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(54) **SHROUD RETENTION WAFER**

HÜLLENHALTERUNGSPLATTE

PLAQUETTE DE RETENUE A ENVELOPPE

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(56) References cited:
US-A- 4 749 373 **US-A- 5 522 730**

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Description

Field of the Invention:

[0001] The present invention relates to a shroud retention wafer.

Brief Description of Prior Developments:

[0002] Typical prior art shrouds have designed interference with a mating pin. In the application process the shroud is placed on the pin tip and, with some sort of toe and press, is pushed down the pin against the rear side of a back panel.

[0003] One of the difficulties associated with such a procedure is knowing if the shroud is properly aligned with the pins. That is, knowing if the shroud is misplaced by perhaps one position. Another problem is that the shroud needs to be held on the pin tips while a tool is placed within it and it is placed into a press. It is also found that as pressure is applied to the shroud, the pin may have a tendency to bend since the load is being placed on a long slender column.

[0004] As is disclosed in European Patent Application No. 578 487 A, it is known to provide a structure known as a locking plate or retention wafer between the shroud or housing and the circuit board or back panel. The arms fit in passageways in the base of the housing and these passageways include a camming surface for urging the gripping arms into contact with the pins. The disadvantage to the above arrangement described in European Patent Application No. 578 487 A is that the interacting protuberance and camming surfaces require the gripping arms or cylindrical members to be displaced from each other at a relatively large distance.

[0005] US 5 522 730 discloses a spacer plate with locking arms to be inserted into passage ways of a housing member. The arms have thickened portions at approximately one end and portion of said arms, the thickened portion fully surrounding said arms.

[0006] US 4 749 373 discloses a crimp snap retention system. Here, respectively two tine members are mounted in an adjacent manner. The tine members are reinforced by vertical ribs.

[0007] It is the object of the invention to provide a shroud retention wafer providing better retention than known shrouds.

[0008] This object is accomplished in accordance with the features of claim 1. Dependent claims are directed on preferred embodiments of the invention.

Summary of the invention

[0009] The insulative shroud retention wafer of this invention includes a planar base member having a first and a second side. There are also first, second, third and fourth cylindrical members each having an axial pin receiving aperture and an axial center line extending

said pin receiving aperture. These cylindrical members extend from the first side of the planar base member, and these cylindrical members are positioned in an arrangement such that a first longitudinal center line extends through the axial center line of the first and second cylindrical members. A second longitudinal center line extends in parallel spaced retention to the first longitudinal center line through the axial center lines of the third and fourth cylindrical members. A first transverse center line extends through the centerlines of the first and third cylindrical members. A second transverse center line extends through the center line of the second and fourth cylindrical members. A protuberance is peripherally positioned on the first cylinder at least in part at a position between the first longitudinal center line and the first transverse center line.

Brief Description of the Drawings

[0010] The present invention is further described with reference to the accompanying in which:

Fig. 1 is a top plan view of a preferred embodiment of the shroud retention wafer of the present invention;

Fig. 2 is a side elevational view of the shroud retention wafer shown in Fig. 1;

Fig. 3 is a front elevational view of the shroud retention wafer shown in Fig. 1;

Fig. 4 is a rear view from 4 - 4 in Fig. 1;

Fig. 5 is an enlarged view of circle 5 in Fig. 4;

Fig. 6 is an enlarged view of Area 6 in Fig. 1; and

Fig. 7 is a further enlarged view of Area 7 in Fig. 6

Detailed Description of the Preferred Embodiments

[0011] The shroud retention wafer of the present invention is an improvement on the insulative plate with integral insulative sleeves which are shown respectively at numerals 57 and 56, PCT International Application No. WO 96/31922 published October 10, 1996. The contents of this application are incorporated herein by reference.

[0012] The wafer is composed of a thin molded base with cylindrical member on its top. Although 30 cylindrical members are shown in the disclosed embodiment, different numbers of cylindrical members may be used in various other situations. The inside coring of the 20 central cores has an odd shaped hole in it and two areas of added material on two opposing sides of the tower. The outside 5 cores on each end of the wafer are not pertinent to the wafer's function. It will be appreciated that while the cores do not serve for pin retention they do serve for insulation and guidance. As pressure is applied to the opposing areas of added material, hereafter referred to as "protuberances", the cylindrical member will start to collapse, since there will preferably be approximately 8 mils of plastic on the cylindrical portion 90

degrees from the protuberances.

[0013] This wafer is used in conjunction with a die cast housing which has a matching grid of holes similar to the wafer. In practice, the wafer is placed by hand into the bottom of the casting and pushed to a specified depth. This piece is then supplied to a user as a shroud which is placed on the rear side of a back panel by hand. The shroud can be placed over the pins protruding from the rear side of the back panel and pushed down to the board until the wafer contacts the board. As this point the casting is not against the back panel. A piece of tooling is placed inside the casting, the back panel supported, and the casting is fully inserted over the wafer. The wafer, which was already pushed against the back panel, cannot move as the casting is pressed over it. This causes the bumps to be pushed toward the center of the core and the plastic core itself to press against the pin. This action causes the shroud to be securely fixed to the back panel.

[0014] Referring to the drawings the insulative shroud retention wafer of the present invention includes a planar base section 10 which has a first upper side 12 and a second lower side 14. Extending upwardly from the upward side there is a first lateral row of cylindrical members shown generally at numeral 16 which is comprised of members 18, 20, 22, 24 and 26. There is also an opposed lateral row of cylindrical members made up of members 30, 32, 34, 36 and 38. Interposed between these lateral rows there are four medial rows shown generally at 40, 42, 44 and 46. The array of cylindrical members is also defined by a number of transverse rows shown generally at numerals 48, 50, 52, 54 and 56. Each of the medial rows has a center line as, for example, center line 58 of medial row 40 and center line 60 of medial row 42. Similarly, each of the transverse rows has a center line as, for example, center line 62 of row 48 and center line 64 of row 50. The medial rows include, for example, first cylinder 66 and second cylinder 68 in medial row 40 and third cylinder 70 and fourth cylinder 72 in medial row 42. Each of the cylindrical members in the medial row has a axial center line as, for example, first axial center line 74 in cylindrical member 66, second axial center line 76 and second cylindrical member 68, third axial center line 78 in third cylindrical member 70 and fourth axial center line 80 in fourth cylindrical member 74. Each of the cylindrical members in the lateral rows such as cylindrical member 30 includes a peripheral base 82, a central body 84 and a central pin receiving aperture 86. While these lateral row pin receiving apertures allow for insulation of the pins they do not serve a gripping function. Each of the cylindrical members in the medial row as, for example, cylindrical member 66 has a peripheral base 88, and a central body 90. Its central pin receiving aperture through which the first axial center line 74 extends includes an elongated slot 92 and lateral recesses 94 and 96 which extend from the elongated 92 at a medial position in opposed directions. It will be seen that the lateral recesses 94 and 96

are triangularly shaped to receive a cross sectionally square pin. A semi-circular shape for these recesses would be used for a round pin. Each of the cylindrical members in the medial rows also includes a pair of opposed protuberances 98 and 100. These protuberances have respectively center lines 102 and 104. It will be seen that these protuberances 98 and 100 are radially aligned respectively with the opposed lateral recesses 94 and 96 in the pin receiving aperture. The protuberance center lines 102 and 104 are also displaced from the first longitudinal center line 58 and the first transverse center line 62 by an angle of 45 degrees. The protuberances 98 and 100 also include vertical wall sections 106 and 108 respectively which overlie the outer periphery of cylindrical member 66. These walls each cover about 90 degrees of the periphery of the cylindrical member 66. These walls have a arcuate upper sections 110 and 112 respectively which curve inwardly toward the cylindrical member to form a cam surface. The wall also has upper edge 114 and 116 respectively which slope laterally and downwardly toward the base from their center lines. It will be understood that all the cylindrical members in the medial rows are essentially identical to cylindrical member 66 and the protuberances in these rows are similarly positioned on the cylindrical members and have the same relatively positions to the longitudinal and traverse center lines.

[0015] The shroud retention wafer described above may be fixed to a header prior to shipment of that header thus saving considerable time and effort during the placement of the header on a back panel or circuit board. It will also be appreciated that the positioning of the protuberances as described above on the cylindrical members allows for efficient use of space on the wafer.

[0016] While the present invention has been described in connection with the preferred embodiments of the various figures, it is to be understood that other similar embodiments may be used or modifications and additions may be made to the described embodiment for performing the same function of the present invention without deviating therefrom. Therefore, the present invention should not be limited to any single embodiment, but rather construed in breadth and scope in accordance with the recitation of the appended claims.

Claims

1. An insulative shroud retention wafer comprising:

- (a) a horizontal planar base member (10) having a first (12) and a second (14) side;
- (b) first, second third and fourth cylindrical members (66, 68, 70, 72) extending vertically from the first side of the planar base member for insertion into a matching grid of holes of a housing and each having an axial pin receiving aperture and an axial center line (74, 76, 78,

80) extending through said pin receiving aperture wherein said cylindrical members are positioned in an arrangement such that a first longitudinal center line (40, 58) extends through the axial center line of the first and second cylindrical members and a second longitudinal center line (42, 60) extends in parallel spaced relation to the first longitudinal center line through the axial center lines of the third and fourth cylindrical members and a first transverse center line (48, 62) extends through the center lines of the first and third cylindrical members and a second transverse center line (50, 64) extends through the center line of the second and fourth cylindrical members;

characterized in further comprising

(c) in a horizontal cross section of the first cylindrical member a protuberance (98, 100) as compared to said holes, said protuberance being peripherally located on the first cylindrical member at least in part at a position between the first longitudinal center line and the first transverse center line.

2. The wafer of claim 1 wherein there is a second protuberance (98, 100) in a horizontal cross section of the first cylindrical member and said second protuberance is located at a second position at least in part between the first longitudinal center line and the first transverse center line.
3. The wafer of claim 1 wherein the second protuberance (98, 100) is circumferentially opposed to the first protuberance (98, 100).
4. The wafer of claim 3 wherein the first and second protuberances each have a protuberance center line (102, 104) and said protuberance center lines are each displaced from the first longitudinal center line and the first transverse center line by about 45 degrees.
5. The wafer of claim 4 wherein the axial aperture includes an elongated slot (92).
6. The wafer of claim 5 wherein a pair of opposed pin receiving recesses (94, 96) extend from the elongated slot in the pin receiving aperture.
7. The wafer of claim 6 wherein the elongated slot has a longitudinal axis which intersects the first longitudinal center line at an acute angle.
8. The wafer of claim 7 wherein the acute angle at which the longitudinal axis of the elongated slot intersects the first longitudinal center line is about 45 degrees.

9. The wafer of claim 8 wherein the recesses extending from the longitudinal slot extend generally perpendicularly from the longitudinal center line of the elongated slot.

10. The wafer of claim 9 wherein the recesses are triangularly shaped.

11. The wafer of claim 9 wherein the protuberances each comprise a wall which overlies a portion of the cylindrical member.

12. The wafer of claim 11 wherein the protuberances each peripherally overlies about a 90 degrees area of the cylindrical member.

13. The wafer of claim 11 wherein the protuberance center lines are radially aligned with the recesses extending from the longitudinal slot.

14. The wafer of claim 11 wherein the first cylindrical member has a height and the protuberances extend over only a portion of said height.

15. The wafer of claim 14 wherein the protuberances each have an upper edge (112, 116) which is curved arcuately toward the cylindrical member.

16. The wafer of claim 15 wherein the upper edge (112, 116) of the protuberances curves laterally toward the planar base member (10) between the protuberance center line (102, 104) and the first longitudinal center line (40) and the first transverse center line (48).

17. The wafer of claim 1 wherein the second cylindrical member has a pair of protuberances which are peripherally positioned on said cylindrical member in opposed relation at positions between the first longitudinal center line and the second transverse center line.

Patentansprüche

1. Isolierende Kontakthüllenhalterungsplatte mit:
 - (a) einem horizontalen, ebenen Basis-Bauteil (10) mit einer ersten (12) und einer zweiten (14) Seite;
 - (b) einem ersten, einem zweiten, einem dritten und einem vierten zylindrischen Bauteil (66, 68, 70, 72), die sich von der ersten Seite des ebenen Basis-Bauteils aus vertikal erstrecken und die in ein passendes Muster von Löchern eines Gehäuses eingeschoben werden können und von denen jedes eine axiale Kontaktaufnahmeöffnung und eine axiale Mitten-Linie (74, 76, 78,

80) hat, die sich durch die Kontaktaufnahmeöffnung erstreckt, wobei die zylindrischen Bauteile in einer solchen Anordnung positioniert sind, daß sich eine erste längliche Mitten-Linie (40, 58) durch die axialen Mitten-Linien des ersten und des zweiten zylindrischen Bauteils erstreckt und daß sich eine zweite längliche Mitten-Linie (42, 60) in parallel beabstandeter Weise zur ersten länglichen Mitten-Linie durch die axialen Mitten-Linien des dritten und vierten zylindrischen Bauteils erstreckt und daß sich eine erste quer verlaufende Mitten-Linie (48, 62) durch die Mitten-Linien des ersten und des dritten zylindrischen Bauteils erstreckt und daß sich eine zweite quer verlaufende Mitten-Linie (50, 64) durch die Mitten-Linien des zweiten und vierten zylindrischen Bauteils erstreckt, verlaufende Mittellinie (50, 64) durch die Mittellinien des zweiten und vierten zylindrischen Bauteils erstreckt, weiter **gekennzeichnet durch**

c) einen Vorsprung (98, 100) in einem horizontalen Querschnitt des ersten zylindrischen Bauteils im Vergleich zu den Löchern, wobei der Vorsprung am Umfang des ersten zylindrischen Bauteils zumindest teilweise an einer Position zwischen der ersten länglichen Mittellinie und der ersten quer verlaufenden Mittellinie angebracht ist.

2. Platte nach Anspruch 1, bei der sich in einem horizontalen Querschnitt des ersten zylindrischen Bauteils ein zweiter Vorsprung findet, der sich an einer zweiten Position befindet, die zumindest teilweise zwischen der ersten länglichen Mittellinie und der ersten quer verlaufenden Mittellinie liegt.
3. Platte nach Anspruch 1, bei der der zweite Vorsprung (98, 100) in Umfangsrichtung dem ersten Vorsprung (98, 100) gegenüber liegt.
4. Platte nach Anspruch 3, bei der der erste und der zweite Vorsprung jeweils eine Vorsprungs-Mittellinie (102, 104) haben, und die Vorsprungs-Mittellinien jeweils gegen die erste längliche Mittellinie und die erste quer verlaufende Mittellinie um etwa 45° verschoben sind.
5. Platte nach Anspruch 4, bei der die axiale Öffnung einen länglichen Schlitz (92) aufweist.
6. Platte nach Anspruch 5, bei der sich zwei gegenüberliegende Kontaktaufnahmevertiefungen (94, 96) vom länglichen Schlitz in der Kontaktaufnahmeöffnung aus wegerstrecken.
7. Platte nach Anspruch 6, bei der der längliche Schlitz eine längliche Achse hat, die die erste längliche Mit-

ten-Linie unter einem spitzen Winkel schneidet.

8. Platte nach Anspruch 7, bei der der spitze Winkel, unter dem die längliche Achse des länglichen Schlitzes die erste längliche Mitten-Linie schneidet, etwa 45° ist.
9. Platte nach Anspruch 8, bei der sich die Vertiefungen, die sich vom länglichen Schlitz aus wegerstrecken, allgemein rechtwinklig von der länglichen Mitten-Linie des länglichen Schlitzes aus wegerstrecken.
10. Platte nach Anspruch 9, bei der die Vertiefungen dreiecksförmig ausgebildet sind.
11. Platte nach Anspruch 9, bei der die Vorsprünge jeweils eine Wand aufweisen, die über einem Teil des zylindrischen Bauteils liegt.
12. Platte nach Anspruch 11, bei der sich der Vorsprung jeweils in Umfangsrichtung über einen Bereich von etwa 90° des zylindrischen Bauteils erstreckt.
13. Platte nach Anspruch 11, bei der die Mitten-Linien der Vorsprünge in radialer Richtung mit den sich vom länglichen Schlitz wegerstreckenden Vertiefungen ausgerichtet sind.
14. Platte nach Anspruch 11, bei der das erste zylindrische Bauteil eine bestimmte Höhe hat und der Vorsprung sich lediglich über einen Teil dieser Höhe erstreckt.
15. Platte nach Anspruch 14, bei der die Vorsprünge jeweils eine obere Kante (112, 116) haben, die bogenförmig auf das zylindrische Bauteil zugekrümmt ist.
16. Platte nach Anspruch 15, bei der sich die obere Kante (112, 116) der Vorsprünge seitlich zwischen der Vorsprungs-Mitten-Linie (102, 104) und der ersten länglichen Mitten-Linie (40) und der ersten quer verlaufenden Mitten-Linie (48) auf das ebene Basisbauteil (10) zukrümmt.
17. Platte nach Anspruch 1, bei der das zweite zylindrische Bauteil zwei Vorsprünge hat, die sich am Umfang des zylindrischen Bauteils gegenüberliegen an Positionen zwischen der ersten länglichen Mitten-Linie und der zweiten quer verlaufenden Mitten-Linie.

Revendications

1. Plaquette de maintien de flasque isolant comprenant :

(a) une base plane horizontale (10) ayant une première (12) et une deuxième (14) face ;

(b) des premier, deuxième, troisième et quatrième cylindres (66, 68, 70, 72) s'étendant verticalement depuis la première face de la base plane pour insertion dans une grille d'accouplement de trous d'un logement et ayant chacun un orifice de réception pour la broche axiale et une ligne centrale axiale (74, 76, 78, 80) s'étendant à travers ledit orifice de réception pour broche dans lequel lesdits cylindres sont positionnés en une telle disposition qu'une première ligne longitudinale centrale (40, 58) s'étende à travers la ligne centrale axiale des premier et deuxième cylindres et une deuxième ligne centrale longitudinale (42, 60) s'étende parallèlement à une certaine distance par rapport à la première ligne longitudinale centrale à travers les lignes centrales axiales des troisième et quatrième cylindres et une première ligne centrale transversale (48, 62) s'étende à travers les lignes centrales des premier et troisième cylindres et une deuxième ligne centrale transversale (50, 64) s'étende à travers la ligne centrale des deuxième et quatrième cylindres ;

caractérisée de plus en ce qu'elle comprend,

(c) dans la section transversale horizontale du premier cylindre, une avancée (98, 100) par rapport aux dits trous, ladite avancée étant localisée en périphérie du premier cylindre au moins partiellement en une position située entre la ligne centrale longitudinale et la première ligne centrale transversale.

2. Plaquette conformément à la revendication 1, où il y a une deuxième avancée (98, 100) dans une section transversale horizontale du premier cylindre et ladite deuxième avancée est localisée en une deuxième position au moins partiellement située entre la ligne centrale longitudinale et la première ligne centrale transversale.

3. Plaquette conformément à la revendication 1, où la deuxième avancée (98, 100) est opposée sur la circonférence à la première avancée (98, 100).

4. Plaquette conformément à la revendication 3, où les première et deuxième avancées ont chacune une ligne centrale d'avancée (102, 104) et lesdites lignes centrales d'avancée sont chacune décalée de la première ligne centrale longitudinale et de la première ligne centrale transversale d'environ 45 degrés.

5. Plaquette conformément à la revendication 4, où l'orifice axial comprend une fente allongée (92).

6. Plaquette conformément à la revendication 5, où une paire de renforcements de réception pour broches (94, 96) opposés s'étendent à partir de la fente allongée dans l'orifice de réception pour broche.

7. Plaquette conformément à la revendication 6, où la fente allongée possède un axe longitudinal qui coupe la ligne centrale longitudinale à angle aigu.

8. Plaquette conformément à la revendication 7, où l'angle aigu auquel l'axe longitudinal de la fente allongée coupe la première ligne centrale longitudinale est d'environ 45 degrés.

9. Plaquette conformément à la revendication 8, où les renforcements s'étendant depuis la fente longitudinale s'étendent en général perpendiculairement depuis la ligne centrale longitudinale de la fente allongée.

10. Plaquette conformément à la revendication 9, où les renforcements sont de forme triangulaire.

11. Plaquette conformément à la revendication 9, où les avancées comprennent chacune une paroi qui recouvre une partie du cylindre.

12. Plaquette conformément à la revendication 11, où les avancées recouvrent à la périphérie chacune environ une zone du cylindre située à 90 degrés.

13. Plaquette conformément à la revendication 11, où les lignes centrales d'avancées sont alignées radialement sur les renforcements s'étendant de la fente longitudinale.

14. Plaquette conformément à la revendication 11, où le premier cylindre a une hauteur et des avancées s'étendant sur seulement une partie de ladite hauteur.

15. Plaquette conformément à la revendication 14, où les avancées ont chacune une arête supérieure (112, 116) qui est courbée en arc de cercle en direction du cylindre.

16. Plaquette conformément à la revendication 15, où l'arête supérieure (112, 116) des avancées se courbe latéralement en direction de la base plane (10) entre la ligne centrale d'avancée (102, 104) et la première ligne centrale longitudinale (40) et la première ligne centrale transversale (48).

17. Plaquette conformément à la revendication 1, où le deuxième cylindre possède une paire d'avancées qui sont positionnées à la périphérie dudit cylindre en relation opposée aux positions entre la première ligne centrale longitudinale et la deuxième ligne

centrale transversale.

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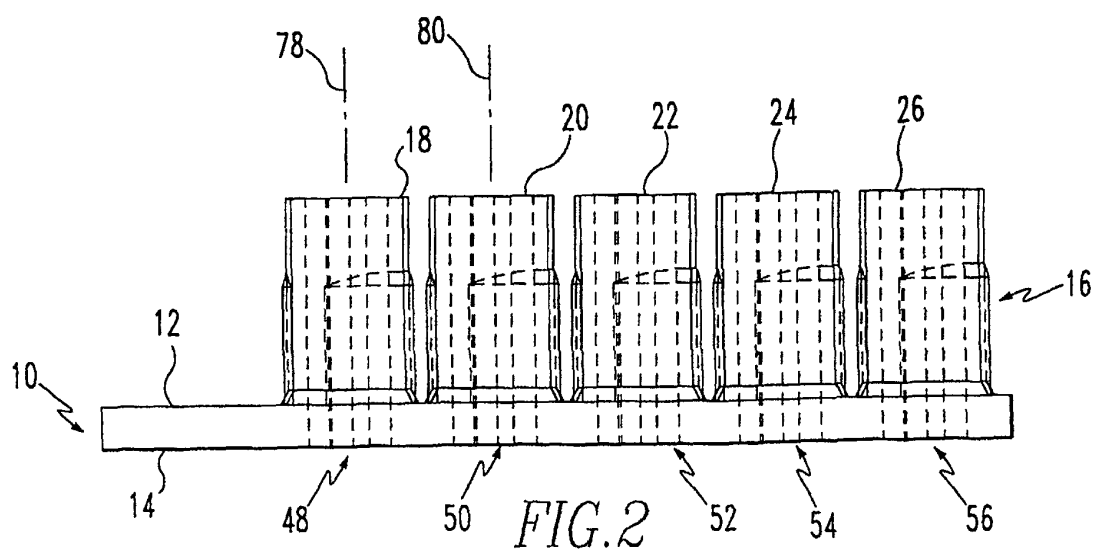
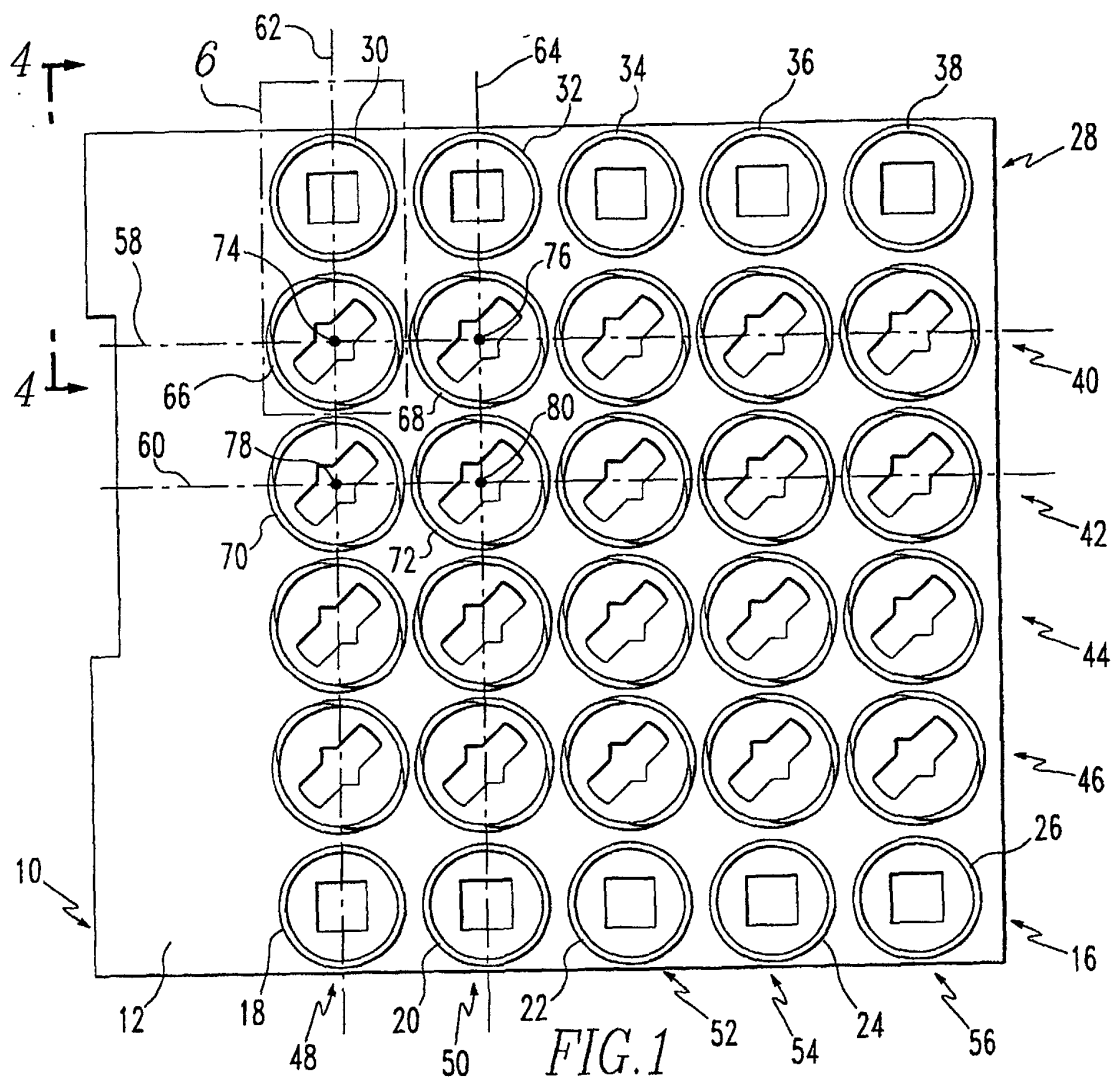
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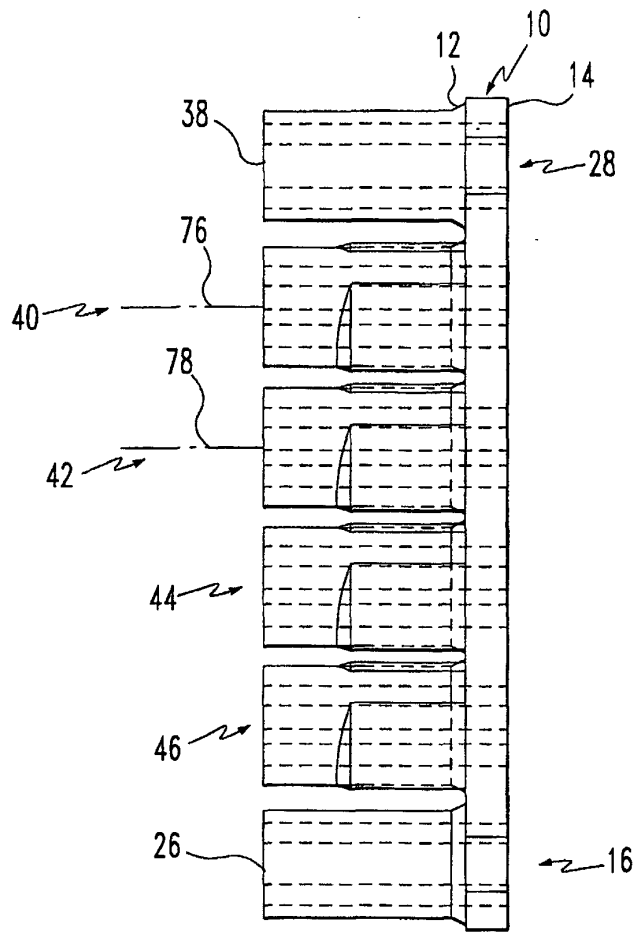


FIG. 3

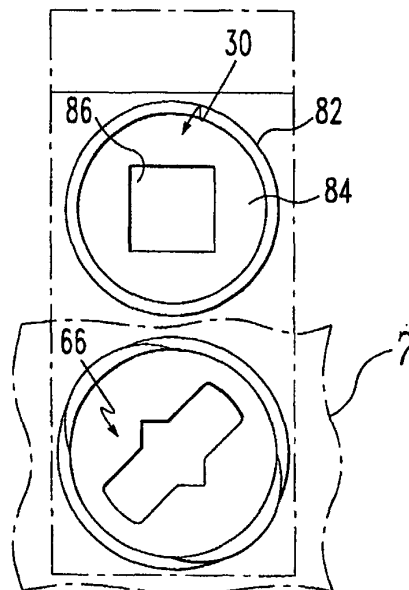


FIG. 6

