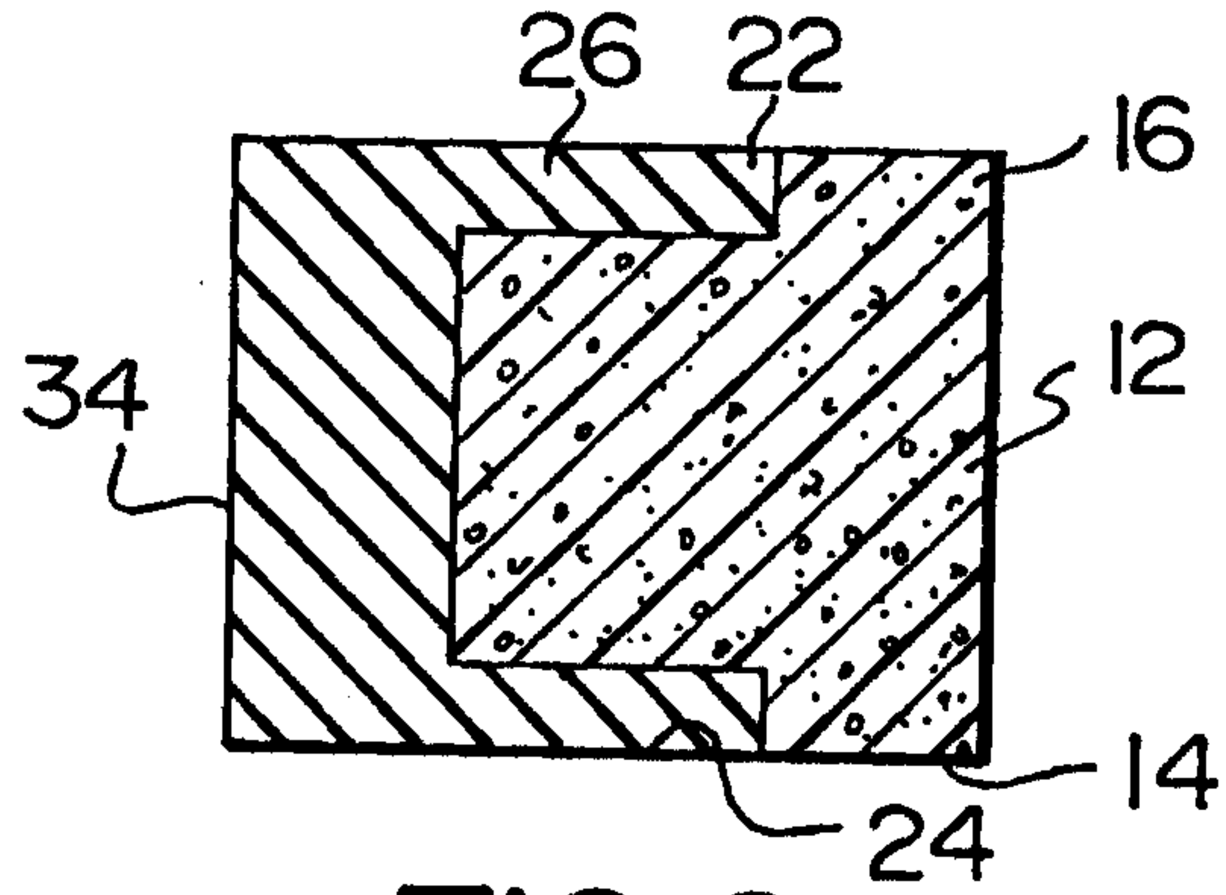


FIG. 2

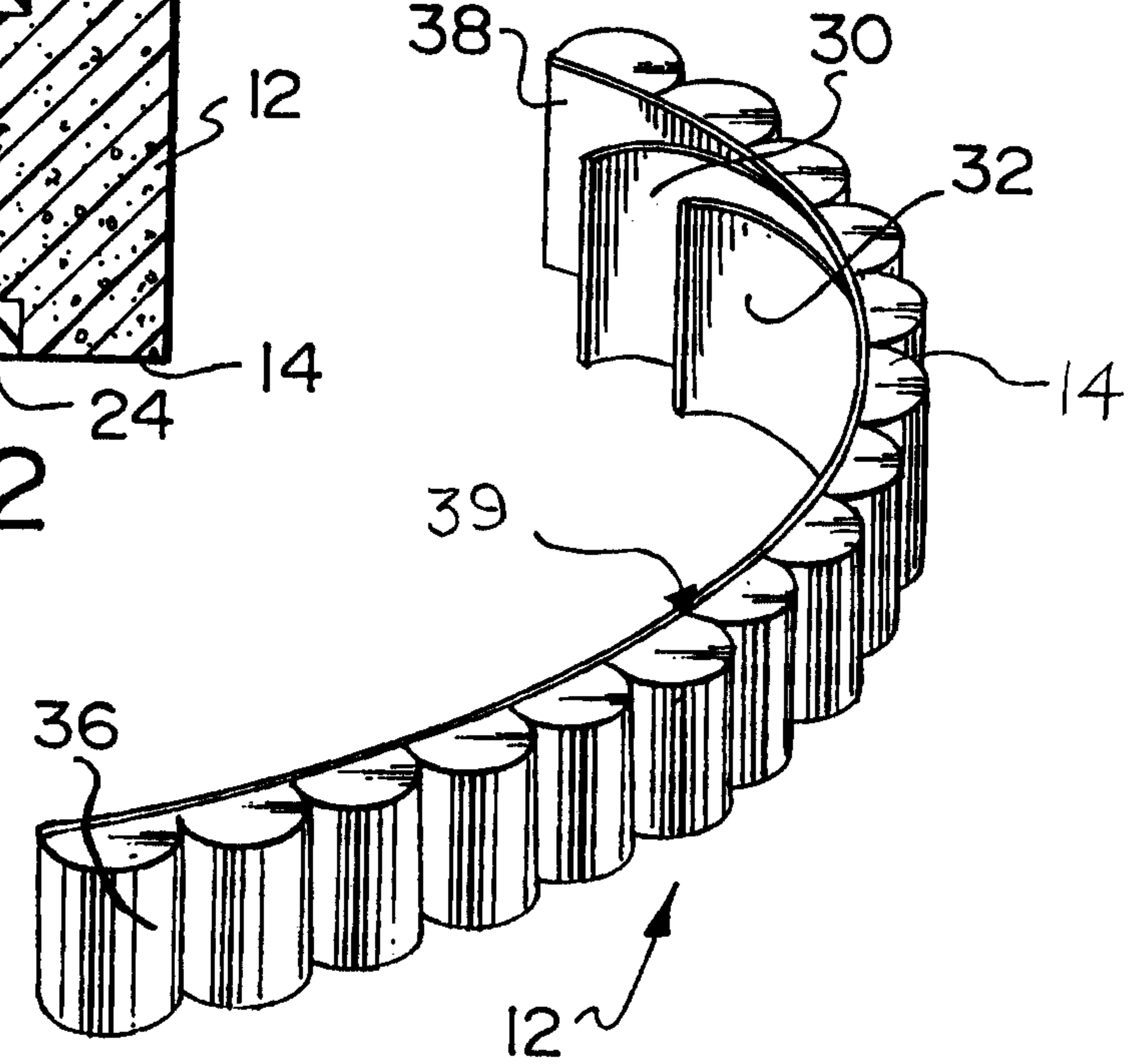


FIG. 3

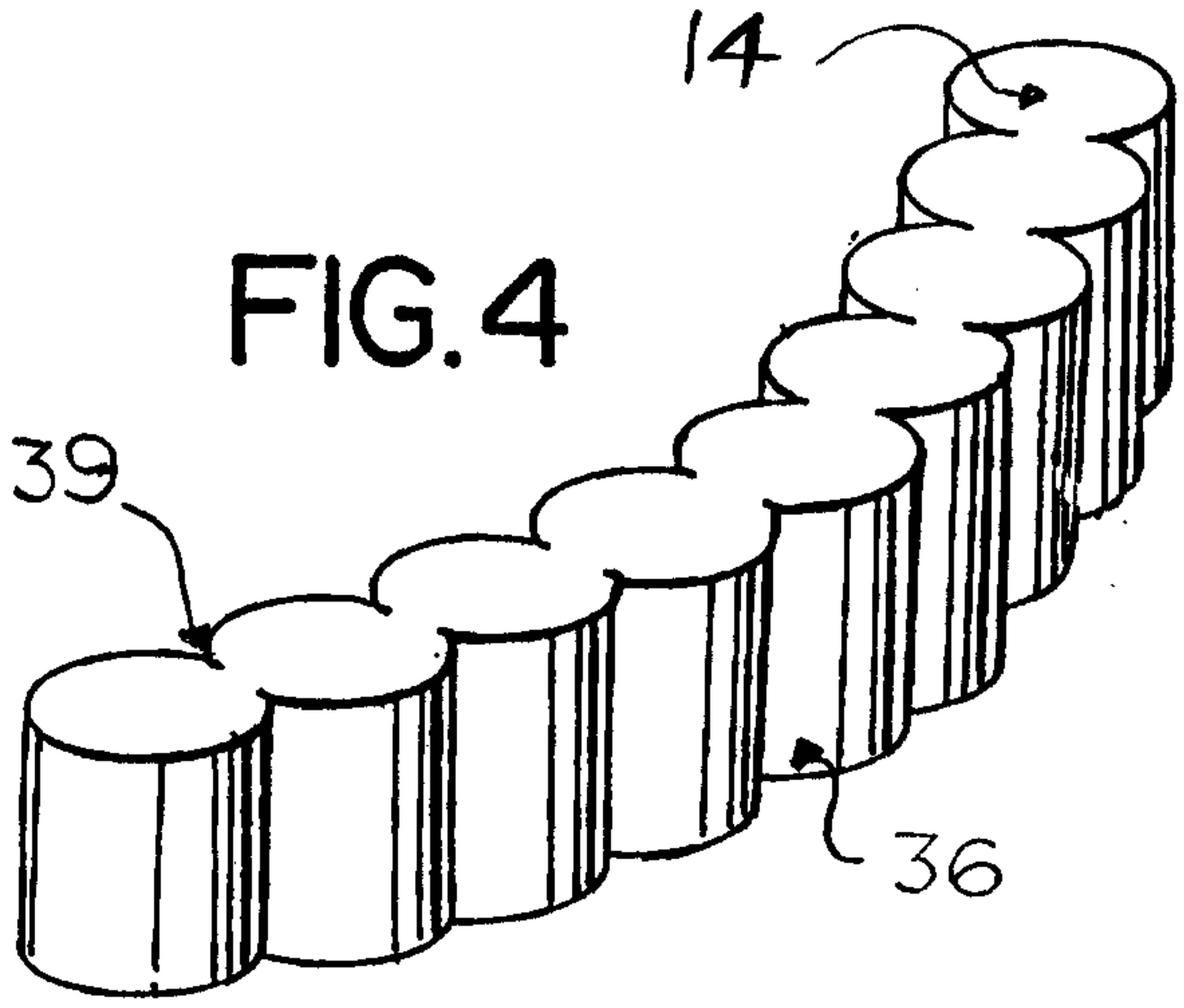


FIG. 4

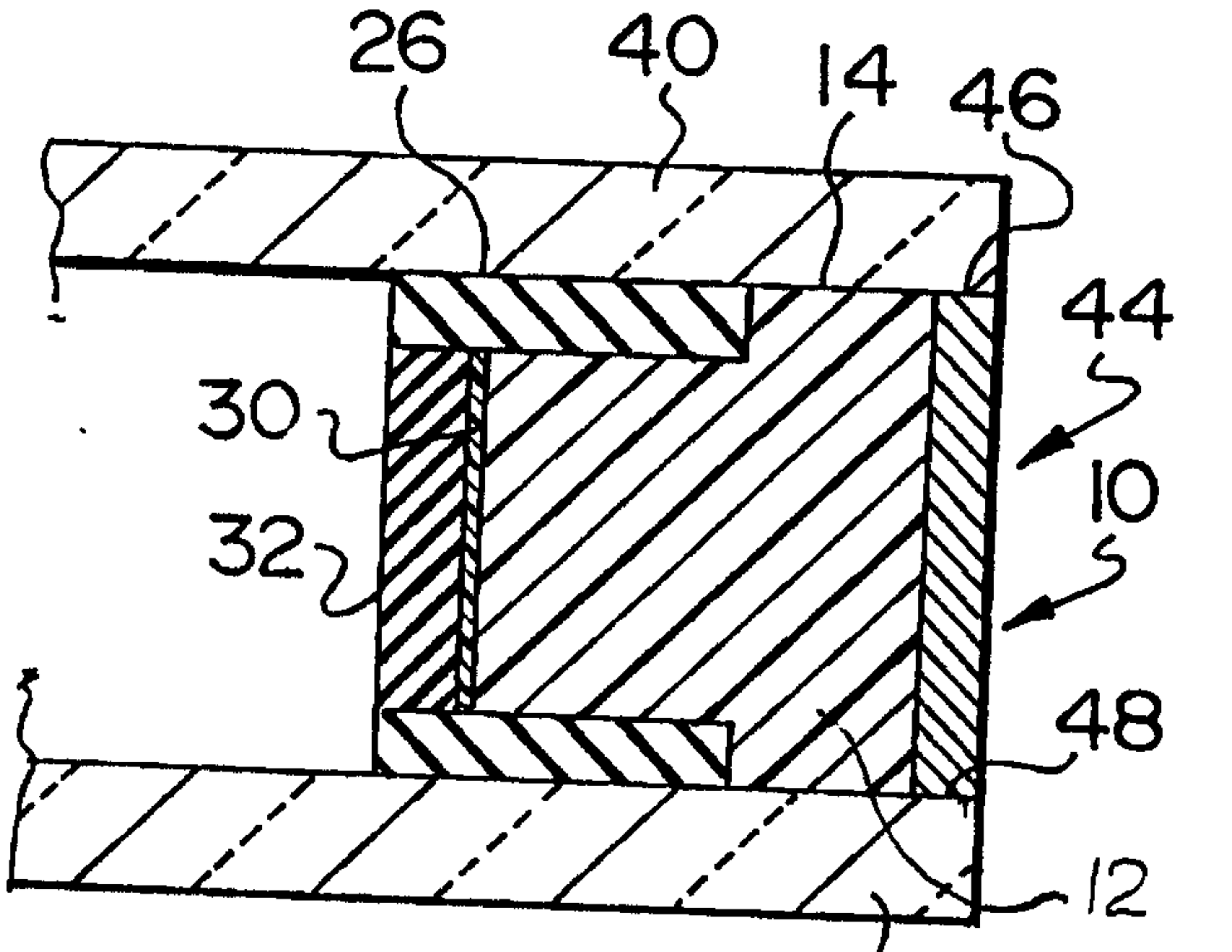
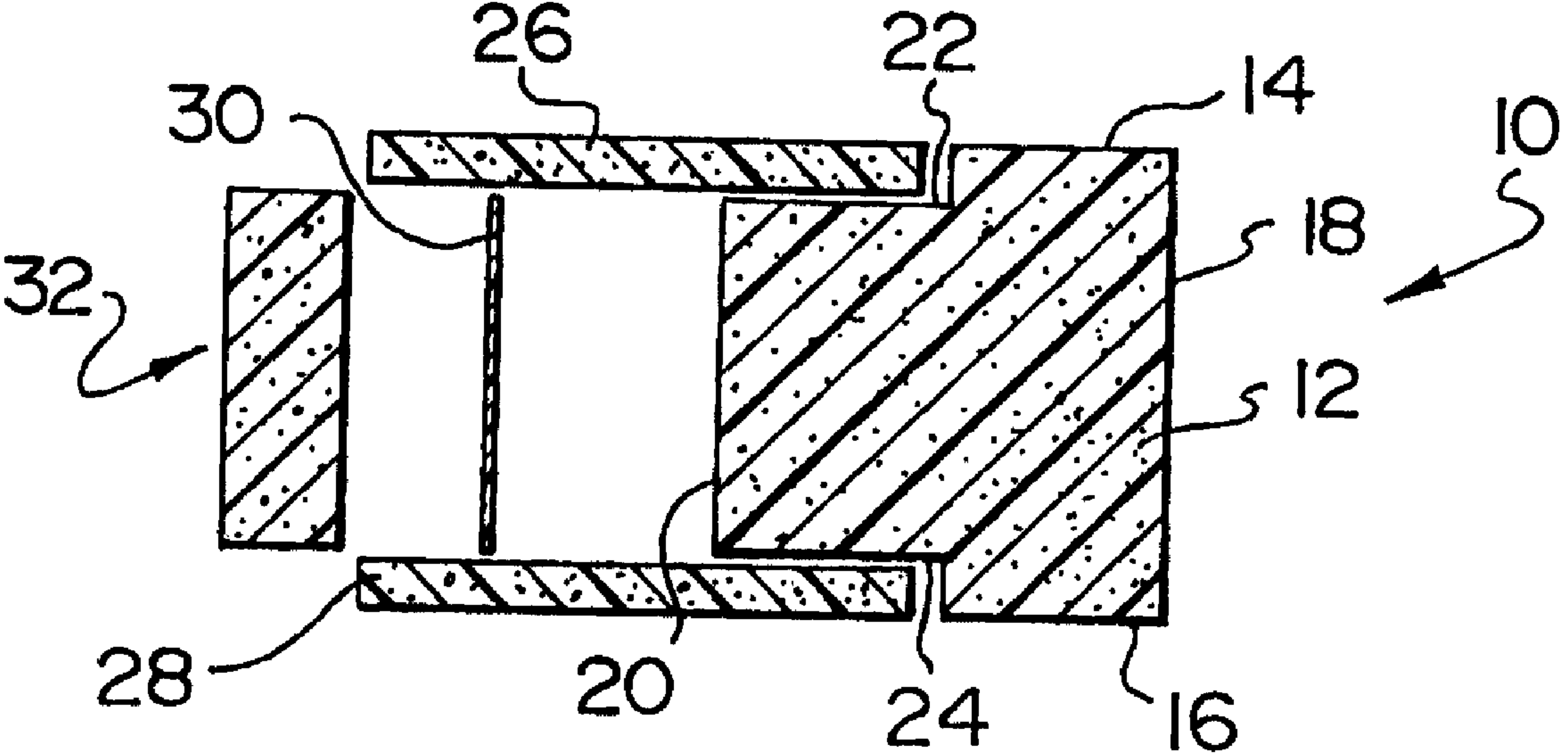


FIG. 5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