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(54) **Rebound sports training apparatus**

(57) A portable rebound (or deflecting) sports training device 101 having at least a first rebound panel (206, 208, 210, 212) or surface adapted to rebound a ball away from the device, and a support structure (805, 806, 807, 808) adapted to hold the panel in a first, operational condition in which the panel is held generally upright; the

panel and the support structure having a second, transport or storage, configuration relative to each other such that the panel and support structure lie flatter (or generally flat) relative to each other in the direction transverse to the rebound panel such that the device occupies less space.

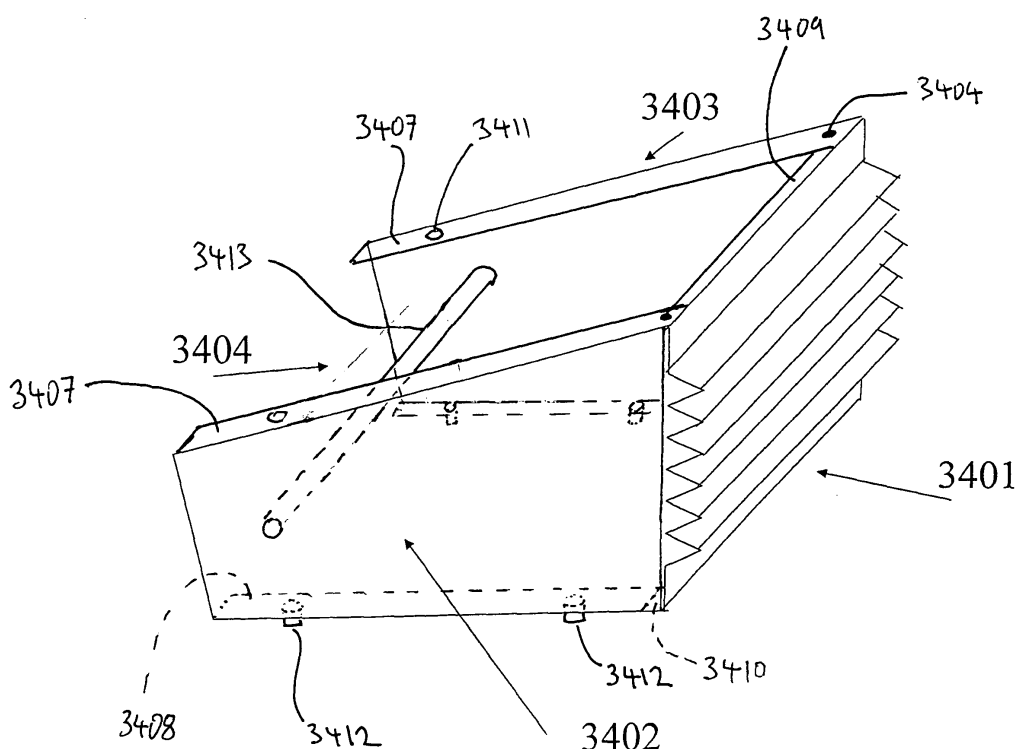


FIG. 34

Description

[0001] Many people will have played a game where a football is kicked against a brick wall and the rebound is then played (eg kicking it again against the brick wall with one or two touches). This game can be played by a single player or by more than one player, for example taking it in turns to kick the ball. The game helps to develop ball control skills and the skills in estimating the timing of running to meet a ball.

[0002] Unfortunately, there is not always a brick wall to hand. Some walls have windows. Some are next to roads. Some are simply not present (eg in the middle of a field).

[0003] An aim of one embodiment of the invention is to provide a sports training rebound apparatus that is portable and can be conveniently moved and positioned in whatever desired location.

[0004] The invention is not restricted to football training apparatus, for example, cricket and hockey are also specifically envisaged as applications.

Summary of invention

[0005] The scope of the protection for this invention(s) is defined in the claims.

[0006] As mentioned, it is a typical pastime and training drill for people (children, young adults and old adults) who play ball sports (such as football/soccer) to project a ball toward a surface such as a wall and for the ball to rebound back to them for them then to repeat the exercise. This invention gives people the opportunity to practice this type of drill in a number of different situations with one or a number of wall type surfaces available. Some embodiments of the invention are designed to be able to be assembled from flat pack and dissembled such that the rebound boxes can be used anywhere. For example one typical constraint of a child using a walled area in say a garden is that the wall is normally fixed. This can result in a grassed area getting repeated use which causes excessive wear in some areas eg muddy areas. The mobility of the rebound box means that it can be moved to different locations thereby reducing the excessive wear in certain areas. Of additional benefit is the ability to use one or a number of rebound boxes in training drills with one or a number of people participating. The design of rebound box is such that the surfaces of the box may be flat or any number of different surface shapes. This variety of shapes gives the participants increased enjoyment and challenge in accommodating the path of the ball having rebounded from the rebound box or been deflected by a surface of the rebound box. The mobility of the rebound box means that it can be used on say football training grounds in a way that a fixed wall would not have the convenience to provide. The invention gives participants unlimited imagination in the way to use one or a number of rebound boxes for training drills or for fun. The rebound box is not limited to its use in football, but can

be used in anyway where a surface would be fun and/or useful in rebounding or deflecting a ball. For example, it could be deployed in one form as a cricket training drill device.

[0007] According to one aspect, the invention comprises a portable rebound or deflecting football training device having a rebound panel comprising a plurality of projections against which in use a football is to be directed for rebounding or deflecting from the panel, the projections comprising spaced apart projections having tips adapted to flex the surface of a football inwards into the football, in use, and the tips being spaced between 1 and 8 cm apart, preferably between about 3 and about 5 cm apart, and most preferably about 4cm apart.

[0008] The rebound panel may be disposed in a generally upright position.

[0009] The projections may comprise elongate ribs or ridges. The projections, ribs or ridges may be provided with a pointed tip. The ribs or ridges may extend generally parallel to each other, and may be evenly spaced part. The ribs or ridges may not be all the same distance from the next adjacent ridge.

[0010] The ribs or ridges may be formed in sheet material. The sheet material may comprise a ziz-zag corrugated sheet. The sheet material may comprise steel or iron or other ferrous metal.

[0011] The ribs or ridges comprise rods or bars or slats, possibly provided with a pointed edge. The rods or bars or slats may comprise steel or iron or other ferrous metal.

[0012] The portable rebound or deflecting football training device may have at least one support or foot adapted to hold the panel generally upright in use. The support may comprise at least one side frame or panel extending in use generally transversely to the rebound panel.

[0013] Side frames or panels may be provided. The, or each, side panel or frame may have a triangular or wedge shape such that force from a ball that hits the rebound panel is directed at least in part into the ground, via the or each side panel or frame.

[0014] The or each side panel or frame may be movable between a position of use in which it extends transversely away from the rebound panel and props it up, to a storage position in which it extends generally parallel to the rebound panel. The, or each, side panel may be movable by being detachable from the rebound panel, e.g. by being bolted onto it.

[0015] At least one of the side frame(s) or panel(s) is, preferably or optionally, (i) angularly movable relative to the rebound panel so as to be able to move between their operative and storage positions; or (ii) removable from the rebound panel so as to be able to be placed alongside it in the storage position. There may be two side panels or frames and wherein: both of the side panels may be (i) above, or both may be (ii) above, or one may be (i) and one may be (ii) above.

[0016] There may be two side panels or frames, and a bracing member, optionally a strut or bar, connecting

them at a region of the side panels or frames disposed away from the region of the panels or frames connected to the rebound panel. The strut or bar may be movable relative to the side panels or frames so as to be movable from a position of use in which it braces the side panels of frames, and a storage position in which it extends generally parallel to the side panel or frames.

[0017] In the storage position, the side panel(s) or frame(s), and if provided the bracing member, may be capable of being positioned to lie disposed generally parallel, for example stacked on top of each other.

[0018] The device may comprise a triangle or quadrilateral (e.g. square in cross section, or trapezium-shaped in cross section), or other closed shape, bounded on at least three, or four, sides by structural members, at least one of the structural members comprising the rebound panel, and having open sides above and below the plane of the triangle, quadrilateral, or other closed shape, defined by the structural members. The open sides may be disposed one against the ground in use and another, opposed to the one open side, at the top of the device.

[0019] In use the open sides may be disposed generally vertically, at the ends of a box formed by the structural members.

[0020] The portable rebound or deflecting football training device may comprise at least two rebound panels separated from each other and inclined to each other at an angle, so that they present rebound panels inclined relative to the ground at different angles.

[0021] The device may be rolled, turned, or otherwise moved to a different orientation relative to the ground so that the same rebound panel can have two different angles of inclination relative to the ground, with the device in two different orientations relative to the ground.

[0022] The portable rebound or deflecting football training device may have one or more feet adapted to engage the ground or floor. The feet may be removable from first feet-location positions on the device and reattachable at second feet-location devices, so as to enable the same feet to be used with the device in different orientations relative to the ground.

[0023] The device may have one or more side panels attached to the (or each) rebound panel, the side panels having a flange at their lower edge, or at both their upper and lower edges, and the feet may be provided on the flanges, or the flange(s) may comprise the feet.

[0024] According to another aspect of the invention, there is provided a portable rebound (or deflecting) sports training device having at least a first rebound panel or surface adapted to rebound a ball away from the device, and a support structure adapted to hold the panel in a first, operational condition in which the panel is held generally upright; the panel and the support structure having a second, transport or storage, configuration relative to each other such that the panel and support structure lie flatter (or generally flat) relative to each other in the direction transverse to the rebound panel such that the device occupies less space.

[0025] The support structure may comprise at least two support walls or frames that extend transverse to the rebound panel in the operational condition and extend generally parallel to the panel in the transport or storage condition.

[0026] The support structure may have a rear bracing member spaced from the rebound panel in the operational condition of the device.

[0027] The support structure may have a top member, a bottom member, and the bracing member bracing the top and bottom members in the operational condition, and the top, bottom and bracing members all being capable of being aligned generally parallel with the plane of the rebound panel in the transport or storage condition of the device. The bracing member may comprise a second rebound panel. The top or bottom member may comprise a further, third rebound panel. Both the top and bottom members may comprise rebound panels.

[0028] The portable rebound (or deflecting) sports training device may comprise a box-section device having first, second, third and fourth rebound panels each having a longitudinal extent and each forming a side of a four sided box when the device is in the operational condition, and each being capable of flat-packing to lie generally parallel to each other when the device is in the transport or storage condition. At least two of the first, second, third and fourth rebound panels that extend at a common edge of the box in the operational condition may be hingedly connected to each other and fold relative to each other to the flat pack transport or storage condition.

[0029] At least two of the first, second, third and fourth rebound panels that extend at a common edge of the box may be separable so as to enable at least two panels to lie flat relative to each other when the box is put in its flat-packing transport or storage condition. All 4 or at least 3 of the panels may be detachable in the transport configuration from the panel that is adjacent them when the box is in the operational condition, so as to enable the box to be flat packed.

[0030] The bracing member (or second rebound panel) may extend generally parallel to the first rebound panel when the device is in the operational condition.

[0031] The rebound panel, or a rebound panel, may have a flat rebound surface (or one where there is a panel extending in, or about, a general flat plane).

[0032] The, or a, rebound panel may have a curved rebound surface, preferably curved about a longitudinal axis (or may be disposed about a curved shape). The, or a, rebound panel may have a convex rebound surface, preferably convex about a longitudinal axis (or be disposed about a convex shape). The, or a, rebound panel may have a concave rebound surface, preferably concave about a longitudinal axis (or may be disposed about a concave shape).

[0033] The, or a, rebound panel may have a rippled or ridged rebound surface (or have other projections), preferably the ripples having an elongate axis of extent, or generally transverse axis of extent.

[0034] The rebound surface may be generally vertical, in use, in the operational condition. The rebound surface may be inclined, in use, to the vertical in the operational condition, either towards or away from the ground.

[0035] There may be two elongate rebound panels extending in a longitudinal direction, and at an angle relative to each other when the device is in the operational condition, the device being capable of being turned over about its longitudinal axis to change which one of the two rebound panels is generally vertical and which one is transverse to the vertical.

[0036] According to another aspect, the invention comprises a portable rebound (or deflecting) sports training device comprising a box having 4 rebound panels and capable of being turned about its longitudinal axis to bring each of the panels to the front face of the box, the box being capable of being flat packed.

[0037] At least two of the rebound panels may have different external faces from the group: (1) flat face, (2) convex face, (3) concave face, (4) rippled (or ridged/tined) face.

[0038] The, each, or at least one or two of the panels may have hand holds extending through them.

[0039] The portable rebound (or deflecting) sports training device may, when in operational condition, have a weight introduced inside it. The weight may comprise sand, gravel, water or sand, gravel or water bags or containers. The device may have spikes, or apertures adapted to receive spikes, to hold it to the ground.

[0040] The portable rebound (or deflecting) sports training device may further comprise at least one, or a pair of opposed, section walls extending across the cross section of the device. The section wall or walls may comprise end walls of a box-like device. The edges of the two adjoining panels may be joined together by joints (e.g. interlocking fingers) provided along the elongate edges of the panels.

[0041] The portable rebound (or deflecting) sports training device may have a frame, and one or more rebound panels mounted on the frame, optionally releasably mounted on the frame. The frame and panel may each be provided with inter-engaging sliding formations which enable the panels to be slid onto and off of the frame. The panels may have male projecting sliding formations and the frame female slots in which the male projecting sliding formations are received (or vice-versa).

[0042] The portable rebound (or deflecting) sports training device may comprise two sub-devices, each in accordance with any aspect of the invention, one stacked on top of the other. The sub devices may have inter-engaging keying or fastening formations which fasten the two sub devices together in use.

[0043] According to another aspect, the invention comprises a kit for assembly into a portable rebound sports training device, the kit comprising:

a first rebound panel adapted to rebound or deflect a ball away from the device;

a support structure adapted to hold the panel in a first operational condition in which the panel is held generally upright;

the first rebound panel and support structure being flat packed to occupy less space compared to when the device is in its operational condition;

and, optionally, instructions on how to assemble the device to its operational condition.

[0044] At least two, three, four, or five rebound panels, flat packed relative to each other, may be provided. At least eight rebound panels (for example two boxes), flat packed relative to each other, may be provided. This may enable two, or four, or eight, rebound boxes to be provided (or n , $n/2$, or $n/4$ boxes, where n is the number of rebound panels in the kit).

[0045] At least twelve rebound panels (for example three boxes), flat packed relative to each other, may be provided.

[0046] The kit may have instructions on different training drills that can be performed with boxes/devices of the kit and/or instructions on how to assemble the rebound device (devices).

[0047] According to another aspect the invention comprises a method of sports training comprising transporting a portable rebound sports training device in accordance with any preceding aspect of the invention to a training location; assembling the device to its operational condition in situ at the training location; bouncing or deflecting a ball off the rebound panel and dealing with the rebound or deflection.

[0048] The method may comprise using at least two of the portable rebound sports training devices in a sports training drill.

[0049] The method may comprise performing a football training exercise with the, or each, portable rebound sports training device, or performing a cricket training exercise with the, or each, portable rebound sports training device.

[0050] According to another aspect of the invention, a football rebound box is provided having at least three panels (or at least one panel) adapted to rebound a football, the panel or panels (or at least one of the panels) comprising at least one projecting point or ridge adapted in use to project into a ball that encounters it to deflect the surface of the ball inwards locally to influence the spring of the ball away from the panel.

[0051] A kit or a panel, may have the panel (or at least one of the panels) comprise at least one projecting point or ridge adapted in use to project into a ball that encounters it to deflect the surface of the ball inwards locally to influence the spring of the ball away from the panel.

[0052] The ridge(s)(or points) may extend generally in the horizontal and/or vertical plane, when the box is in use.

[0053] According to another aspect of the invention there is provided a football rebound box, in which there are a plurality of points spaced apart by a distance such

that no more than two points (or three points) can poke into the ball at any one time.

[0054] There may be three or four panels each extending parallel to each other. The panels may have an elongate extent in direction of a central axis of the box/a box.

[0055] It will be appreciated that any feature of an aspect or embodiment of the invention could be used with any other feature (in any number and in any combination). Also, any feature, or features, from one aspect or embodiment of the invention can be used in any number and in any combination with other aspects or embodiments of the invention, and with other features of other aspects or embodiments of the invention.

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Figure 38 Example construction of rebound box

Figure 39 Indicative diagram of one moment of impact of a ball with rebound box panel

Figure 40 Indicative diagram of one moment of impact of a ball with rebound box panel

Figure 41 shows another embodiment of the rebound box; and

Figure 42 shows a still further embodiment of the rebound box.

Description of the invention

[0057] Figure 1 shows the rebound box 101 where a ball 102 is projected towards the rebound box and the ball rebounds off one of the sides of the rebound box. This is a typical effect for which the rebound box is used. A rebound box is shown in Figure 2. It has an elongate square section hollow tunnel shape having an elongate length of between 100 and 200 cms long by 40 cms to 80 cms tall. It is made from four metal (eg steel) panels 206, 208, 210, 212, each of which is substantially vertical. Screws or bolts 214, in this case pairs of screws or bolts,

releasably fasten an edge region 216 of one panel to an edge region 218 of the adjacent panel, when the rebound box is assembled as shown in Figure 2. The screws or bolts 214 may screw into bores in the regions 218 themselves, or into mounting blocks (not shown) provided at the regions 218, or into some other fixture.

[0058] The rebound box 200 is first supplied to a user disassembled in a flat pack kit having the four identical panels 206, 208, 210, 212, and screws or bolts 214. Instructions, eg a sheet of instructions 213, showing how to assemble the rebound box 200, may be included. The panels 206, 208, 210, 212 are provided, typically, one above the other, in registration, and may be strapped or bound or otherwise held together. The instructions may include further instructions 215 giving details of training exercises that can be performed using the rebound box. The instructions 213 and 215 may be on paper (e.g. the same or different pamphlet) or on computer readable media.

[0059] Figure 2A shows the rebound box in transportation state, in a kit 220. The kit 220 can be transported flat packed easily and assembled later, e.g. in situ at its position of use. It can also be disassembled and flat packed again for transportation or storage.

[0060] In Figure 2 the rebound box 201 may have holes in the sides depicted by 202 which act as hand holds allowing the rebound box to be more easily moved or picked up. In addition the rebound box may have additional weights inserted inside the box such as bags filled with sand or plastic containers filled with water which give the rebound box additional stability and solidity from which a projected ball will rebound. The kit 220 may include empty containers, e.g. bags, for filling with sand or water or the like. Alternatively, the weight of the box may, on its own, be enough to enable the box to be used effectively (for example if the box is made of metal, e.g. steel).

[0061] In Figure 3 the rebound box 301 may be open ended or have a further end piece 302 in one or both ends of the rebound box, possibly closing the end and/or providing additional rigidity.

[0062] In some embodiments, the panels (when mounted together/ when the box is assembled) have a degree of resilience such that they have a springboard effect when a ball hits the middle region of a panel, augmenting the pace of the rebound/deflection from the panel. They can flex when struck by the ball and flex back, adding power to the returning ball.

[0063] In Figure 4 the four sides of the rebound box may have outward (and inward) facing surfaces which are differing. Figure 4 depicts some examples of the differing outward facing surfaces that the rebound box may have. 401 depicts a flat surface. 402 depicts a variable shaped surface (or rippled surface). 403 depicts a concave surface. 404 depicts a convex surface. 405 depicts a further variable shaped surface. There are an unlimited number of surface shapes that the rebound box may support. Where the rebound box has end faces these also

may have varying shaped surfaces to either one or both ends. End panels may or may not be provided in the kit 220.

[0064] Although Figure 4 shows the inner face of the panels as flat, the inner face of the panels could be profiled or shaped to import rebound/deflection characteristics. For example, one or more inner surfaces may be profiled, for example with any of the panels of Figure 4, or "cobbled effect" to give an unpredictable bounce/rebound in the vertical and horizontal directions, or vertical ribs to give variation in angle of rebound in the horizontal plane. The panels may be reversible (whether profiled on both sides or not), so as to be able to be assembled into the box with either of their panel surfaces facing outwards.

[0065] Figure 5 shows the overhead view of example surfaces of the sides of the rebound box. 501 depicts a concave surface. 502 depicts a convex surface. 503 depicts a flat surface. 504 and 505 depict variable shaped surfaces. There are an unlimited number of surface shapes that the rebound box may support. The point of Figure 4 and Figure 5 is to demonstrate that the surface shapes of the sides of the rebound box may vary in both the end view and plan view perspectives. Where the rebound box has end faces these also may have varying shaped surfaces in both the cross sectional and plan perspectives.

[0066] The assembly of the rebound box may be in a number of ways. For convenience it is intended that the rebound box can be readily assembled and disassembled into a flat pack state which allows it to be readily stored and transported. Figure 6 depicts one example of how the sides may be assembled through a jointing mechanism.

[0067] A first panel 602 has an array of teeth 604 at one longitudinal edge 606 which interlock in an interleaved manner, with complementary array of teeth 608 at edge 610 of another panel 612 in the manner of tennon joints. The other edges of its panels 602 and 612 may also have tennon joints, or may be joined to other panels 614 and 616, shown schematically, in some other way (eg screws, or hinges). Screws/bolts/other fasteners may be used in conjunction with the tennon joints.

[0068] The dimensions of the rebound box are unlimited. The rebound box can be both a rectangular box shape or a square box shape or part rectangular shape or part box shape. The sides and other parts used in the rebound box may be of differing materials. The rebound box may be of metal, wood or plastic construction or a combination of a number of material types. Typically, the materials used would be inherently weather resistant (for example a tough plastic material) or the materials would be treated with a weather protecting finish (for example a paint with weather resistant properties). Typically, a rebound box would have a length range of between 50cm and 200cm with a height of around 40cm to 100cm (possibly the range height= 30cm or 50cm to 150cm, say 50cm, 70cm, 90cm, 100cm, 110cm, 120cm, or 140cm;

and length = 100cm or 90cm or 200cm or 125cm, or 150cm, or 175cm, or thereabouts. These dimensions can vary. An overall weight of approximately 30kg would be typical (perhaps in range between about 10kg and about 50kg, with 20kg, 25kg, 30kg, 35kg being more typical). In many embodiments a single average man should be able to transport the box and it should be able to fit into the back of a car, for example with the rear seats folded down.

[0069] Figure 7 shows one example of the design of rebound box where there is a frame structure to which the sides of rebound box can be fixed. The sides may be held to the frame structure with screws or other types of fixing facilities such as clips or bolts. The frame structure comprises a peripheral box frame. This may be supplied as two rectangular/polygon side frames and a number of connecting struts (eg 4 struts) to connect the pre-assembled side frames. This can help to flat pack it. There is space inside the frame structure/box which may be used to hold things (eg corner flags, training bibs, balls - things that may be used in soccer training).

[0070] Figure 8 depicts a cross section of one example of the construction of the rebound box where the sides of the rebound box 801, 802, 803 & 804 are fixed/held to the frame 805, 806, 807 & 808.

[0071] The frame 805, 806, 807, 808 comprises an extended metal (e.g. steel, aluminum) profile provided with recessed channels 810, best seen in Figure 8A. The channels 810 have a parallel, a piped truncated arrow cross section, with rebate portions 812 and an entrance portion 814.

[0072] Figure 8B shows a connector piece 820 having a complementary truncated arrow shaped cross-section with projecting portions 822 which are received in rebates 812, in use. The connector piece 820 also has a boss portion 824 which extends through entrance portion 814 in use, and which is internally screw threaded, referenced 826, to receive a screw 828. Screw 828 fastens a panel 801, 802, 803, 804 to the connector piece 820 and hence to the frame.

[0073] The frames 805, 806, 807, 808 may have a profiled cross section shown in Figure 8A for their entire length, or just at their ends only, or at spaced positions along their length. Similarly, the entire edge of the panels could have a complementary inter-engaging cross section as shown in Figure 8B, or only at spaced regions along their length which in use engage with complementary formations in the frame, for example at their ends/at the longitudinal ends of their edges and/or in between. It will be appreciated that the male formations (e.g. connector pieces 820) are slid into the profiled channels 810.

[0074] Figure 9 depicts a cross section of a further example of the construction of the rebound box where the sides of the rebound box 901, 902, 903 & 904 are fixed/held to the frame 905, 906, 907 & 908.

[0075] Figure 10 depicts how two rebound boxes may be used. The arrows pointing towards the rebound boxes depict an example of the path taken by a ball when pro-

jected toward the rebound box. The arrows pointing away from the rebound box depict an example of the path taken as the ball rebounds from the rebound boxes. The projection of the ball towards the rebound box is typically achieved by a person kicking the ball. The path taken by the ball rebounding from the rebound boxes will be affected by the surface of the rebound box to which the ball is being projected.

[0076] For example the curved or irregular face on the rebound box will cause the ball to rebound differently to the flat face on the rebound box.

[0077] Figure 11 depicts one example of how three rebound boxes may be used. The dual pointed arrows overlayed with a ball pointing towards the rebound boxes depict an example of the path taken by a ball when projected towards each of the rebound boxes. In this example the Player 1101 is projecting the ball (typically as a kick at the ball) towards the rebound boxes in turn or possible in a random sequence. On the ball rebounding back the Player 1101 then projects the ball at the same or one of the other rebound boxes.

[0078] Figure 12 depicts a further example of how three rebound boxes may be used. The dual pointed arrows overlayed with a ball pointing towards the rebound boxes depict an example of the path taken by a ball when projected towards each of the rebound boxes. In this example the Player 1201 is projecting the ball (typically as a kick at the ball) towards the rebound boxes in turn or possible in a random sequence. On the ball rebounding back the Player 1201 then projects the ball at the same or one of the other rebound boxes.

[0079] Figure 13 depicts a further example of how three rebound boxes may be used. The dual pointed arrows overlayed with a ball pointing towards the rebound boxes depict an example of the path taken by a ball when projected towards each of the rebound boxes. In this example there are 4 players labelled P1, P2, P3 and P4. In this example in addition to players P1, P2 and P3 having the option to project the ball towards the rebound boxes there is also the option to project the ball towards player P4. Typically, the drill in Figure 13 would be conducted with 3 footballs in play.

[0080] Figure 14 is an overview of a football pitch area where the rebound boxes are used in a drill where Player P1 and Player P2 project the ball toward the rebound box and then attempt to project the ball towards the goal after it has rebounded from the rebound box. The single pointed arrows depict an example of the path taken by the ball during this drill.

[0081] Figure 15 is an overview of a football pitch area where the rebound boxes are used in a drill where Player P1 projects the ball toward the rebound box and then attempts to project the ball toward a further rebound box. In this example drill there are 4 rebound boxes where Player P1 having projected the ball toward the rebound box closest to the goal then attempts to project the ball toward the goal. The arrows indicate a typical path that the ball may follow during this drill.

[0082] Figure 16 depicts how the rebound boxes may be fastened to position on top of each other or fastened to each other so that one (or more) sits on top of each other thereby increasing the size and height of the rebound area. The arrows depict a typical path that the ball may follow when projected toward the rebound boxes. Although Figure 16 has two boxes shown, one could stack 2, 3, or 4 or more. Also envisaged is placing them end to end, possibly fastened, to form a wall.

[0083] Figure 17 depicts one example of the construction of the rebound box. Side panels of the rebound box 1705 and 1706 have holes in each corner of the panels. The panels are then held in a firm position in relation to each other by the use of bolts screwed into corner blocks 1701, 1702, 1703 and 1704. The two other panels not shown in Figure 17 would be held in position using the same type of corner block fixing. Additionally, end panels could be fixed by the same means.

[0084] Figure 18 shows one corner of the example rebound box construction depicted in Figure 17. Side panels 2001 and 2002 are held in position by bolts 2003 and 2004 which are screwed into tenon nuts 2005 and 2006. Tenon nuts are slid into position along channels within the corner block 2007.

[0085] Figure 19 depicts an overhead view of the path of a ball where the ball is projected towards one example construction of the rebound box 1901 and the ball is deflected off one of the surfaces of the rebound box. An example of how this particular example of a rebound box may be used is where a person practising their bowling at cricket bowls the ball towards the rebound box and the deflected ball is caught by a person who is practising their catching situated behind and to the side of the rebound box. As with the general design principle of the rebound box the surface of the rebound box in this particular example could be flat or one of a number of surface shapes which produce slightly different variations in the path taken by the ball on being deflected by the rebound box surface. In this particular example in the use of the rebound box it is standing on end.

[0086] It will be seen that the ball, or projectile, can rebound back in the general direction from which it came, or can be deflected, but still travel forwards. "Rebound" is not meant necessarily to limit things to the ball returning to towards the player, but it can often mean that.

[0087] Figure 20 depicts an example use of the rebound box 2003 in the context of cricket. Figure 20 is an overhead view of a cricket playing area. Players P1, P2 and P3 are positioned behind and to the side of the cricket stumps 2001. Player P4 bowls the ball towards the stumps 2001 in front of which the rebound box 2003 is positioned. The position of the rebound box 2003 is in the area where a batsmen would typically attempt to strike a ball bowled towards wickets 2001. The bowled ball is deflected by the rebound box towards players P1, P2 and P3 who practice catching and fielding the ball. The height and width of the rebound box is variable but typically would be of a height and width which would

present an area consistent with the area within which a batsman would typically strike a bowled cricket ball. The benefit afforded by the rebound box in this particular example is that bowlers can practice bowling the ball at particular areas in the direction of the wicket. Additionally, fielders can practice the catching of the ball where a batsman may intentionally or not intentionally hit the ball. The lines with arrows and a ball shaped overlayed depict an example path taken by the ball when projected towards and deflected by the rebound box 2003.

[0088] In some embodiments the weight of the rebound box itself will be enough (i.e. no internal ballast required), for example, if the panels and/or the frame is made of metal.

[0089] Basketball is another sport where a portable rebound sports training device find a use.

[0090] Throw-ins can be practiced in football using the rebound box to bounce the ball back/deflect it on to another player.

[0091] Figure 21 depicts one example of the construction of the rebound box, showing alternative/additional features. Side panels of the rebound box 2105 and 2106 have holes in each corner of the panels and/or at one or multiple points along the length of the panels. The panels are then held in a firm position in relation to each other by the use of bolts inserted through the holes in the panels and screwed into blocks 2101, 2102, 2103, 2104 and 2107. The two other panels not shown in Figure 21 would be held in position using the same type of block fixing at points along the panel length. Each block assists in securing two adjacent panels typically and approximately at right angles to each other. Additionally, end panels could be fixed by the same means.

[0092] Figure 22 depicts a plan view of a panel with 2206 indicating example locations where holes can be made in the panel through which bolts can be inserted and screwed to blocks.

[0093] Figure 23 depicts the cross sectional end view of 3 rebound boxes 2301, 2302 and 2303. Figure 23 shows how the rebound boxes can be rotated to sit on different panel sides thereby allowing differing side panels to be offered in the vertical and horizontal planes. The purpose of this is to demonstrate how a single rebound box can support a number of differing panel sides which would provide differing rebound or deflection effects to a ball projected towards each of the panel sides.

[0094] Figure 24 depicts the cross sectional end view of 3 rebound boxes 2401, 2402 and 2403 where each of the rebound boxes comprise 3 panels with the panels of each rebound box being joined by triangular jointing blocks. Figure 24 shows how the rebound boxes can be rotated to sit on different panel sides thereby allowing differing side panels to be offered in the upright planes. The purpose of this is to demonstrate how a single rebound box can support a number of differing panel sides which would provide differing rebound or deflection effects to a ball projected towards each of the panel sides.

[0095] Figure 25 shows some examples of the impact

points a ball may have when balls are projected towards the panels of a 4 panelled rebound box. It will be seen that the panels referenced 2501 in Figure 25 have a number of points or ridges 2502 separated by troughs 2503. The panels are, in this example, made of sheet steel, but they could be made of plastic, or suitable material. The points 2502 are spread apart by a distance 2504 that is generally the same between adjacent points. The spacing 2504 is such that a normal adult sized football engages/contacts one, or at most two, points (in this example) when it bounces off (impacts with) the panel. The points act as rigid fingers which poke into the ball, deflecting the surface of the ball materials. This helps the ball to spring away from the "fingers" (ridges) of the points 2502 - assisting the bounce/rebound characteristics of the panel box.

[0096] It will be appreciated that if there are too many fingers/points 2502 too close together, the effect will get closer and closer to using a flat rebound surface.

[0097] In other embodiments the points 2502 may be so far apart that the ball can only encounter one at a time. In another embodiment three points can be encountered at a time - but two points is what is preferred. This means a spacing of about 3 cm, or 4cm, or 5cm, or 6cm, or 7cm, or 8cm, in some embodiments.

[0098] Also of note is the arrangement shown in Figures 24 and 26 - three sided boxes. A triangular box is envisaged. It still has a space inside and can still be rolled over to present different surfaces. Equilateral triangles, isosceles triangles, scalene, obtuse or acute angled triangles are envisaged - any sort of triangle.

[0099] The panels may, of course, be removable and replaceable.

[0100] The points may be elongated ridges or corrugations. They may be discrete islands of point/projections, not elongate ridges necessarily. For example they may be like the surface of a pineapple, or a regular pattern, preferably pointed, bosses, for example cone-shaped or pyramid-shaped. The points may be formed at the apex of generally V-shaped ridges, with generally flat sides to the "V".

[0101] It will be appreciated that the "points" idea, and the three-sided box idea, can be used in conjunction with any other features, or combination of features, described herein.

[0102] Figure 26 shows some examples of the impact points a ball may have when balls are projected towards the panels of a 3 panelled rebound box. Figure 27 depicts the cross sectional overhead view of 3 rebound boxes 2701, 2702 and 2703 standing vertically on end. Figure 27 shows how the rebound boxes can be stood on end thereby allowing differing side panels surfaces to be offered in the vertical planes.

[0103] Figure 28 is an angled overhead view of one example of construction of a rebound box where two panels 2801 and 2802 are joined by three connector pieces 2803 where the edges of the panels are in closest proximity. The panels are held firm with connection rods 2804

fixed between fixed connector pieces 2805. The connection rods may for example be made of metal or toughened plastic and be held to the connector pieces 2805 with screw nuts.

[0104] Figure 29 is a cross sectional view of the two panel rebound box depicted in Figure 28 with panels 2903 and 2904. Figure 29 shows how the connection rod 2902 is held by connection pieces 2905. Connector rod 2902 has ends which are bent at right angles which allows them to be inserted through central bore holes in connector pieces 2905. Connector piece 2901 is the same design as connector pieces 2905. 2901 shows the central bore hole through which the connection rod ends 2902 are inserted. The ends of the connection rod 2902 have screw threads, which allow a bolt to be screwed onto the connection rod end thereby holding the connection rod firmly place with the connection pieces 2905 at each end.

[0105] Figure 30 shows how the connection rods in Figure 28 and Figure 29 are connected to the connector pieces. A connection rod before being deployed may look like 3001. Each end is at right angles to the main body of the rod and typically would have screw thread on each end. In deploying the connection rod each end of connection rod 3004 is inserted through central bore holes in connector pieces 3007 and 3008. To firmly hold the connection rod 3004 in place, nuts 3009 are screwed onto the ends of the connection rods.

[0106] Figure 31 depicts one example of the construction of the rebound box. Two panels of the rebound box 3105 and 3106 have holes in each corner of the panels and/or at one or multiple points along the length of the panels. The panels are then held in a firm position in relation to each other by the use of bolts inserted through the holes in the panels and screwed into blocks 3101, 3102, 3103, 3104 and 3107. A connection rod 3105 is secured between connector pieces 3101 3103.

[0107] Figure 32 depicts one example of the construction of the rebound box. Two panels of the rebound box 3205 and 3206 have holes in each corner of the panels and/or at one or multiple points along the length of the panels. The panels are then held in a firm position in relation to each other by the use of bolts inserted through the holes in the panels and screwed into blocks 3201, 3202, 3203, 3204 and 3207. 3208 is a connection rod between connector pieces 3201 and 3203. Figure 32 additionally depicts how feet may be affixed to the panels of the rebound box. The feet may be affixed to one or all of the panels. There may be one or a number of feet. The positioning and height of the feet may vary thereby changing the angle of how the rebound box sits. This therefore affects the way a ball may rebound or deflect from the surfaces of the rebound box. The feet may be made of wood, metal, plastic or rubber. The feet may be affixed by glue or bolted or screwed or clipped on to the panels.

[0108] Figure 33 depicts the cross sectional end view of three example rebound boxes 3301, 3302 and 3303. Figure 33 shows how the rebound boxes can be rotated

to sit on different sides thereby allowing different panels to be offered in the vertical and horizontal and other planes. The purpose of this is to demonstrate how a single rebound box can support a number of differing panel sides which would provide differing rebound or deflection effects to a ball projected towards each of the panel sides.

[0109] Figure 34 depicts one example of a construction where the rebound panel 3401 is held in place by two side panels 3402 and 3403 and a further cross panel 3404 between side panels 3402 and 3403. All panels being attached by jointing blocks or through the use of nuts and bolts 3404.

[0110] Front panel (the rebound panel) 3401 has a zig-zag corrugated face, which provides projections 3405 having pointed tips 3406. The tips are spaced apart by about 4cm so that when a normal full-size Association football hits the panel at least one, but usually no more than two, tips dig into the ball and "spring" it away from the panel by deflecting the surface of the ball locally inwards. This punches the ball back. The tips 3406 are pointed and sharp compared to a part-circular surface, such as a dome or cylinder so as to be spiky in nature.

[0111] Side panels 3402 and 3405 are alike and each has an upper flange 3407 and a lower flange 3408. They are made from steel, as is the front panel. The flanges 3407 and 3408 are bolted via bolts 3404 to upper and lower flanges 3409, 3410 on the front panel.

[0112] The flanges 3407 and 3408 have through holes 3411 provided to receive, removably, rubber/plastic/resilient material feet 3412 which are shown in the Figure in the lower flange 3408, with just the holes 3411 in the upper flange 3407. When the device is to be turned over (see the discussion of Figure 35 below) the feet 3412 can be taken off the flange 3408 and fitted to the other flange 3407, so that they are still serving as feet. No tools may be needed to do this. Or two sets of feet may be provided - one being redundant - at any particular orientation of the device. Or no feet may be provided, and the holes 3411 may be used to stake the rebound box down. (e.g. when it is used on grass).

[0113] The flanges serve as carrying handles to enable a man to lift and carry/at least slide and move the device.

[0114] A bracing bar 3413 is provided extending between the side panels, the bar being removable.

[0115] The device can be disassembled and the two sides and the front panel (and optionally the bar) laid flat, for example in a packaging box for original retail or for transport. Or they could be put in the back of a car.

[0116] The sides 3402 and 3403 are trapezium-shaped to present the rebound panel 3401 at different angles to the ground when the device is turned upside down (see the discussion of Figure 35 below).

[0117] Figure 35 depicts one example of a construction where the rebound unit shown in Figure 34 has been turned through 180 degrees. By doing this the angle of rebound panel 3501 is presented at a different angle therefore causing a ball to rebound off at a different angle from the face compared with the rebound from the panel

face in Figure 34. Panel 3501 is held in place by two side panels 3502 and 3503 and a further cross panel 3504 between side panels 3502 and 3503. All panels being attached by jointing blocks or through the use of nuts and bolts.

[0118] Figure 36 depicts one example construction where rebound panels 3601 and 3602 are held in place by two side panels. Figure 36 is a cross sectional "side on" view showing one side panel 3603 of the two side panels. This example of construction allows two rebound panels to be used simultaneously. The side panels can be constructed with different angled edges thereby allowing the rebound panels to be held at different angles.

[0119] Figure 37 depicts one example construction where rebound panels comprise a number of rods. Two side panels 3703 and 3704 are held in place by a number of rods 3701 and 3702 fixed between the two side panels 3703 and 3704. In this example of the construction of the rebound box the rods act as rebound panels for both the front and back of the rebound box. This example of construction allows both the front and back of the rebound box to be used simultaneously. The rods can be made of metal, wood or a plastic based material or alternatively of any material of sufficient robustness.

[0120] Figure 38 depicts the cross sectional view of one example construction of the rebound box where the side panels of the rebound box have a number of rods attached between both side/end panels. The side/end panel 3801 shows one example of how the rods may be arranged when fixed to the side/end panels. The rods being fixed to the side/end panels by bolts/screws screwed into a threaded channel in the ends of the rods. This example of construction allows two sides of the rebound box to be used simultaneously. In this example the rods are arranged in a straight line for one side of the rebound box and in a non linear arrangement for the other side of the rebound box.

[0121] Figure 39 is an indicative, cross sectional representation of one snapshot moment of impact of a ball 3901 striking a rebound panel where the rebound panel 3902 comprises a number of ridges. The ridges of the rebound panel act as fingers poking into the ball causing the ball to be "toe poked" or "punched" away in the rebound from the surface. This arrangement of ridges causes forces to be applied in a concentrated manner on the ball thereby causing the ball to rebound with greater speed.

[0122] The spacing of the ridges is important in that if the ridge cusps are too far apart the ball can become squeezed between adjacent ridges (and does not rebound with a "punched" effect) and obviously if the ridges are too close they are indistinguishable from a flat surface. For a size 5 soccer ball used against a rebound panel an appropriate spacing between the ridge cusps is about 4cm. The distance between the ridge cusps can vary from 1cm to 8cm.

[0123] Figure 40 is an indicative, cross sectional representation of one snapshot moment of impact of a ball

4001 striking a rebound panel where the rebound panel 4002 comprises a number of rods. The rods of the rebound panel act as rounded fingers poking into the ball causing the ball to be "toe poked" or "punched" away in the rebound from the surface. This arrangement of rods causes forces to be applied in a concentrated manner on the ball thereby causing the ball to rebound with greater speed. The spacing of the rods is important in that if the rods are too far apart the ball can become squeezed between adjacent rods (and does not rebound with a "punched" effect) and obviously if the ridges are too close they are indistinguishable from a flat surface. For a size 5 soccer ball used against a rebound panel an appropriate spacing between the ridge cusps is about 4cm. The distance between the ridge cusps can vary from 1cm to 8cm.

[0124] Figure 41 shows a rebound box where rebound packs 4101 and 4104 are held in place by two side panels. Figure 41 is a cross-sectional side view showing one side panel 4104 for the pair of side panels. In this embodiment, there is a "finger", or projection, 4103 cut into the profile of the sheet steel (in this embodiment) of the side panels. The finger 4103 is a locating and supporting formation for a spring, 4201 (shown in Figure 42). The spring 4201 helps increase the spring rebound force applied to a football by the rebound panels. The springs 4201 are disposed generally in the middle of the panels 4101, 4104. The compression springs shown in Figure 42 are placed over the fingers 4103 prior to the assembly of the rebound panels 4101 and 4104 to the side panels 4104. The rebound panels and side panels are connected together by releasable fastenings, such as nuts and bolts, shown as reference number 4102.

[0125] In many embodiments the sheet material (e.g. steel sheet) of the rebound panels has relatively sharp projections (for example ridges/points, extending in the same general direction. They are spaced apart by a distance such that a normal adults size 4 or 5 Association football always hits at least one projection, but not at the same time more than two projections, or at most more than three projections (for some embodiments). This maintains a high degree of "poke" into the ball.

[0126] The projections are sharp, compared with domes, or hemispherical shapes or part-circular projections.

[0127] The rebound panel/at least one rebound panel, extends generally upright/upwards in use (usually). Many embodiments of rebound boxes are such that they can be carried/moved by an average man whilst still assembled. They might be about 20kg, or 30kg or so (± 5 or 10kg), and might be about 1.5m long and about 0.5m high (± 20 -50%).

Claims

1. A portable rebound or deflecting football training device having a rebound panel comprising a plurality

of projections against which in use a football is to be directed for rebounding or deflecting from the panel, the projections comprising spaced apart projections having tips adapted to flex the surface of a football inwards into the football, in use, and the tips being spaced between 1 and 8 cm apart, preferably between about 3 and about 5 cm apart, and most preferably about 4cm apart.

2. A portable rebound or deflecting football training device according to claim 1 in which the projections have pointed tips, and/or wherein the panel extends generally upright.
3. A portable rebound or deflecting football training device according to claim 1, or claim 2, wherein the projections comprise elongate ribs or ridges.
4. A portable rebound or deflecting football training device according to claim 3 wherein the ribs or ridges are provided with a pointed tip and wherein the ribs or ridges extend generally parallel to each other, and are optionally evenly spaced apart.
5. A portable rebound or deflecting football training device according to any preceding claim wherein the projections, ribs or ridges, are formed in sheet material, and wherein preferably the sheet material comprises a zig-zag corrugated sheet.
6. A portable rebound or deflecting football training device according to any preceding claim comprising at least one support or foot adapted to hold the panel generally upright in use.
7. A portable rebound or deflecting football training device according to any preceding claim wherein the support comprises at least one side frame or panel extending in use generally transversely to the rebound panel, and preferably wherein there are side frames or panels at each longitudinally spaced end of the rebound panel.
8. A portable rebound or deflecting football training device according to claim 7 wherein the or each side panel or frame has a triangular shape such that force from a ball that hits the rebound panel is directed at least in part into the ground, via the or each side panel or frame.
9. A portable rebound or deflecting football training device according to claim 7 or claim 8 wherein the or each side panel or frame is movable between a position of use in which it extends transversely away from the rebound panel and props it up, to a storage position in which it extends generally parallel to the rebound panel, and wherein preferably at least one of the side frame(s) and panel(s) is:

- (i) angularly movable relative to the rebound panel so as to be able to move between their operative and storage positions; or
(ii) removable from the rebound panel so as to be able to be placed alongside it in the storage position. 5
10. A portable rebound or deflecting football training device according to any of claims 7 to 9 wherein there are two side panels or frames, and a bracing member, optionally a strut or bar, connects them at a region of the side panels or frames disposed away from the region of the panels or frames connected to the rebound panel. 10
11. A portable rebound or deflecting football training device according to any preceding claim wherein in use the device comprises a triangle or quadrilateral (e.g. square in cross section , or trapezium -shaped in cross section) , or other closed shape , bounded on at least three, or four, sides by structural members , at least one of the structural members comprising the rebound panel , and having open sides above and below the plane of the triangle, quadrilateral, or other closed shape ,defined by the structural members, and optionally wherein the open sides are disposed one against the ground in use and another, opposed to the one open side, at the top of the device, or alternatively wherein in use the open sides are disposed generally vertically, at the ends of a box formed by the structural members. 15 20 25 30
12. A portable rebound or deflecting football training device according to any preceding claim wherein the device can be rolled, turned, or otherwise moved to a different orientation relative to the ground so that the same rebound panel can have two different angles of inclination relative to the ground, with the device in two different orientations relative to the ground. 35 40
13. A portable rebound or deflecting football training device according to any preceding claim further comprising one or more feet adapted to engage the ground or floor, and optionally or preferably wherein the feet are removable from first feet-location positions on the device and reattachable at second feet-location devices, so as to enable the same feet to be used with the device in different orientations relative to the ground. 45 50
14. A kit for assembly into a portable rebound sports training device, the kit comprising:
- a first rebound panel adapted to rebound or deflect a ball away from the device; 55
a support structure adapted to hold the panel in a first operational condition in which the panel is held generally upright;
the first rebound panel and support structure being flat packed to occupy less space compared to when the device is in its operational condition; and, optionally, instructions on how to assemble the device to its operational condition.
15. A football rebound box having at least three panels adapted to rebound a football, the panels (or at least one of the panels) comprising at least one projecting point or ridge adapted in use to project into a ball that encounters it to deflect the surface of the ball inwards locally to influence the spring of the ball away from the panel.

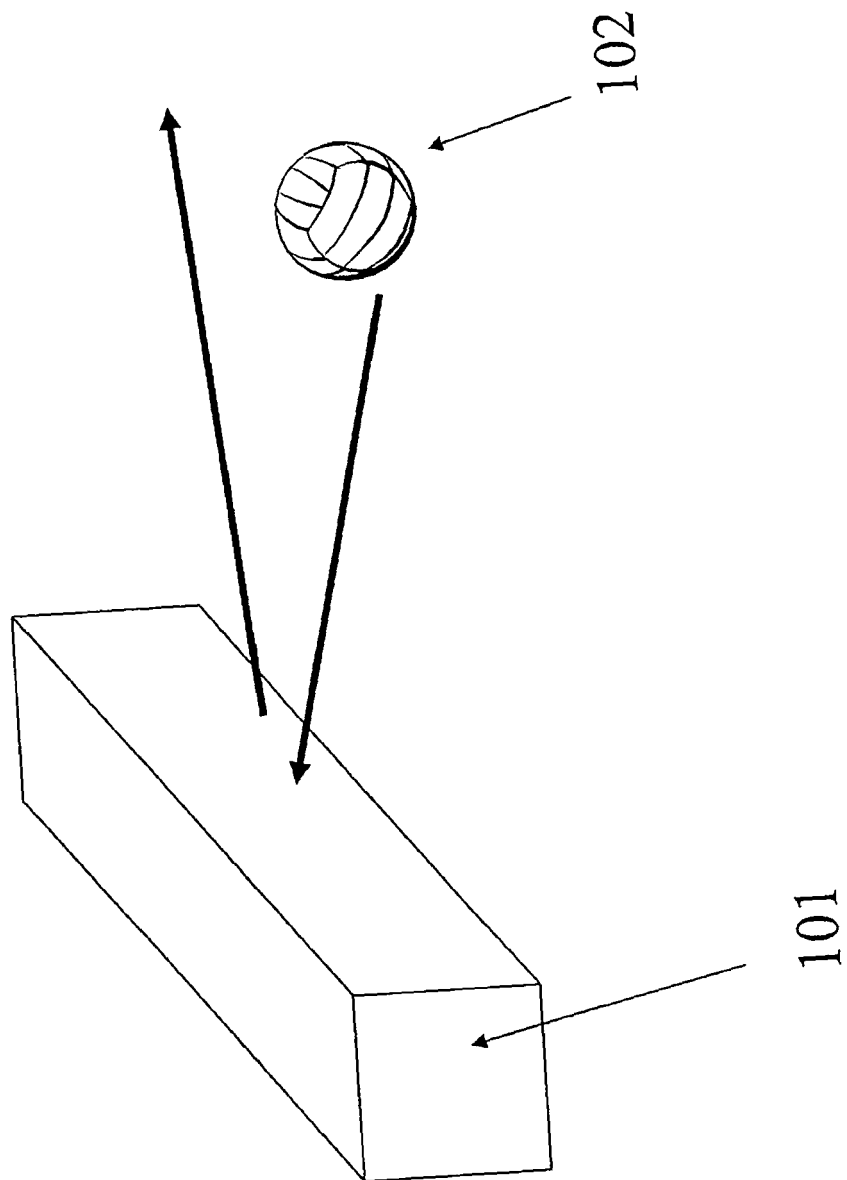


FIG. 1

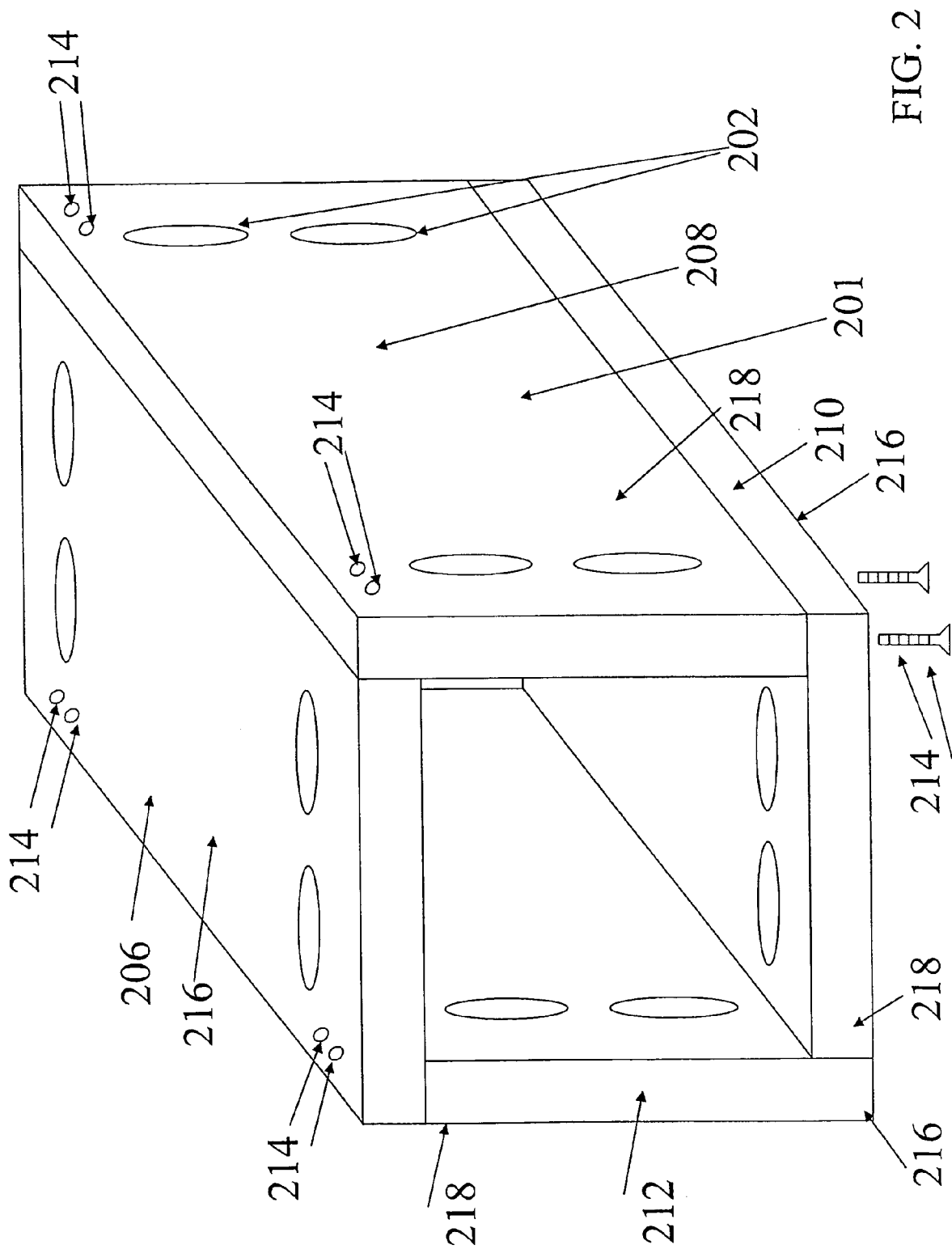


FIG. 2

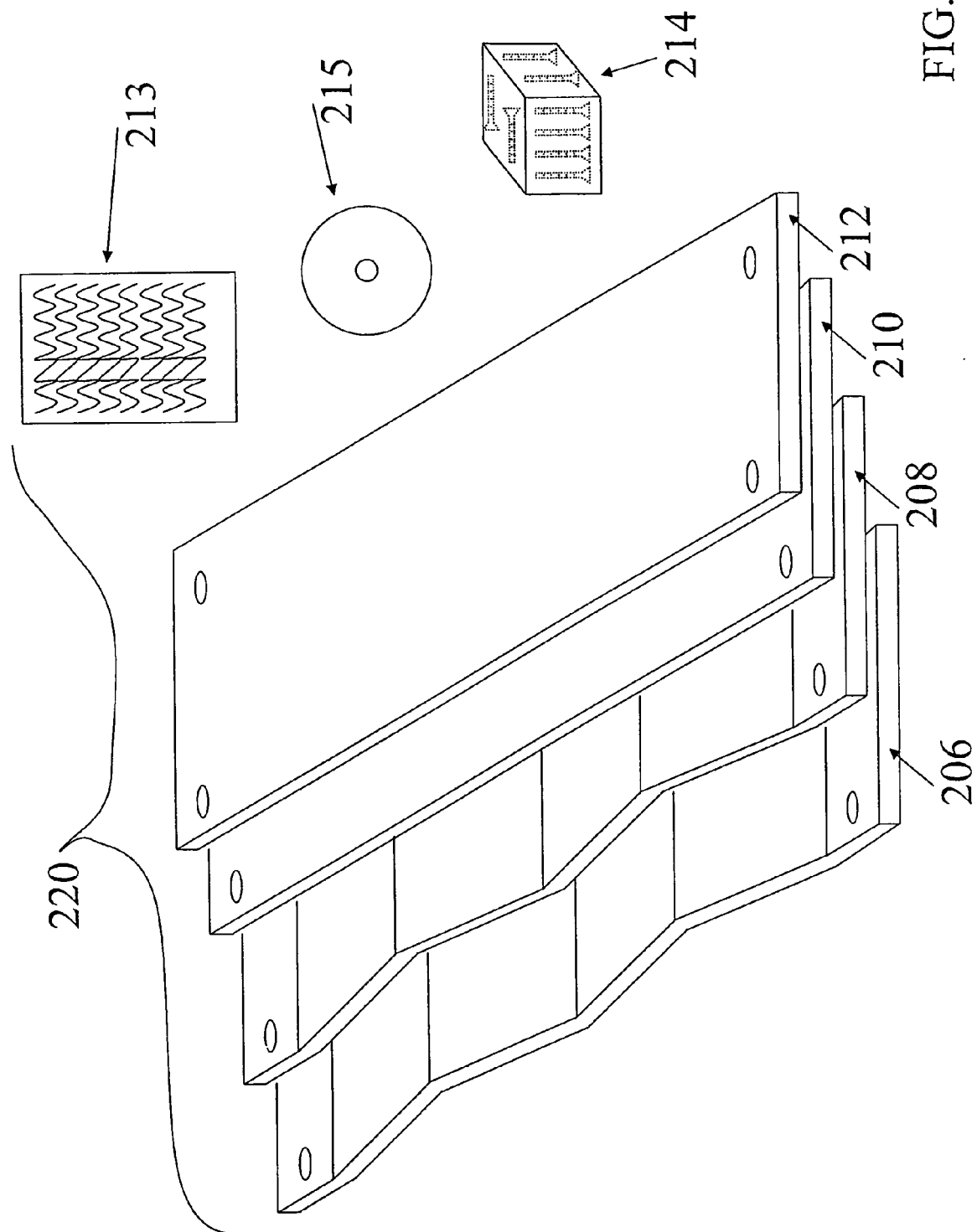
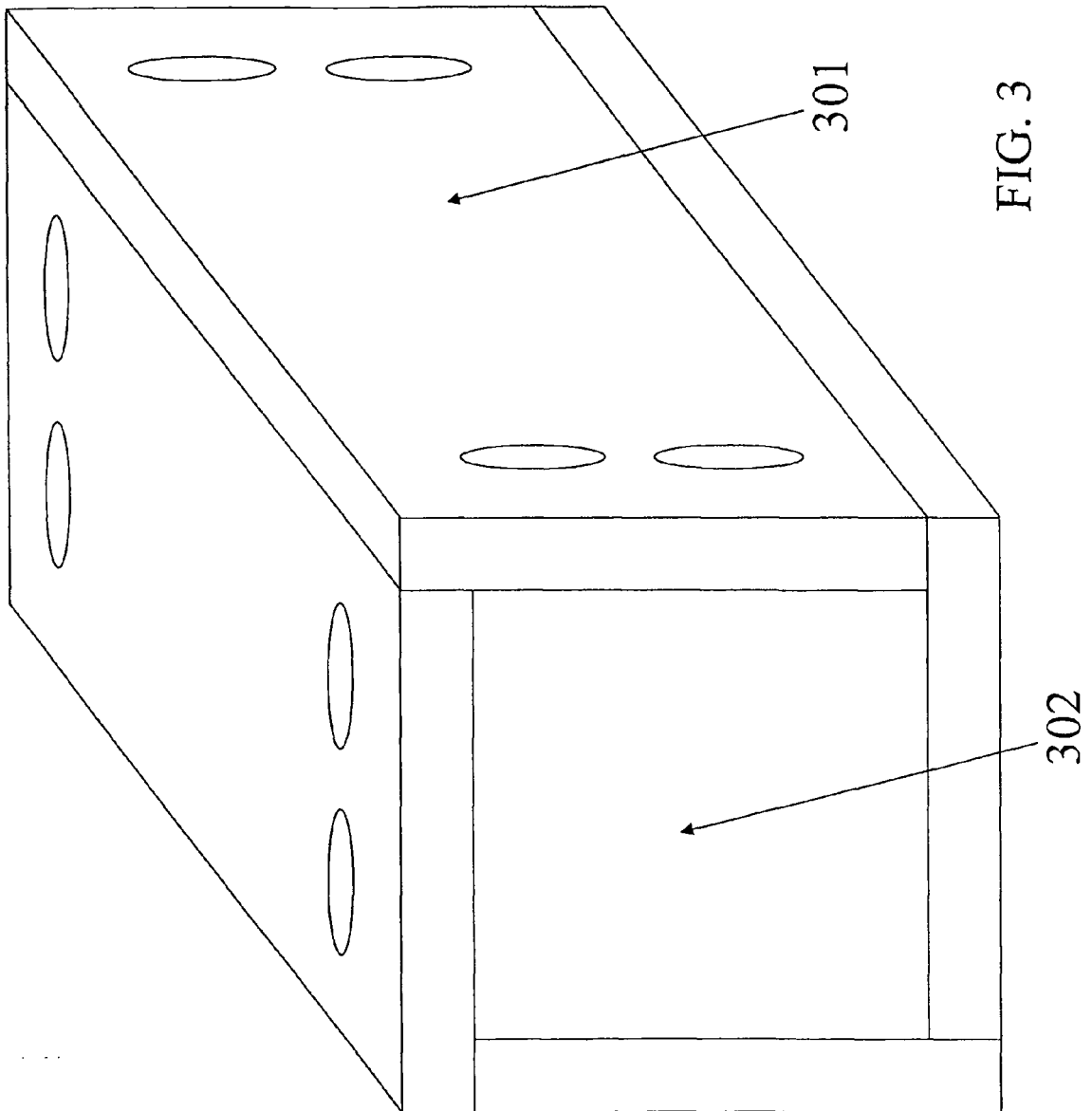
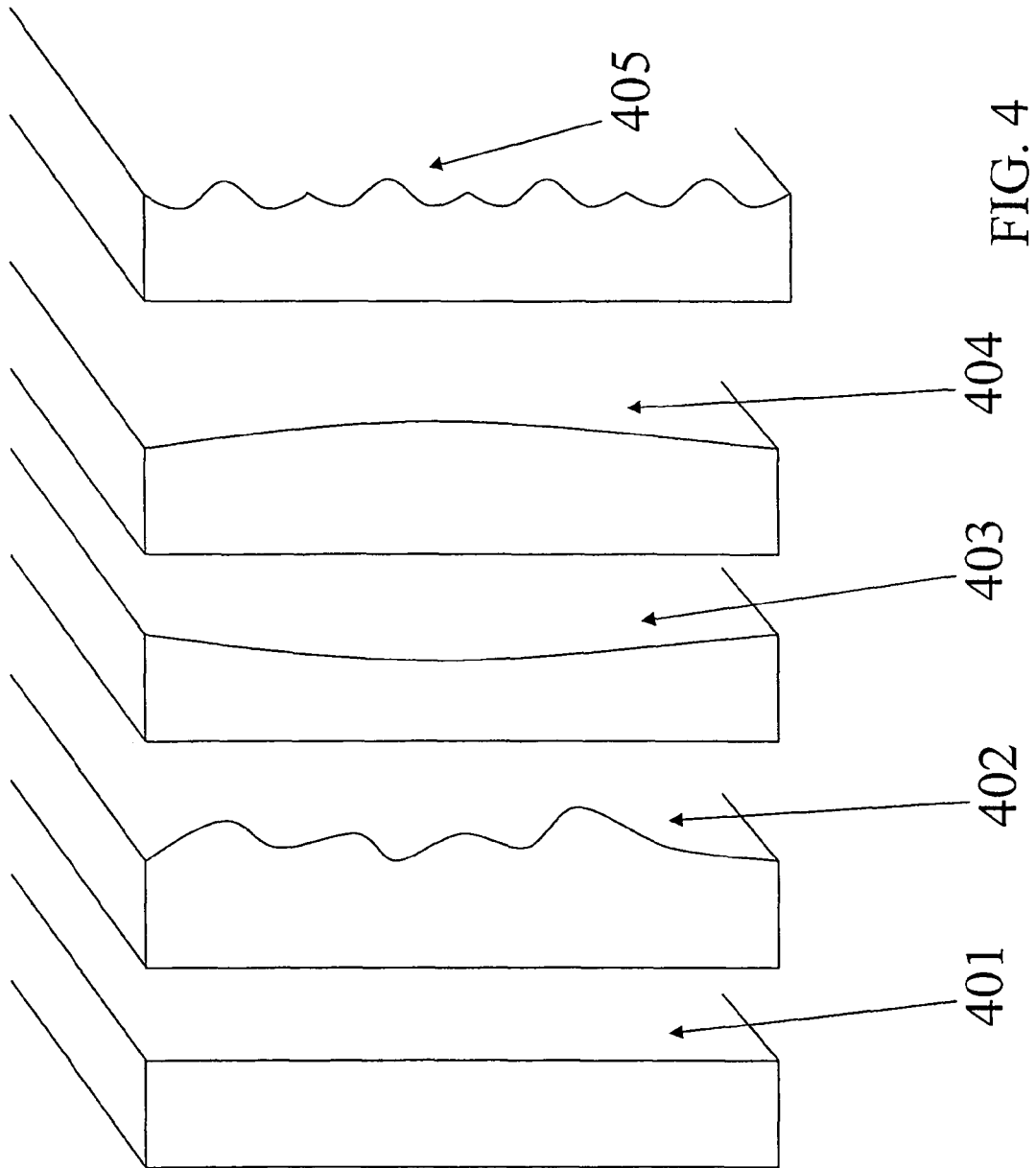
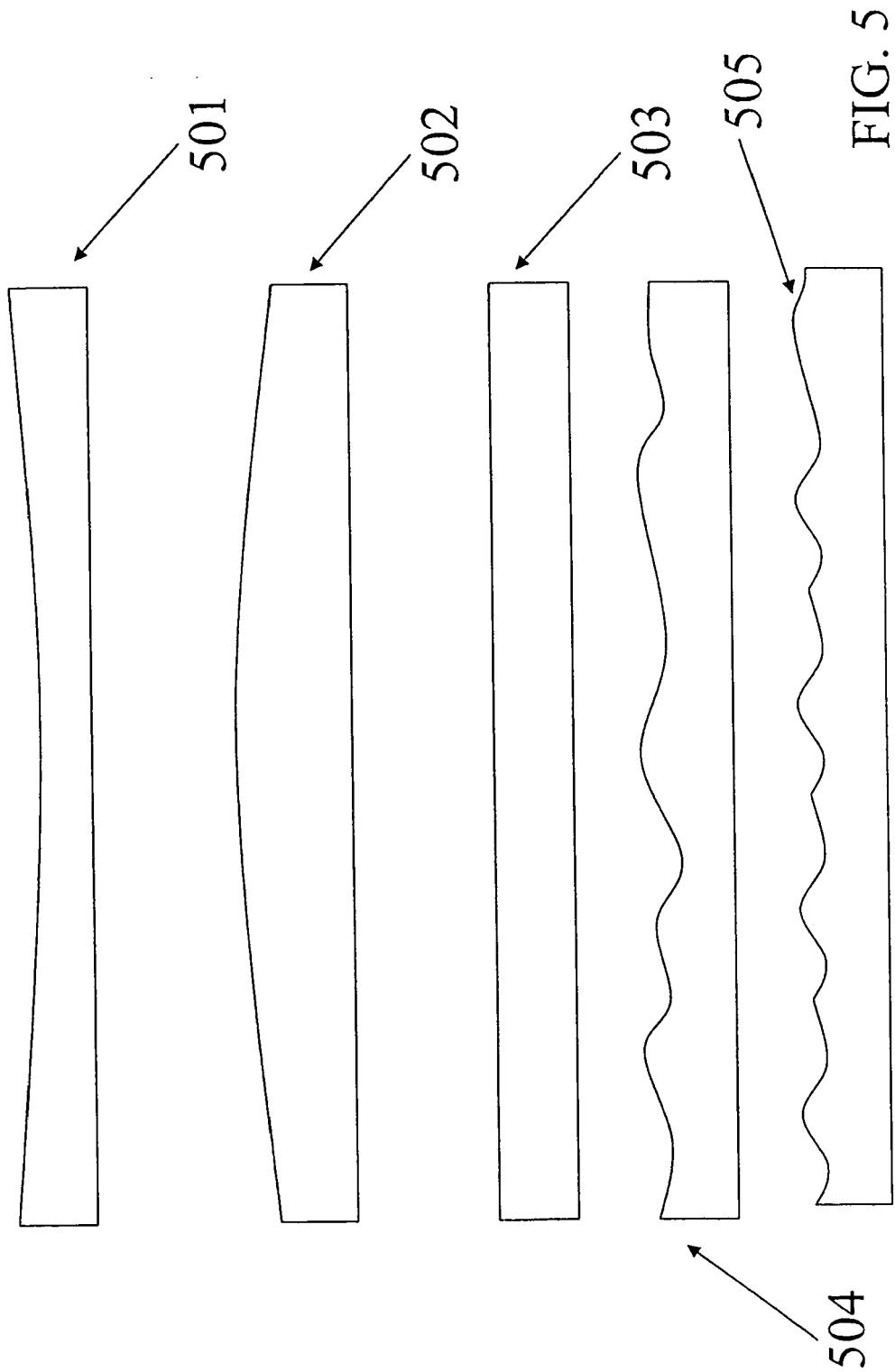
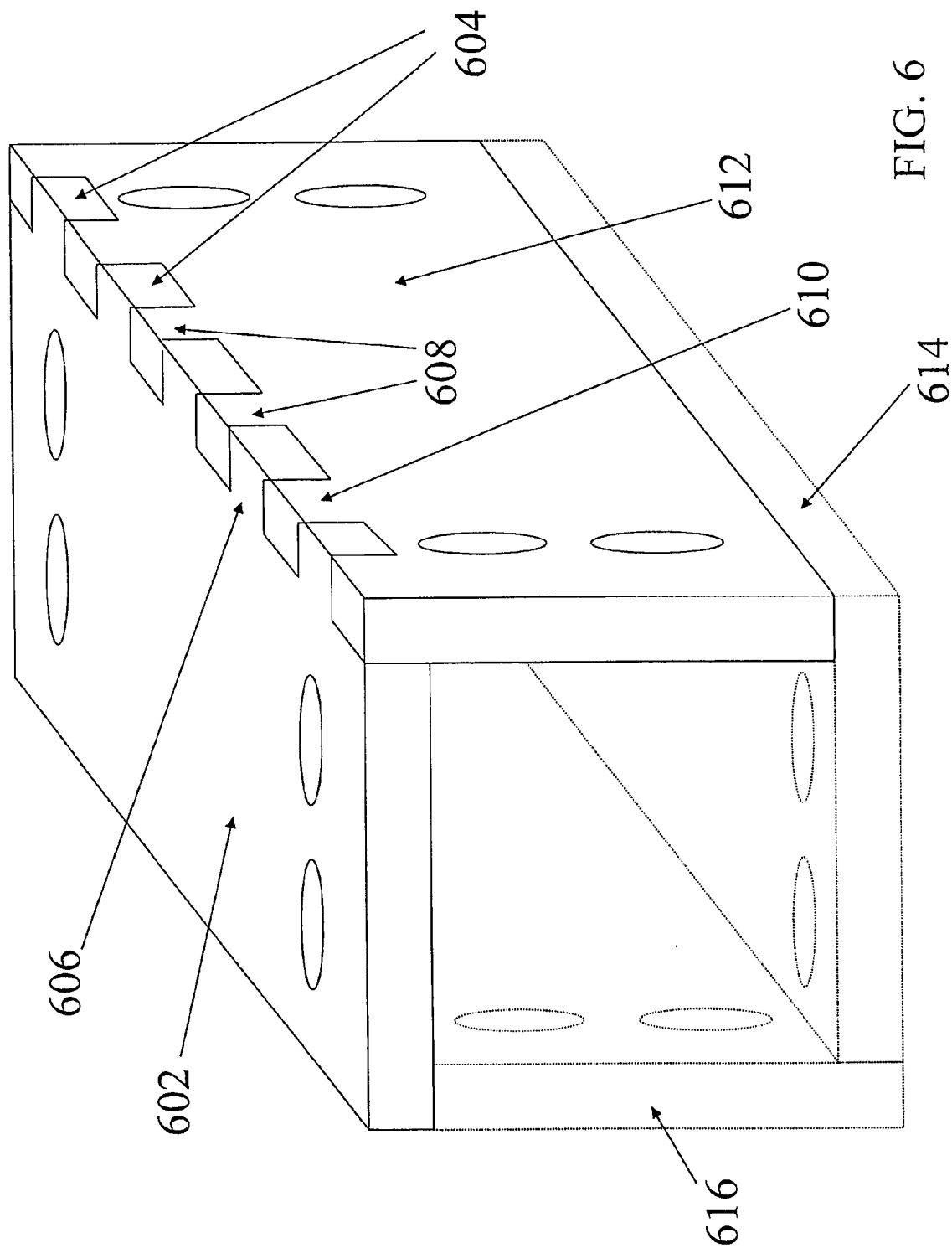


FIG. 2A









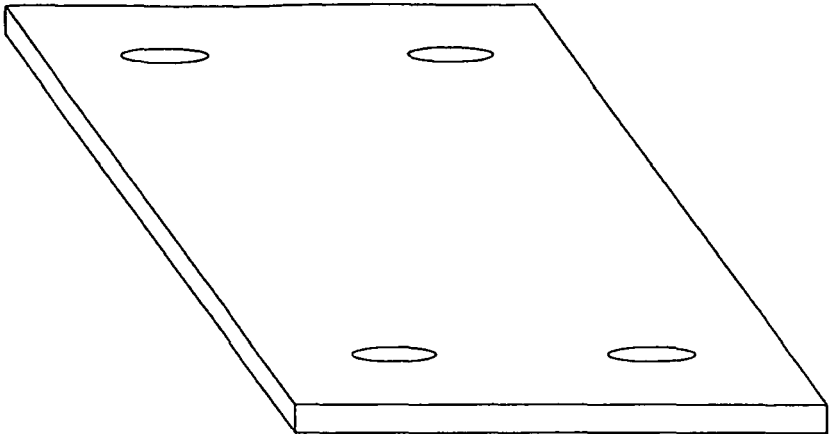
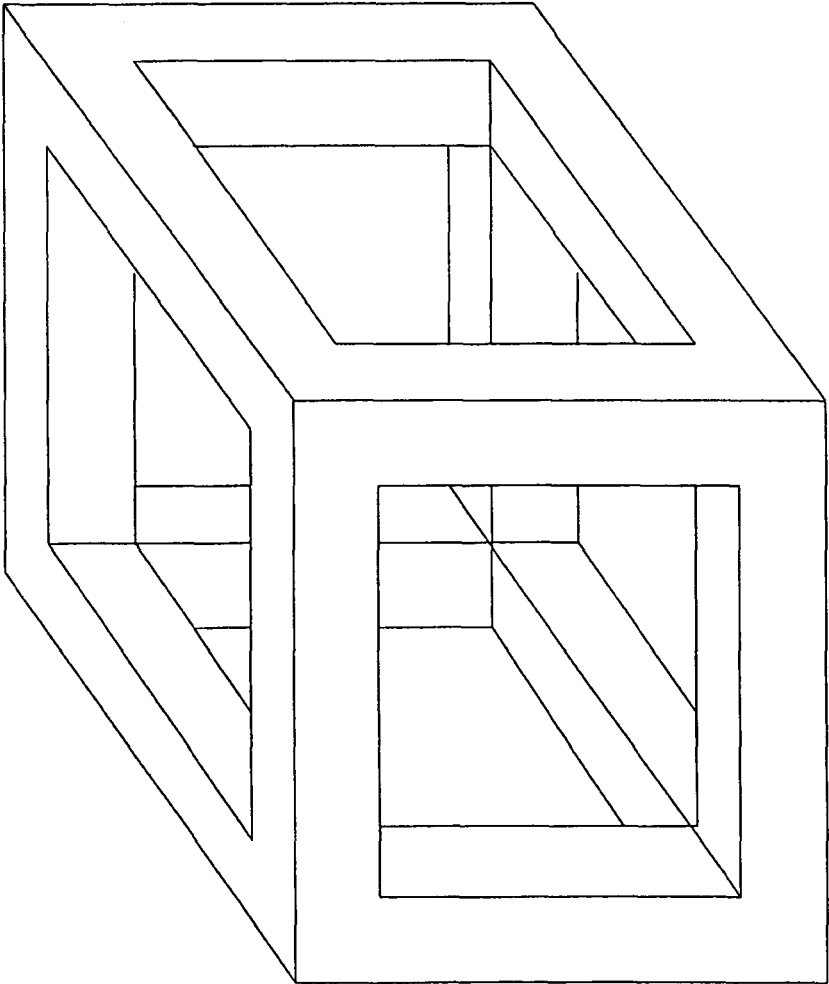


FIG. 7



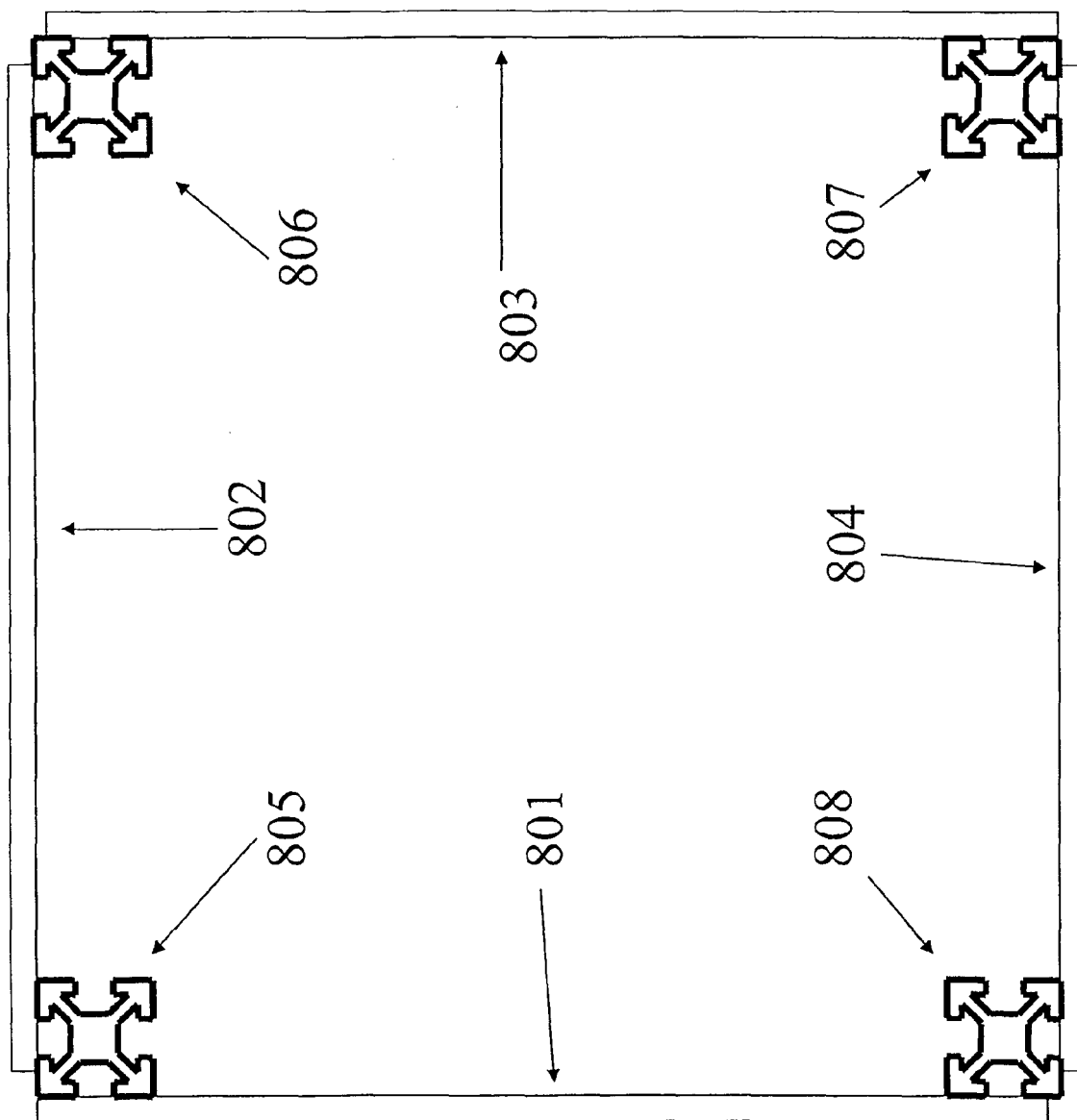


FIG. 8

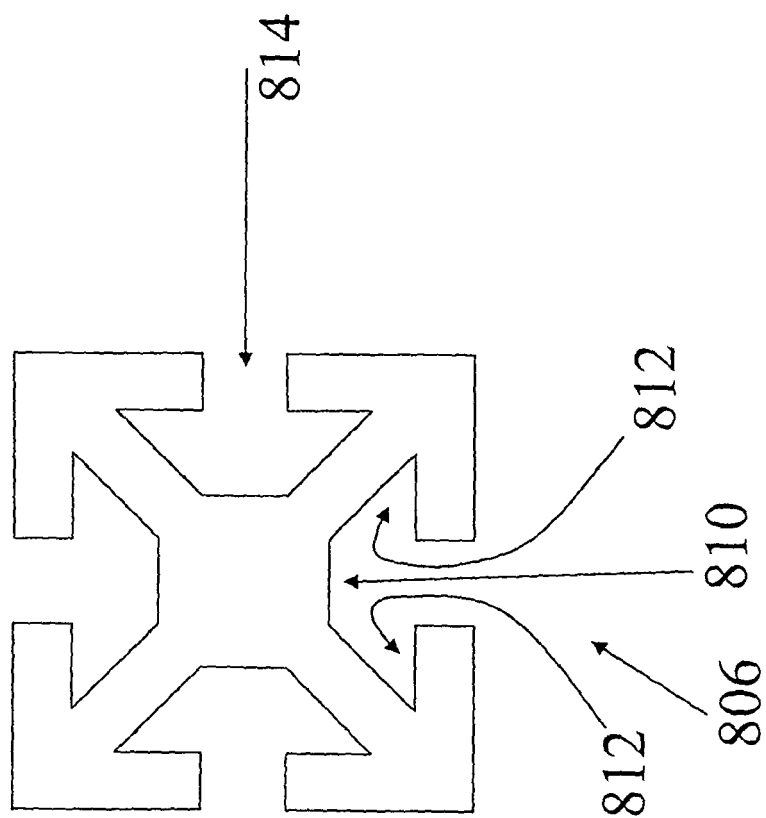


FIG. 8A

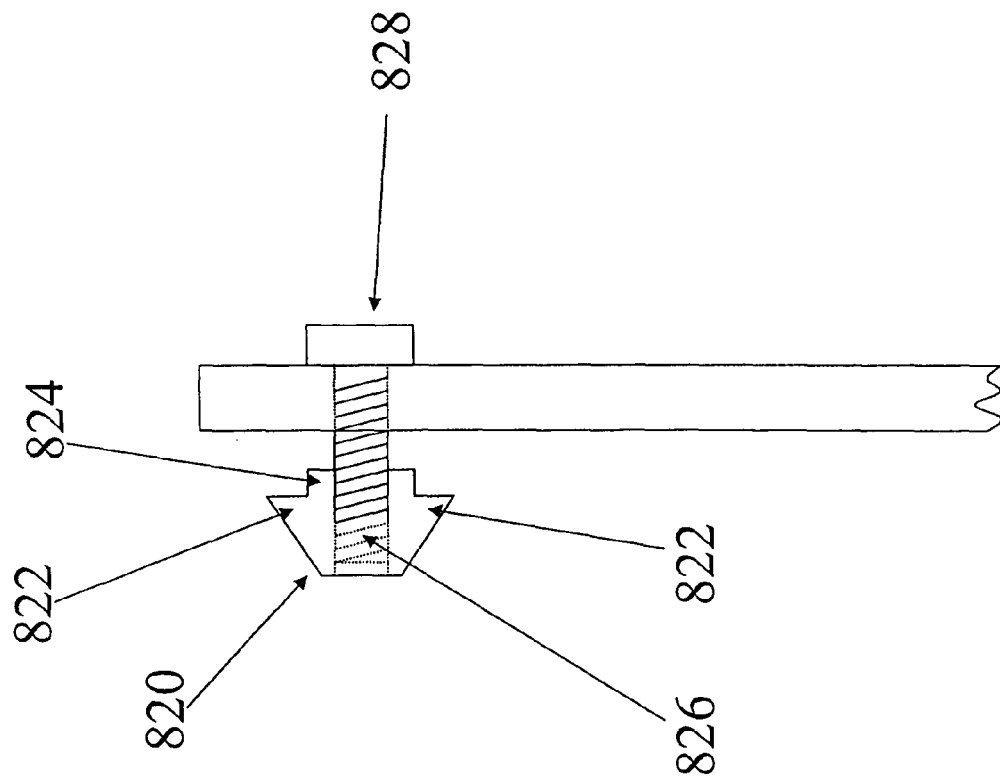


FIG. 8B

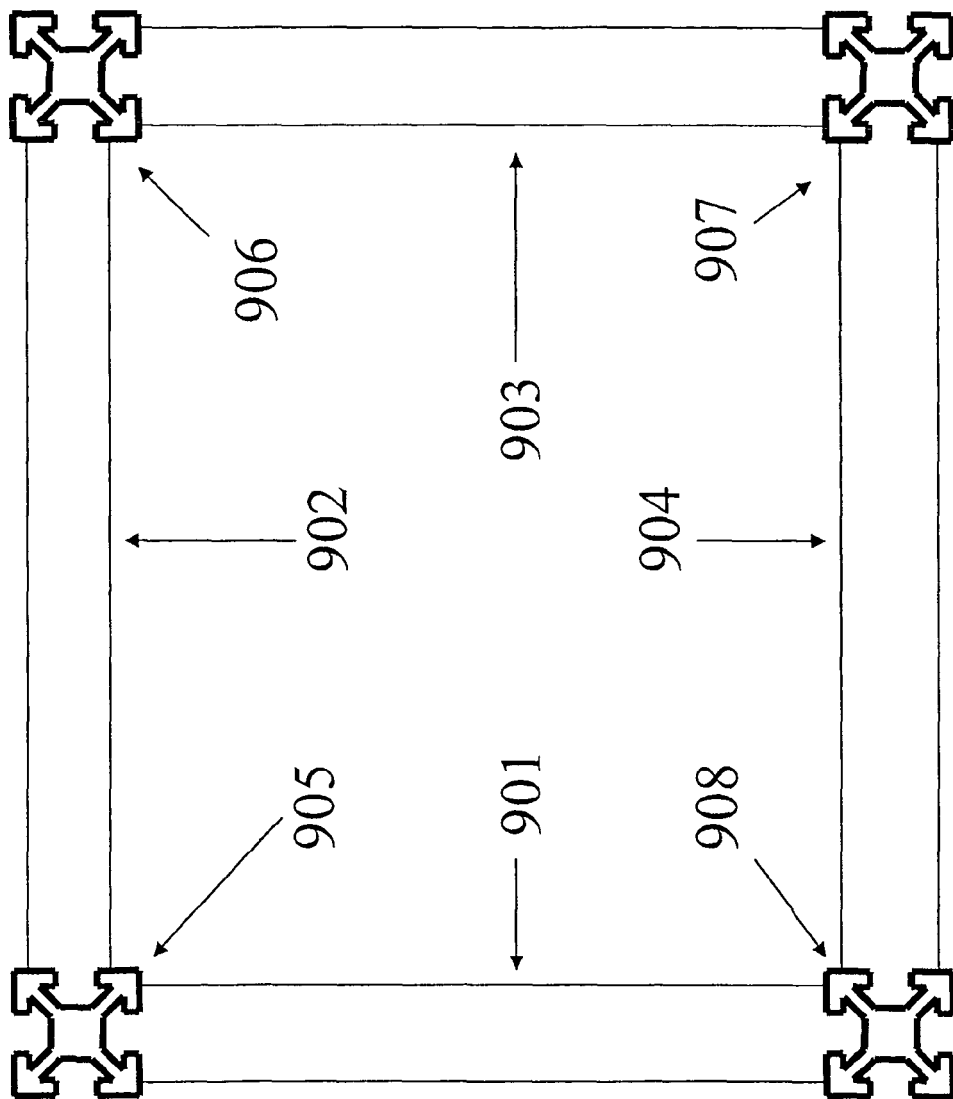


FIG. 9

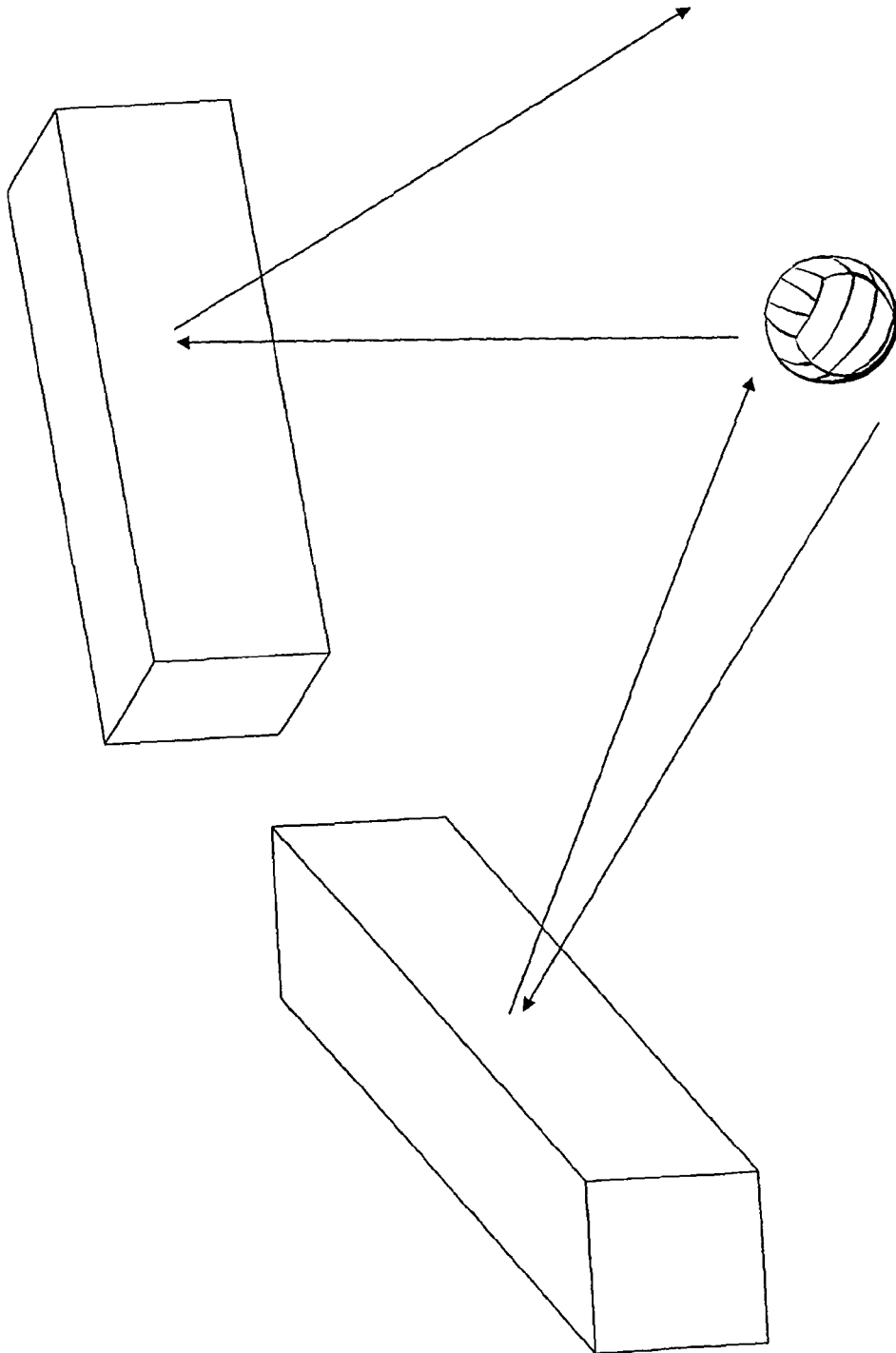


FIG. 10

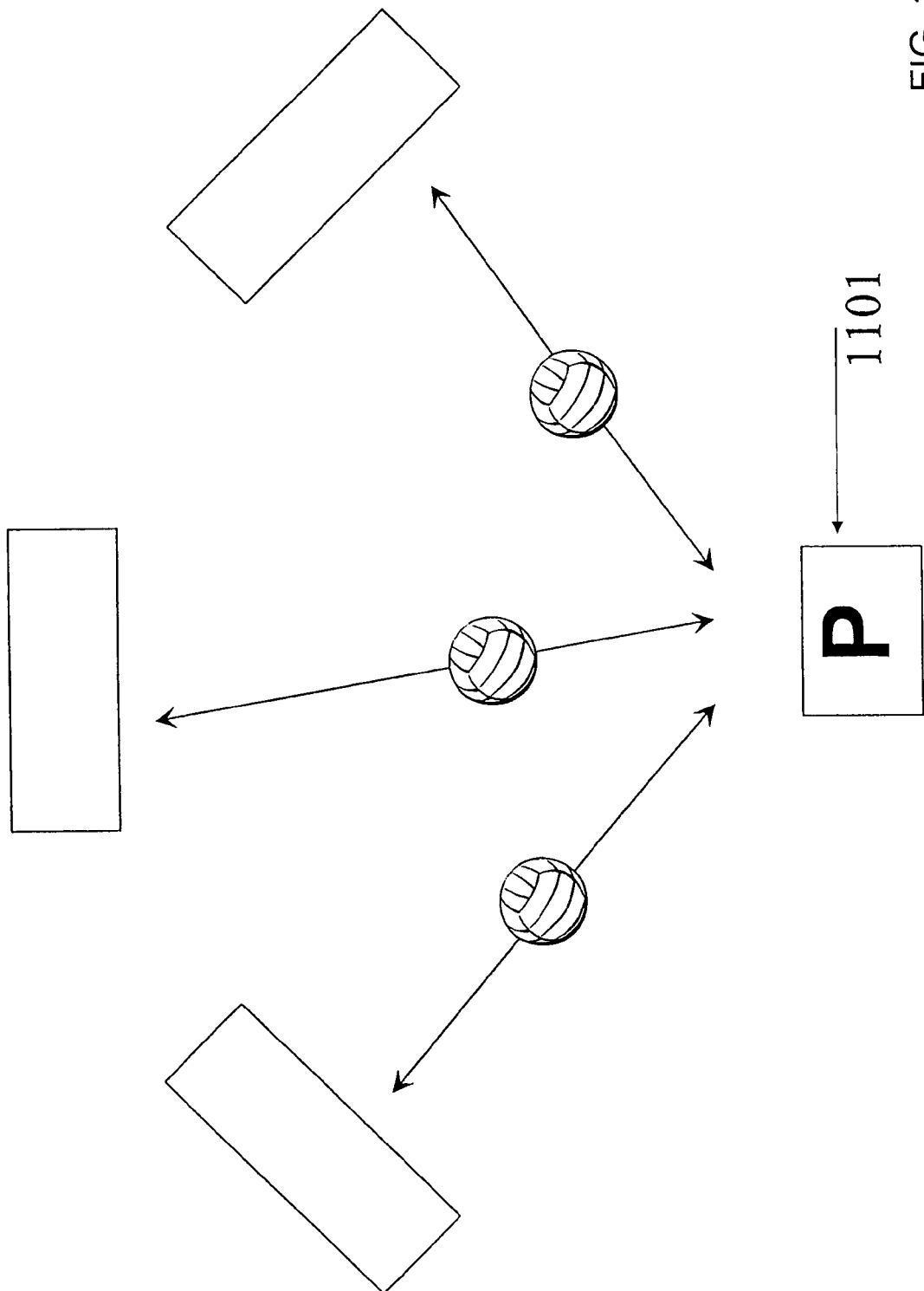


FIG. 11

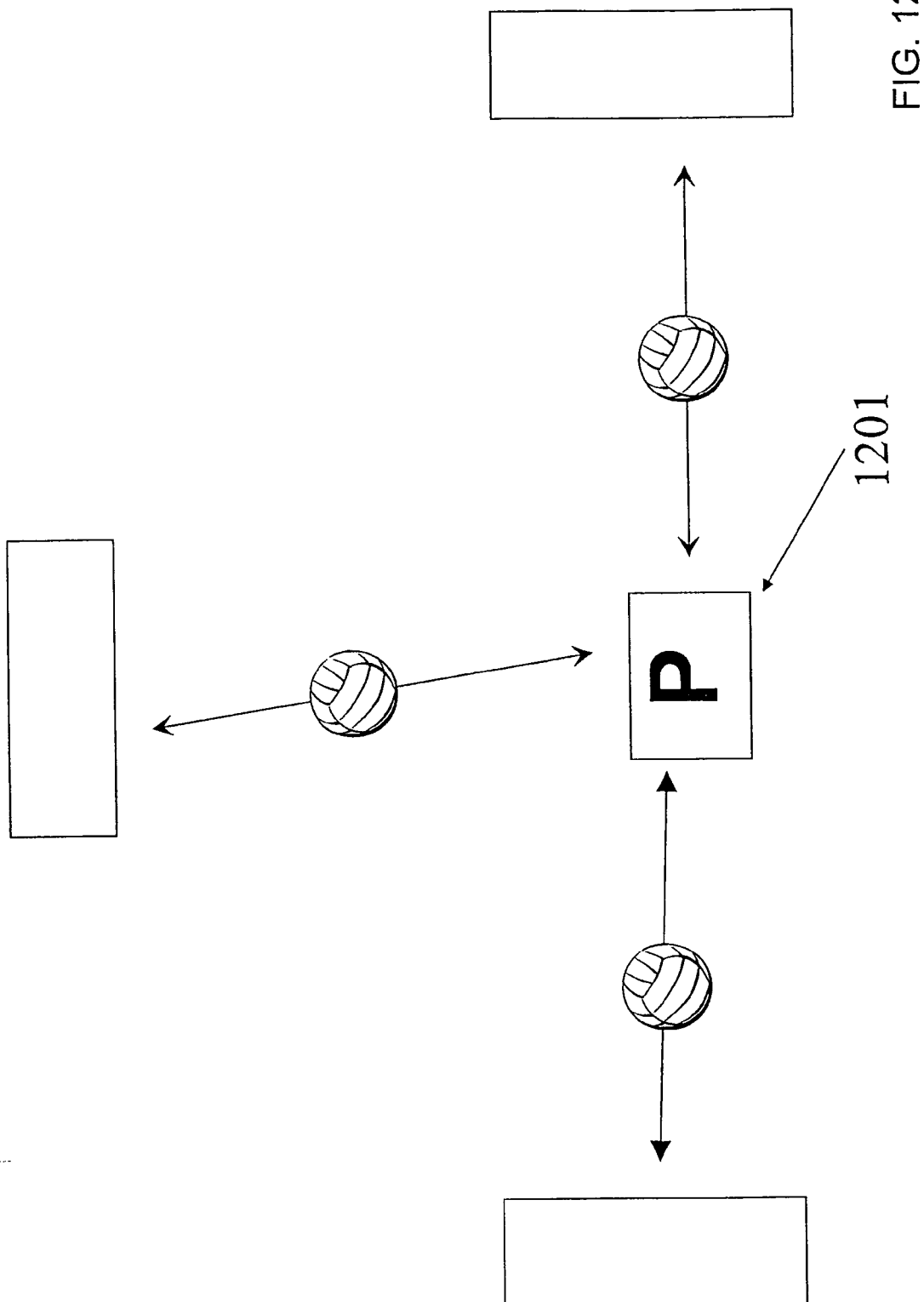


FIG. 12

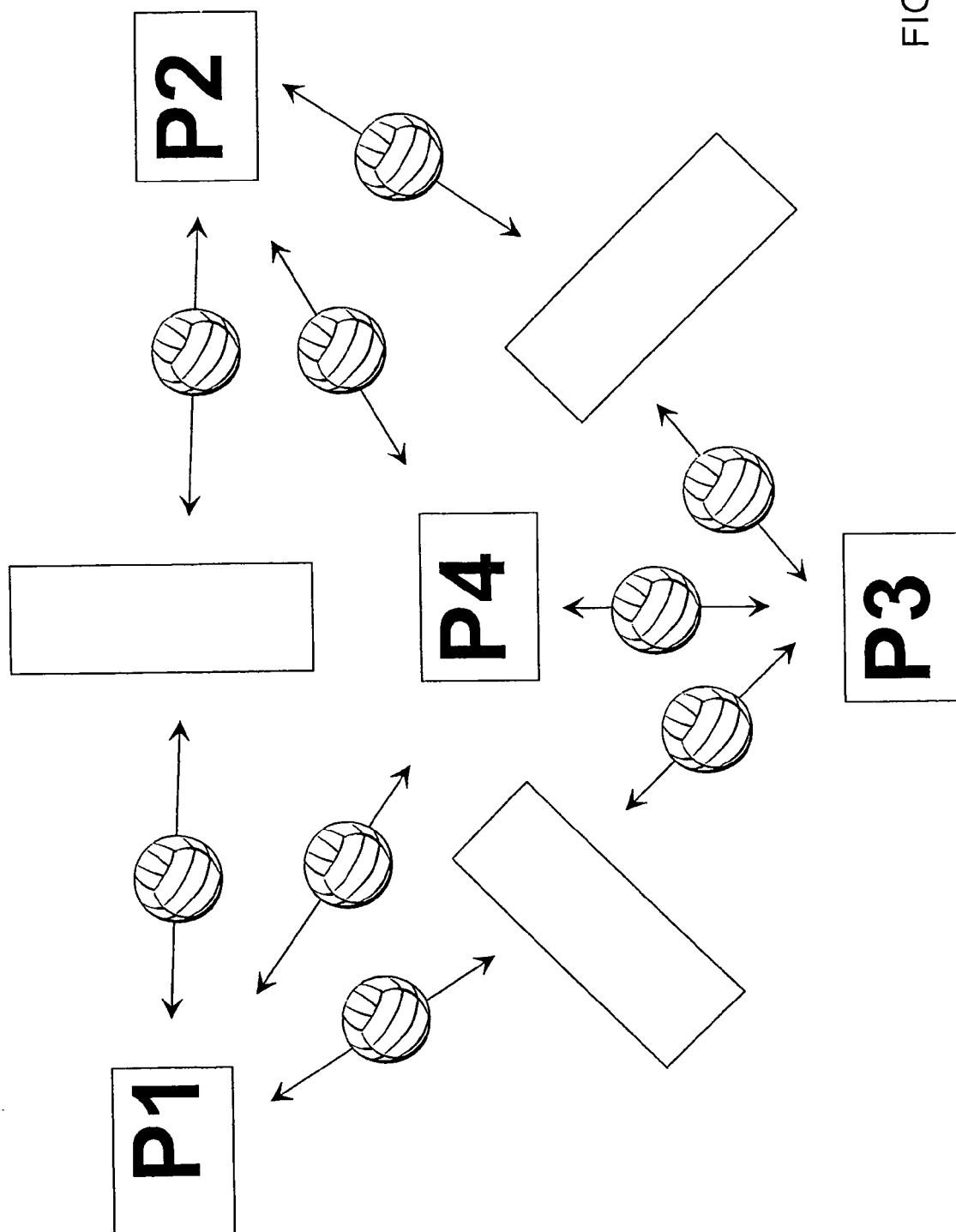


FIG. 13

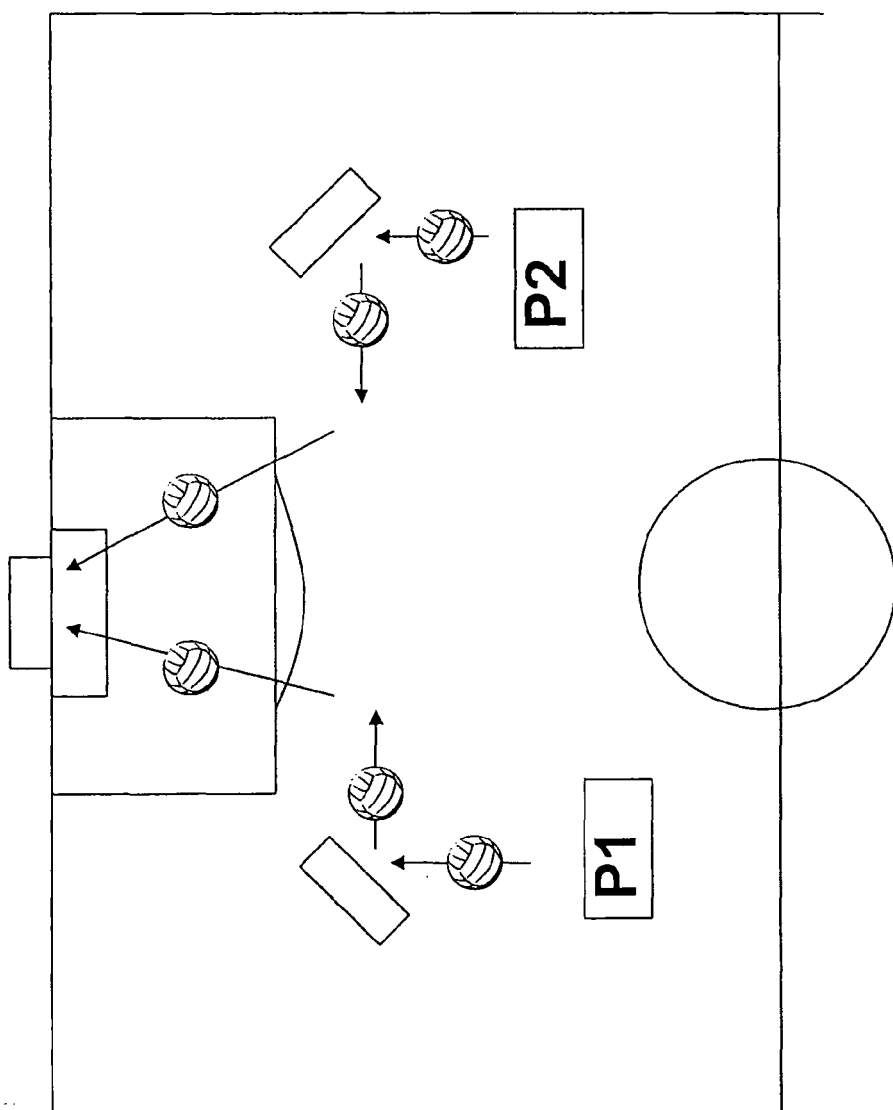


FIG. 14

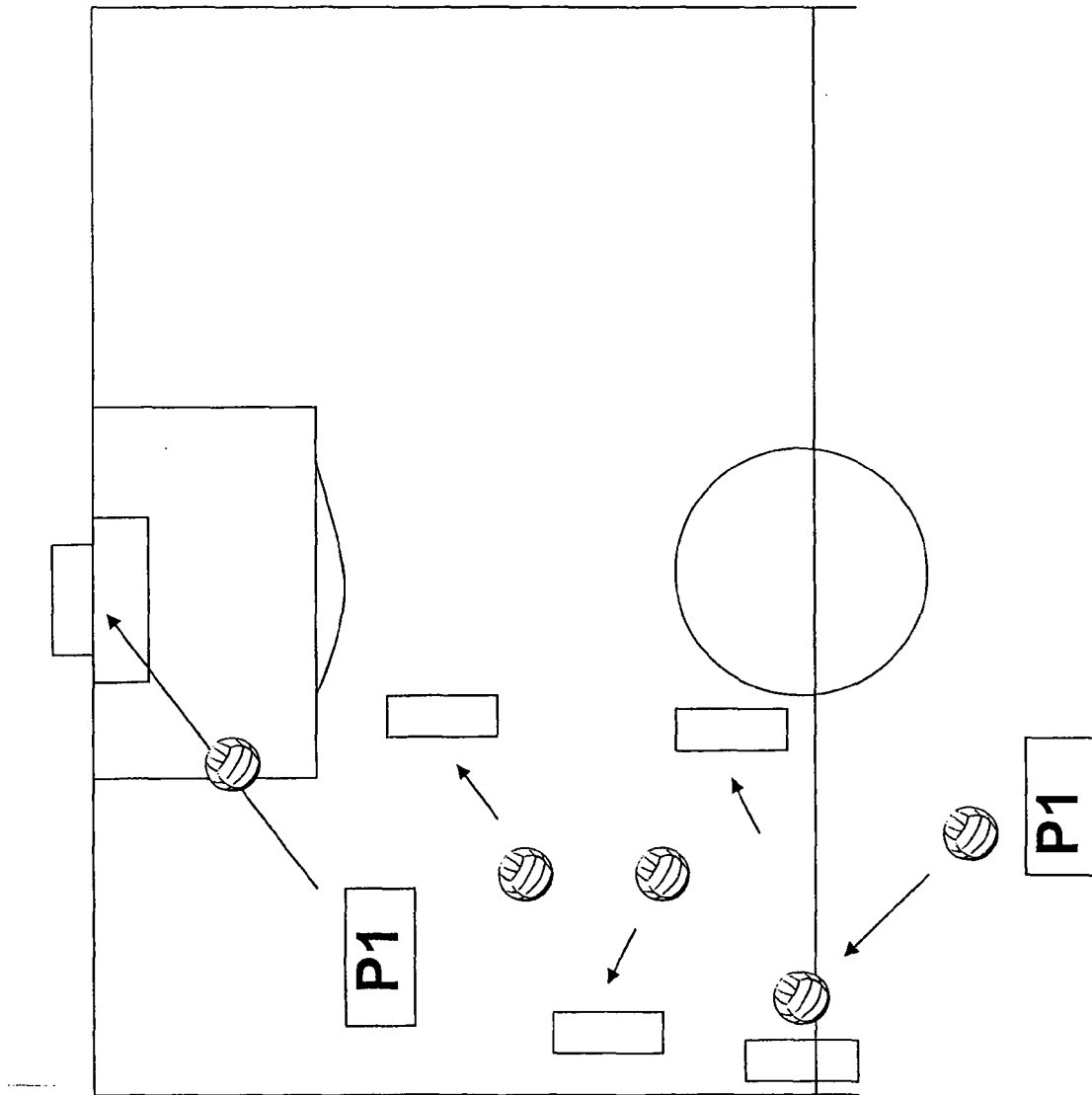


FIG. 15

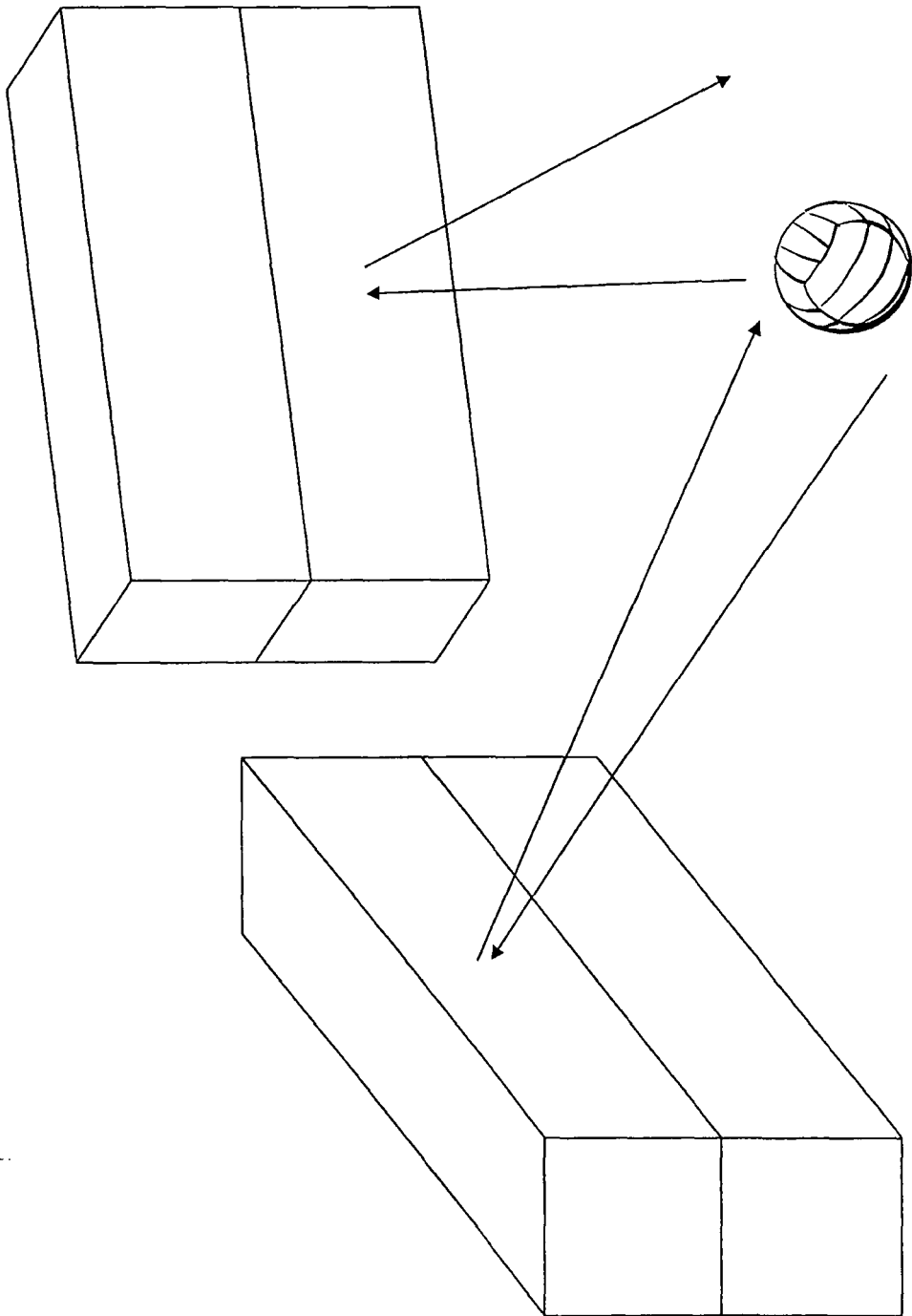
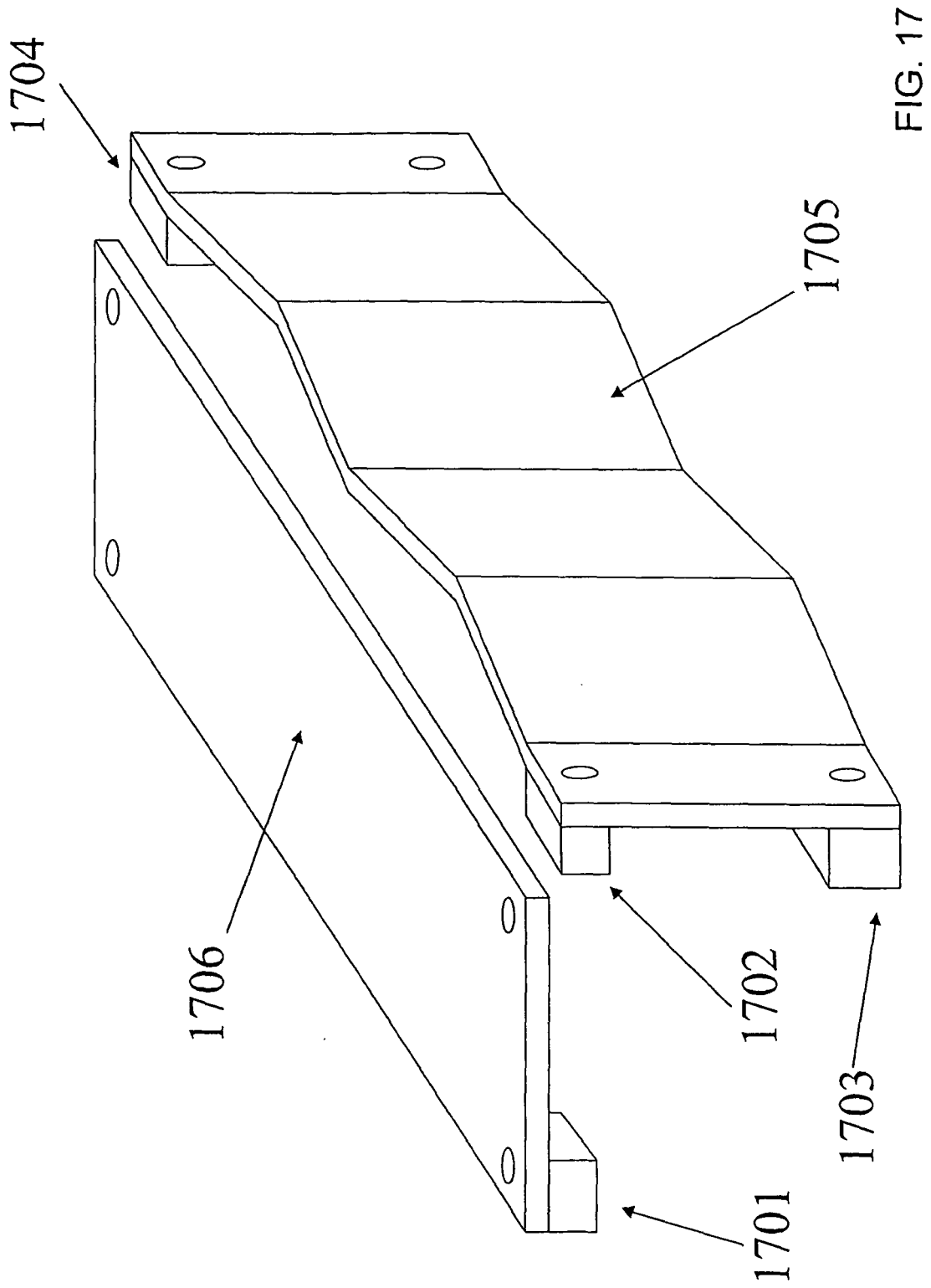


FIG. 16



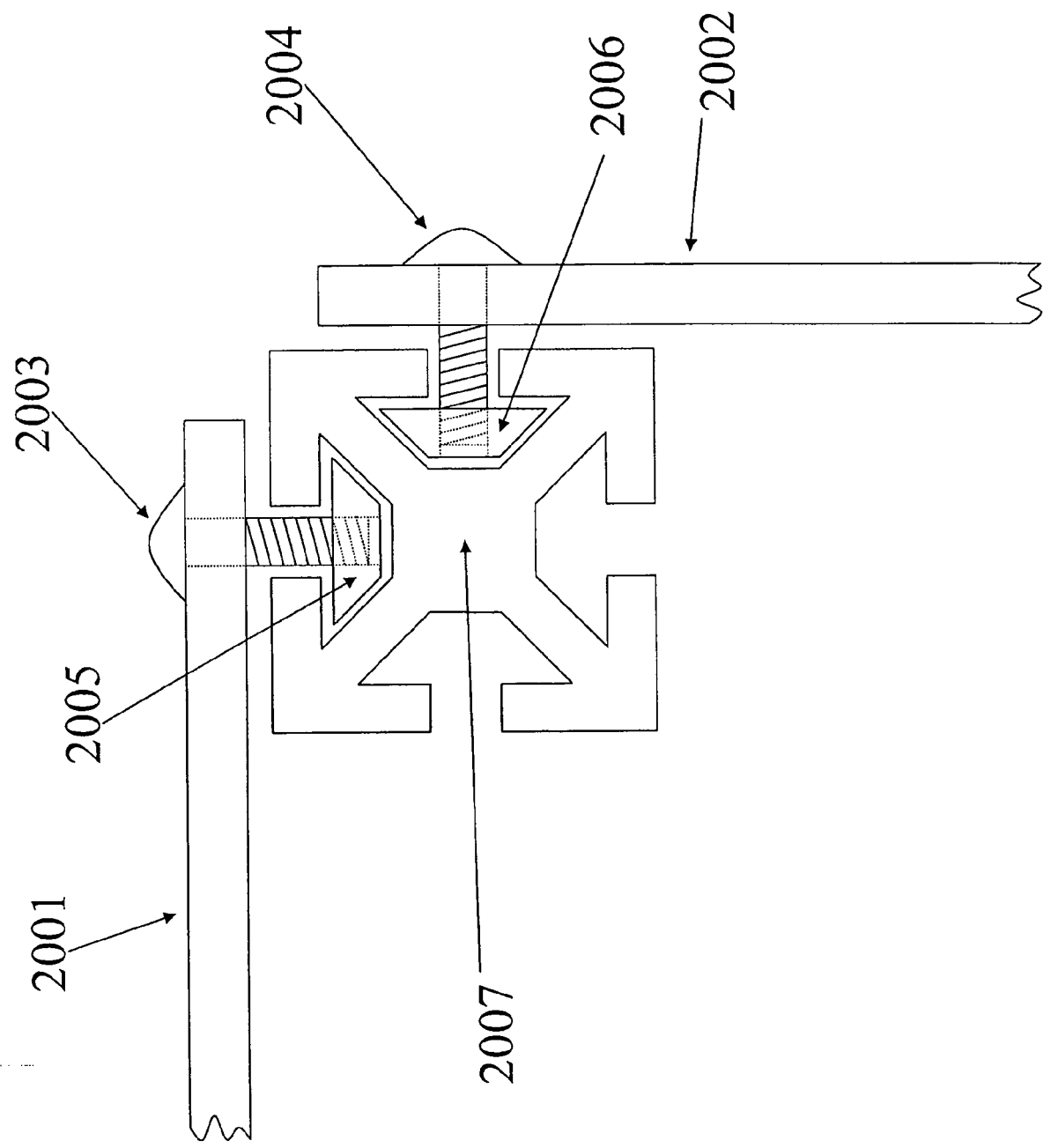


FIG. 18

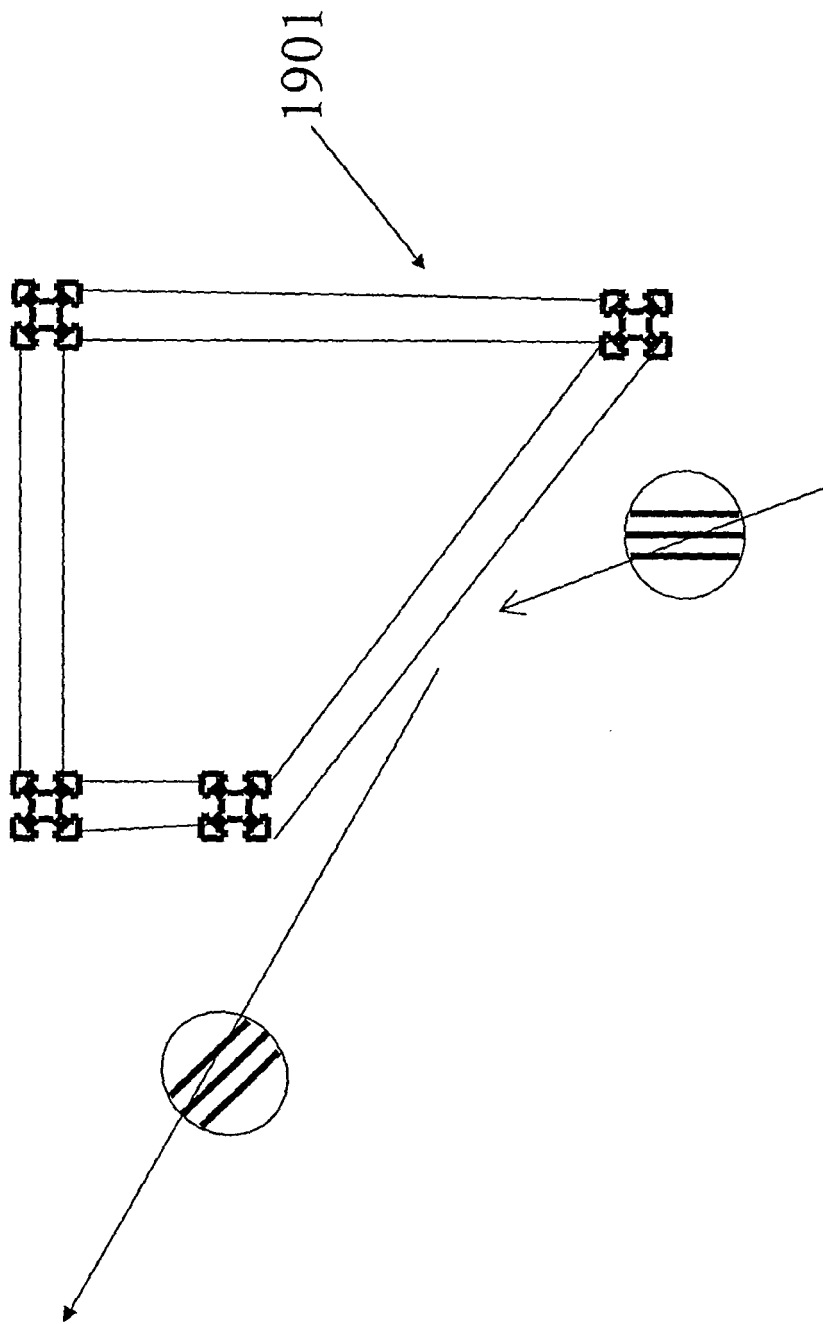


FIG. 19

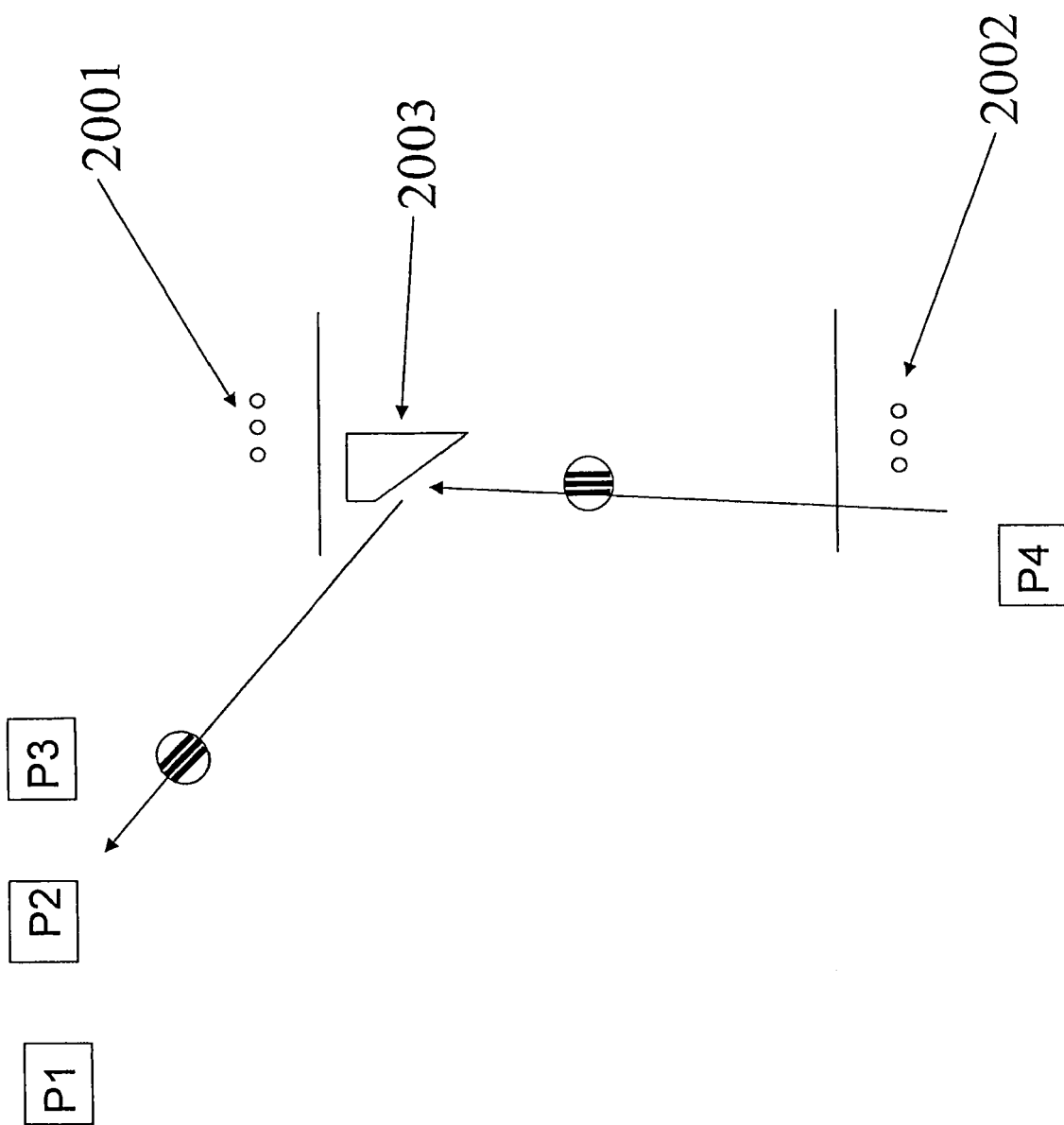


FIG. 20

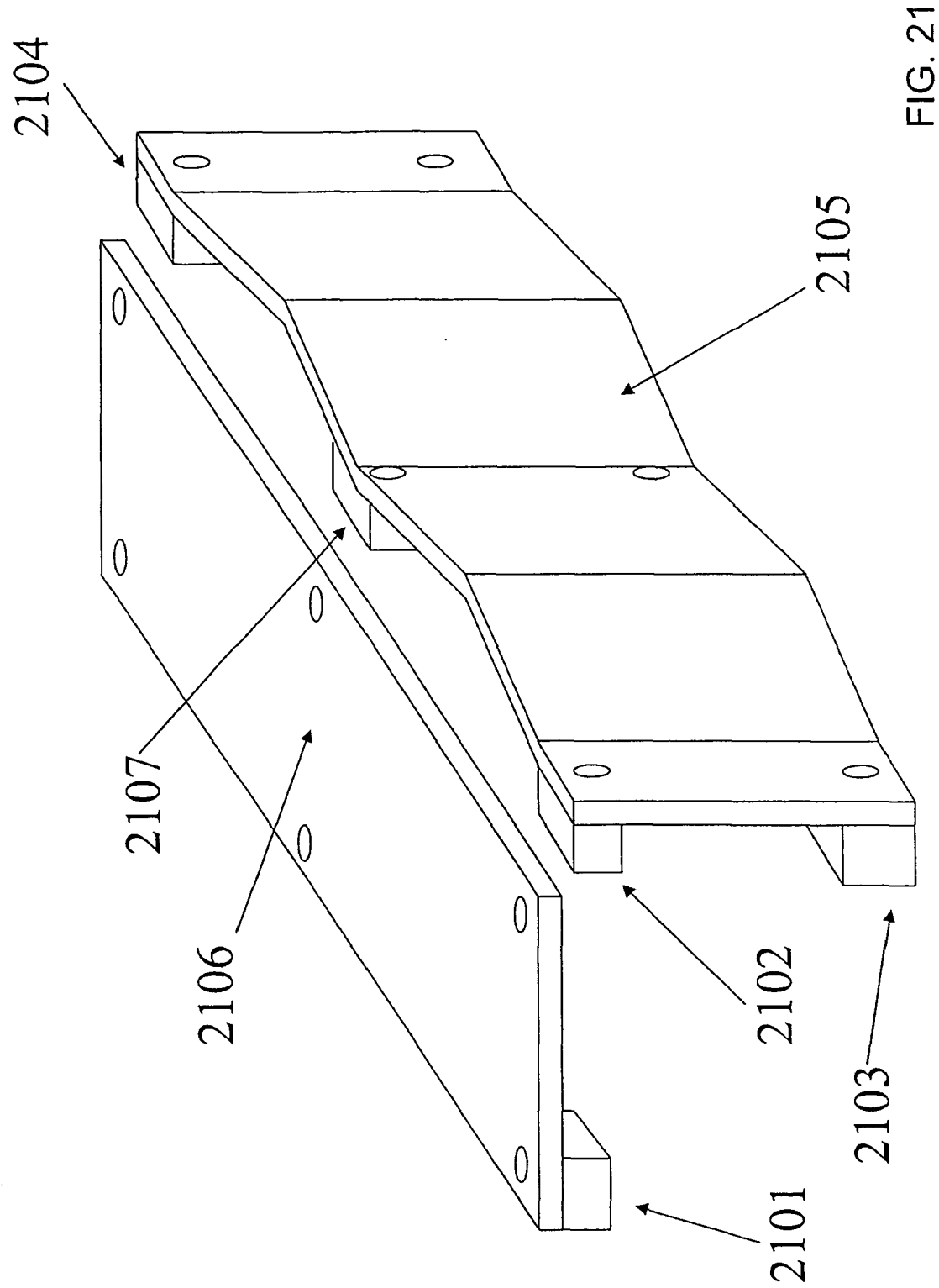


FIG. 21

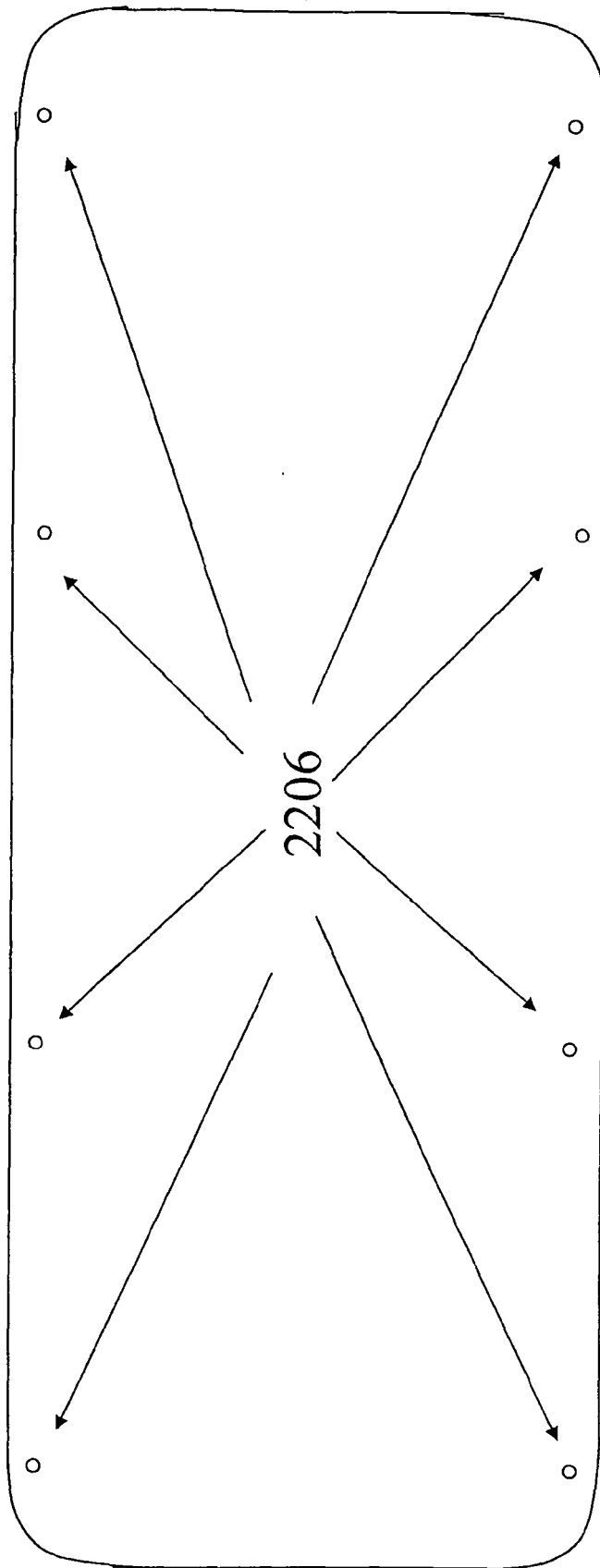


FIG. 22

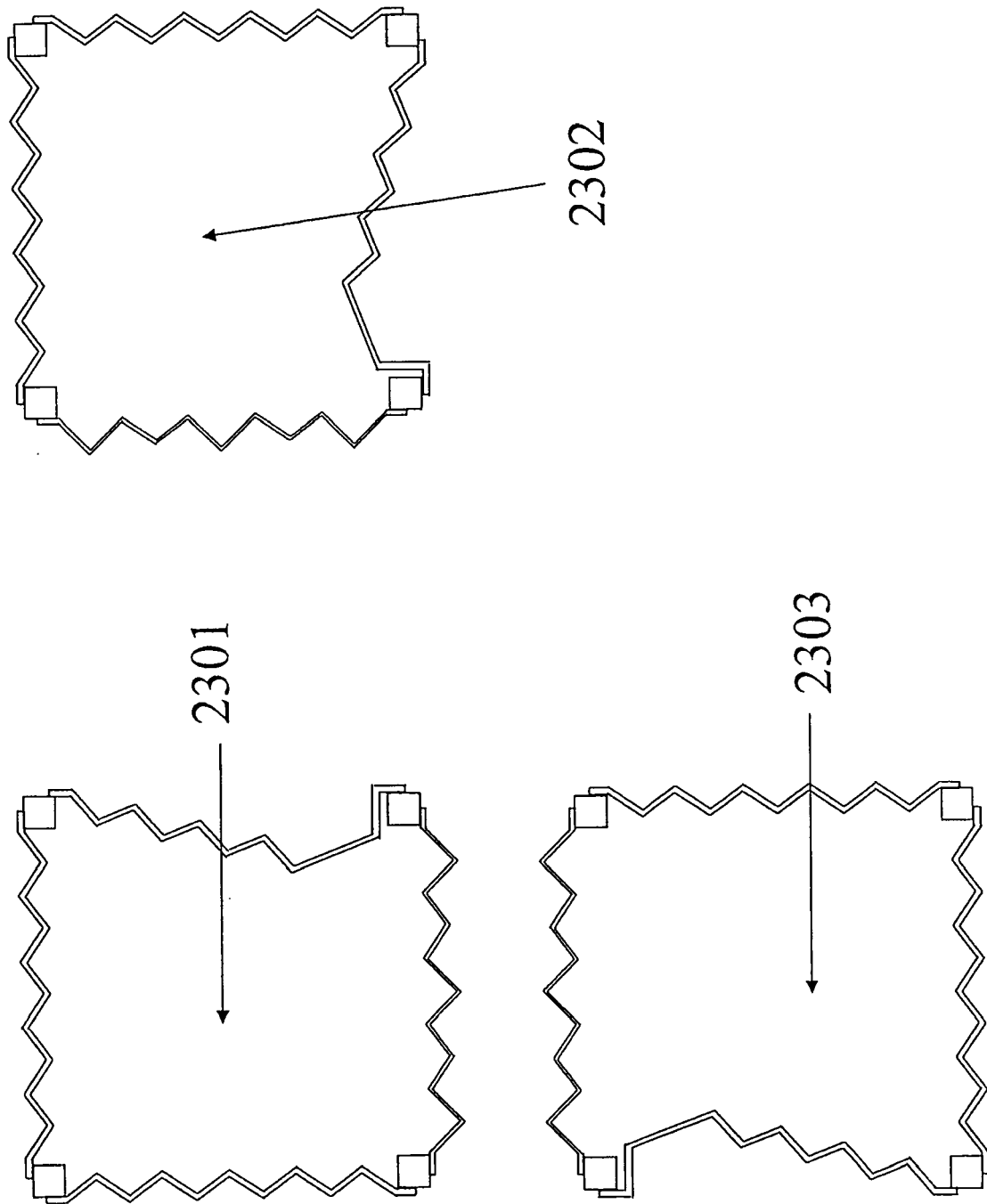


FIG. 23

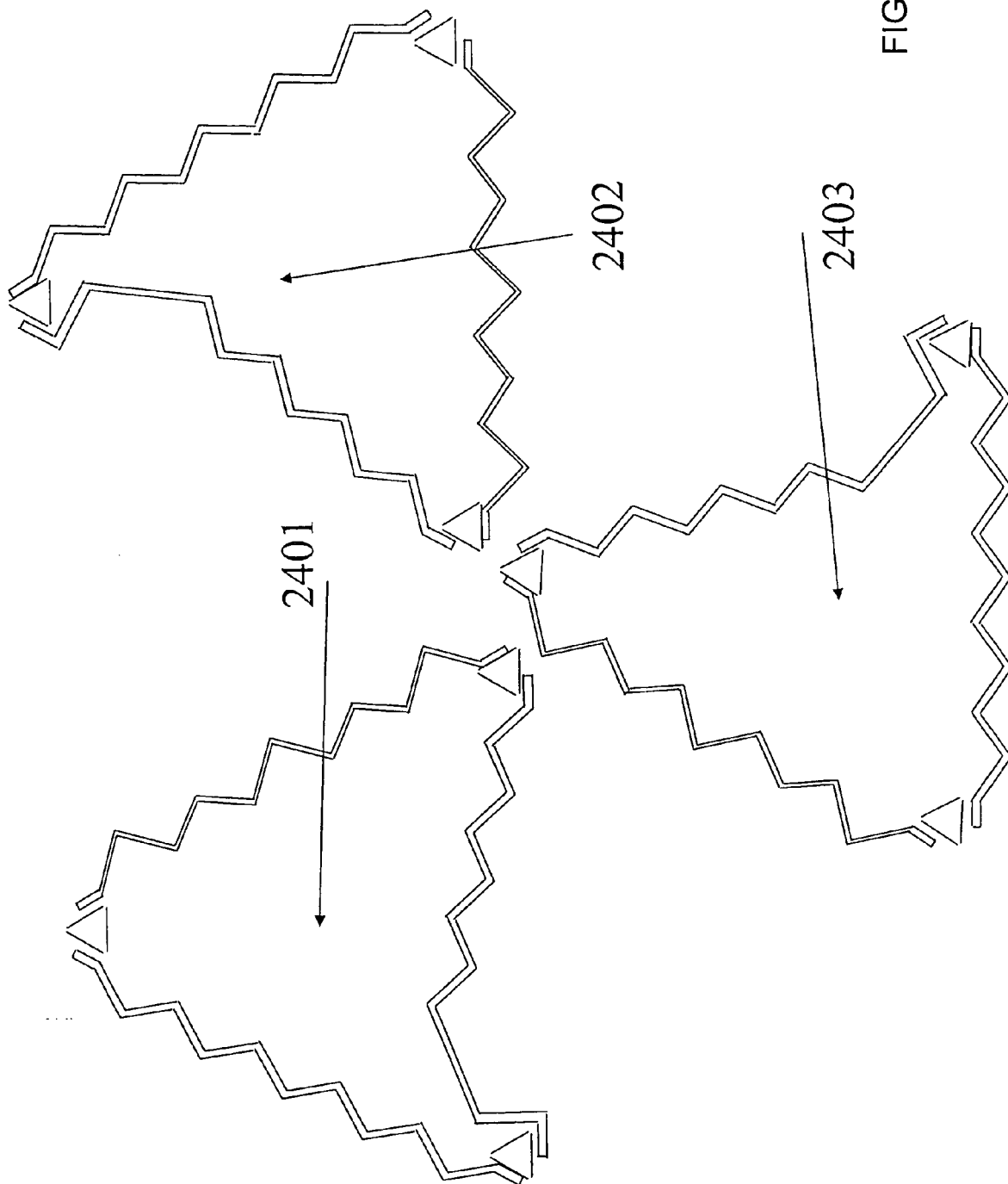
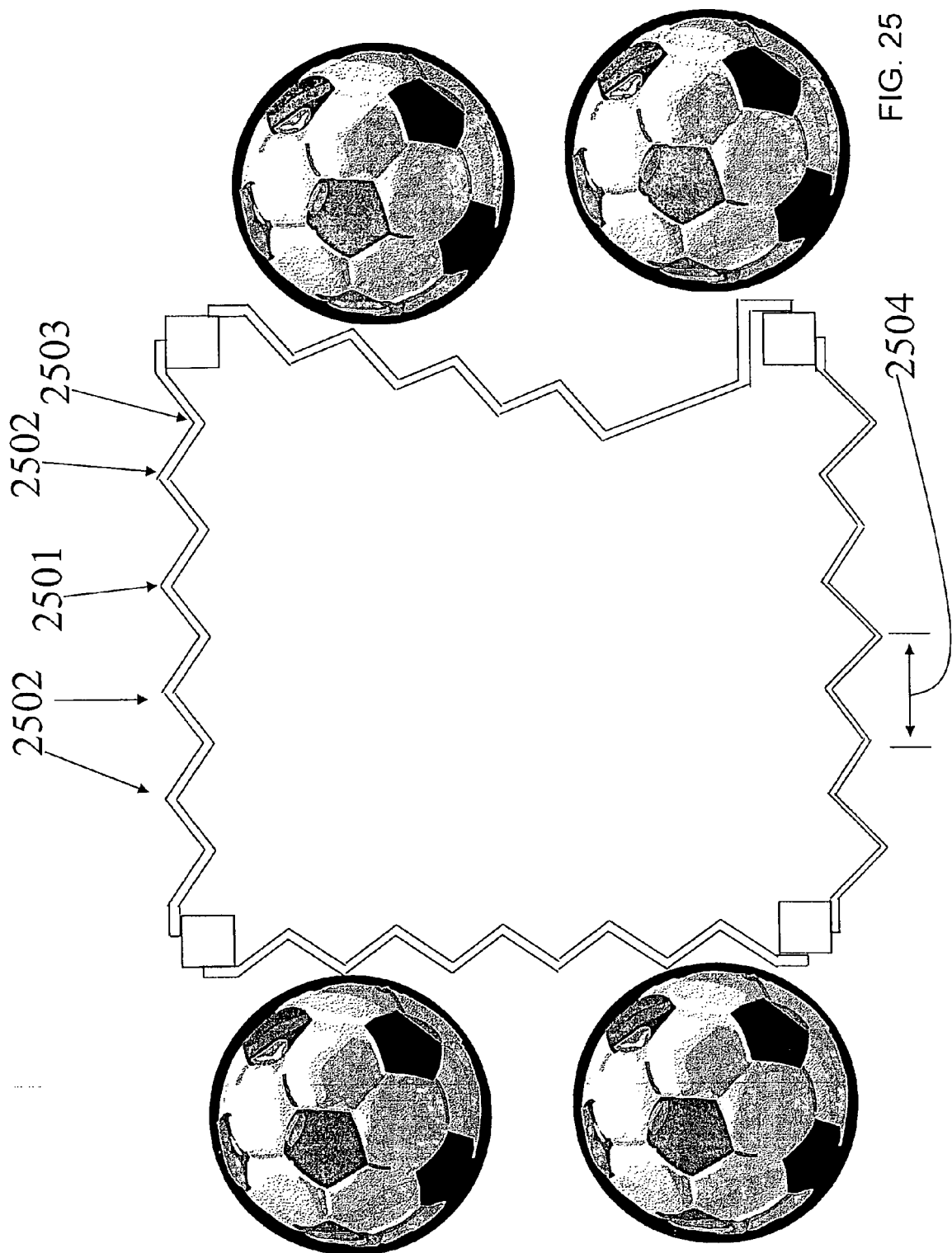


FIG. 24



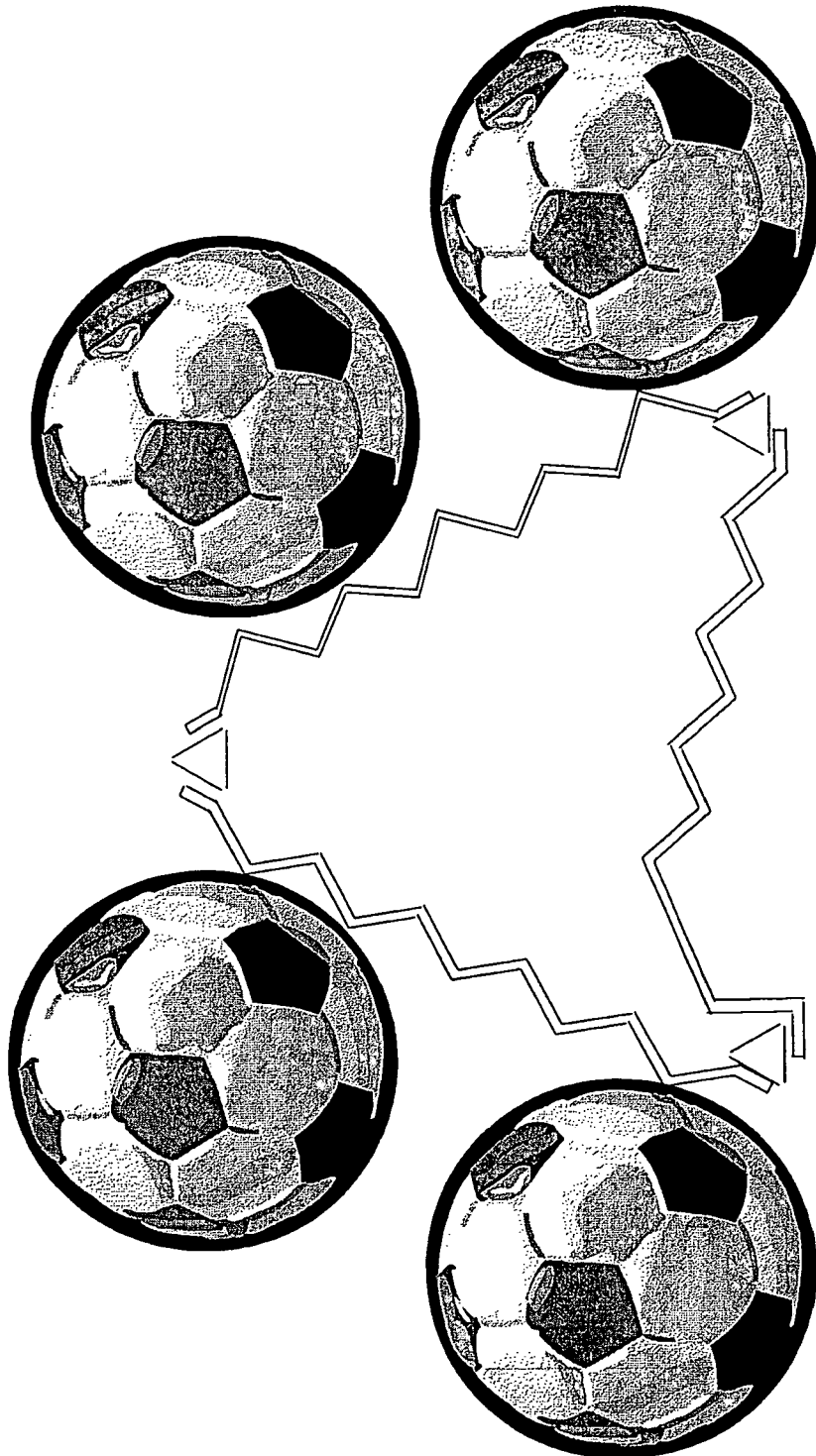


FIG. 26

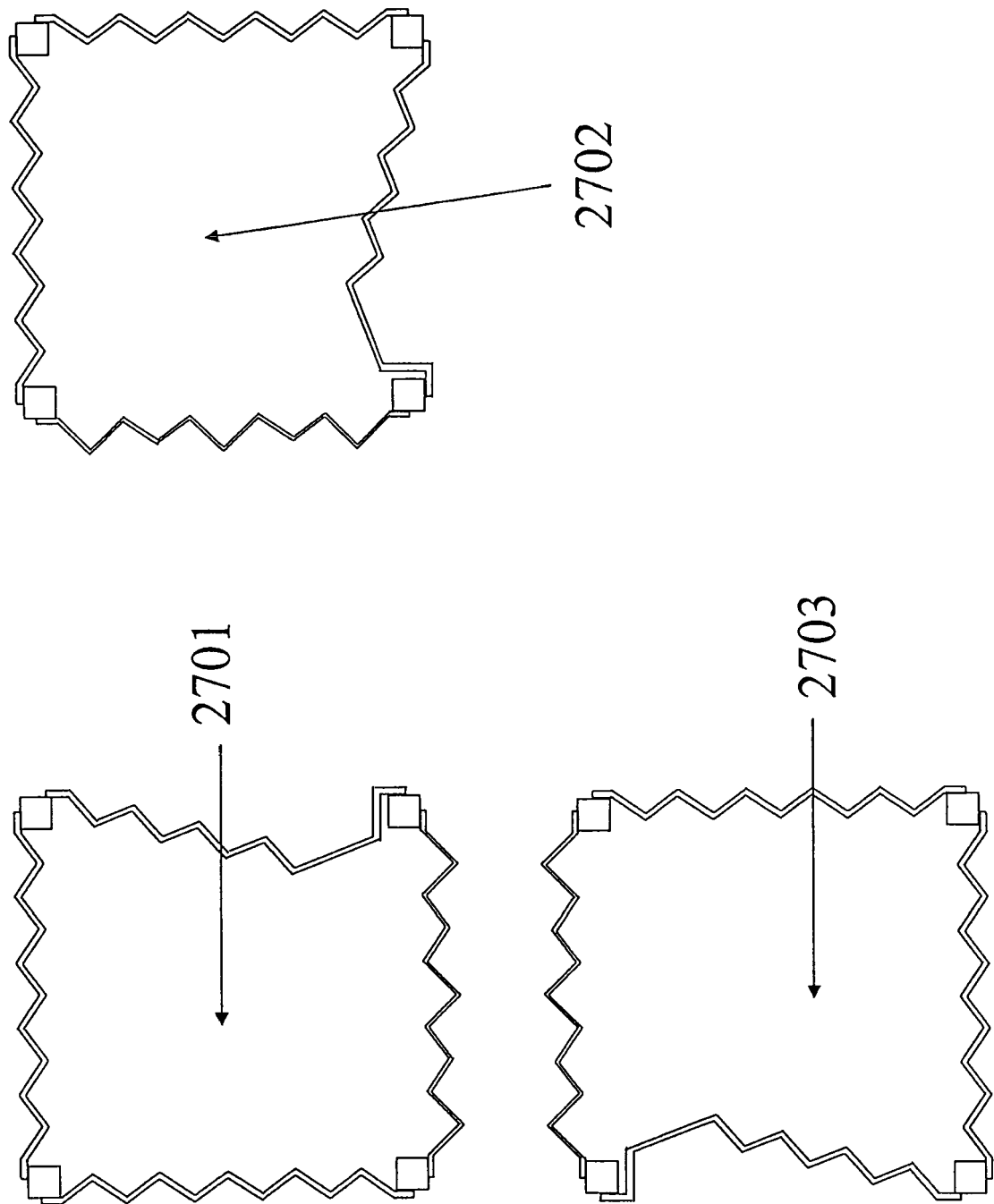


FIG. 27

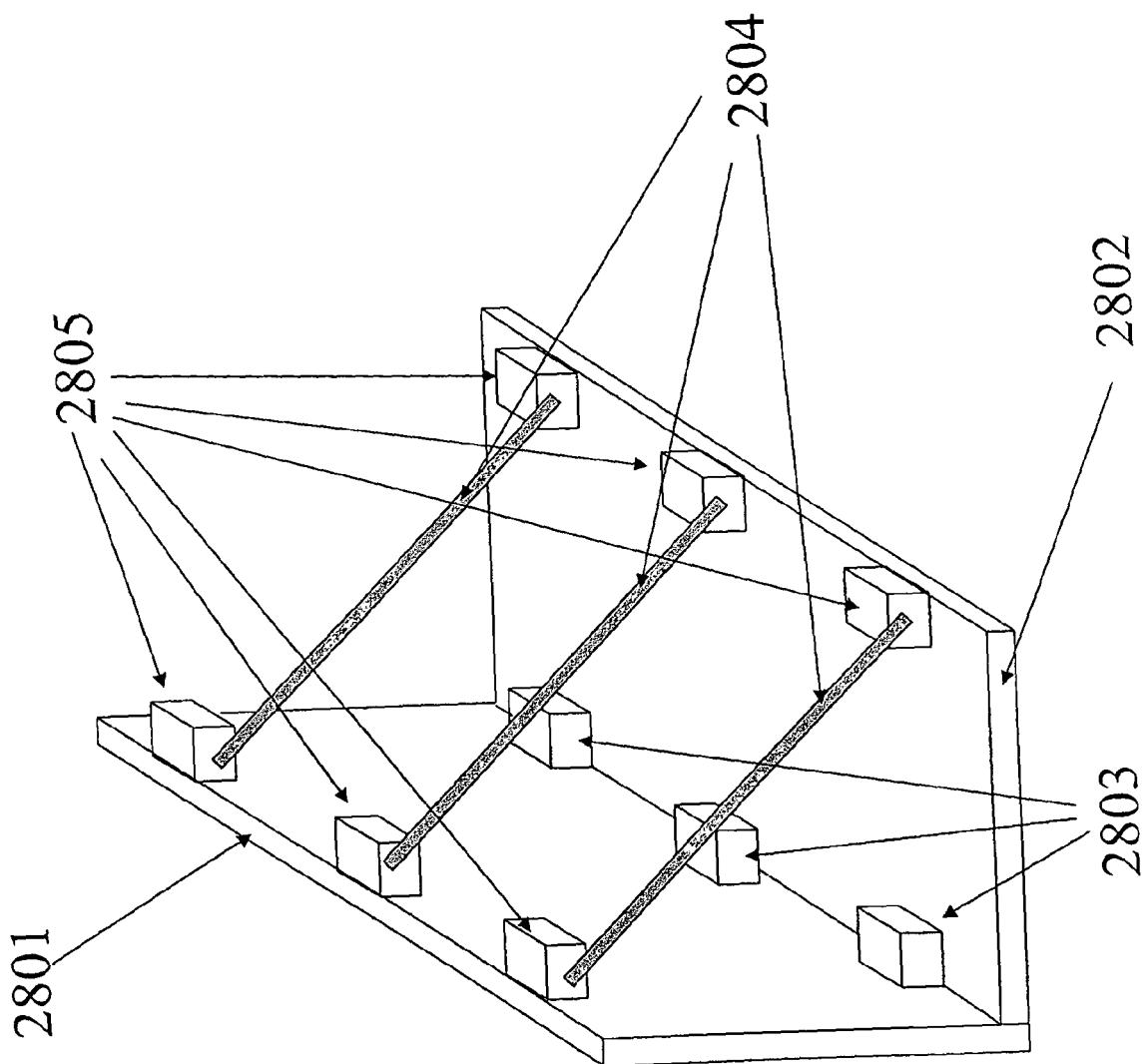


FIG. 28

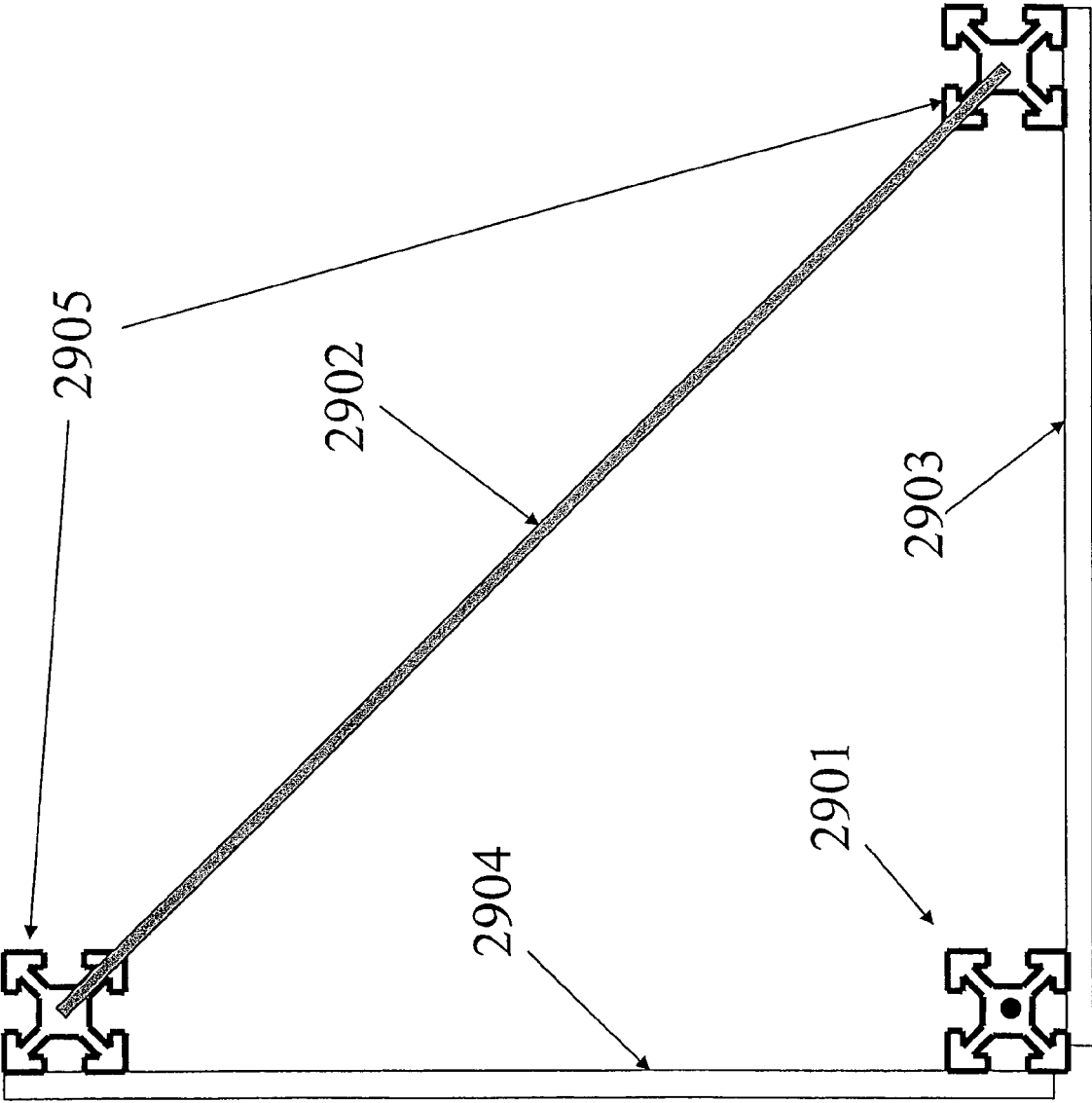


FIG. 29

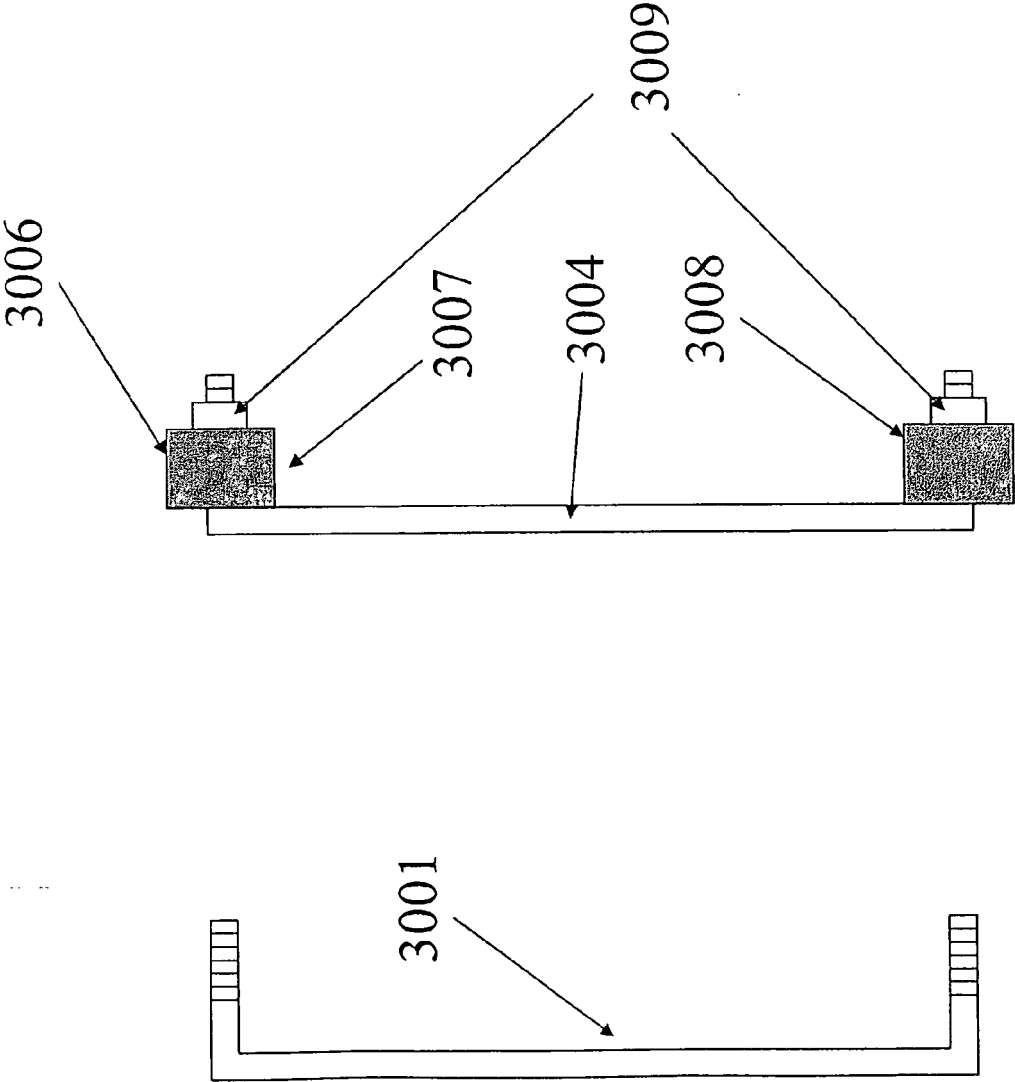


FIG. 30

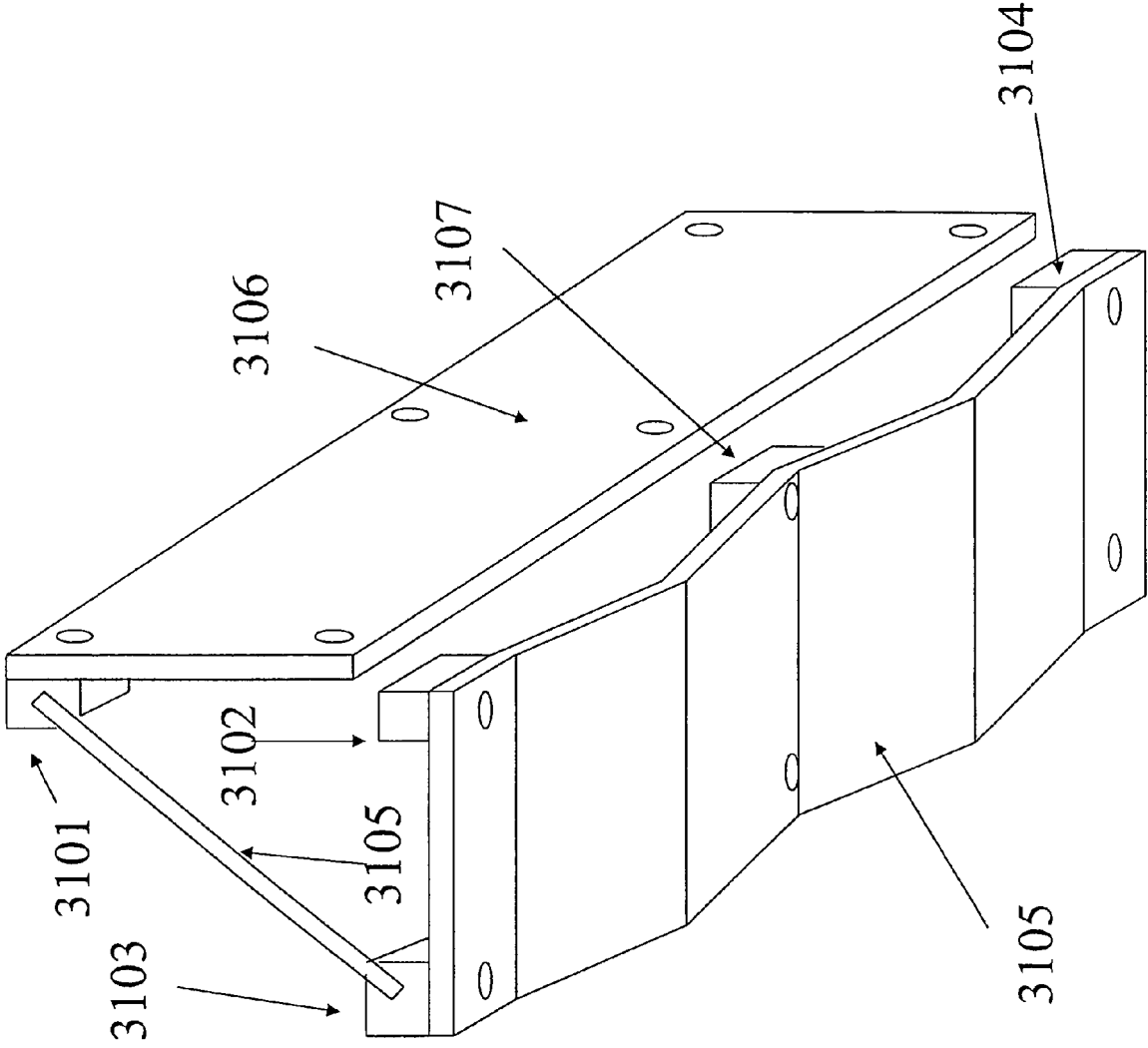


FIG. 31

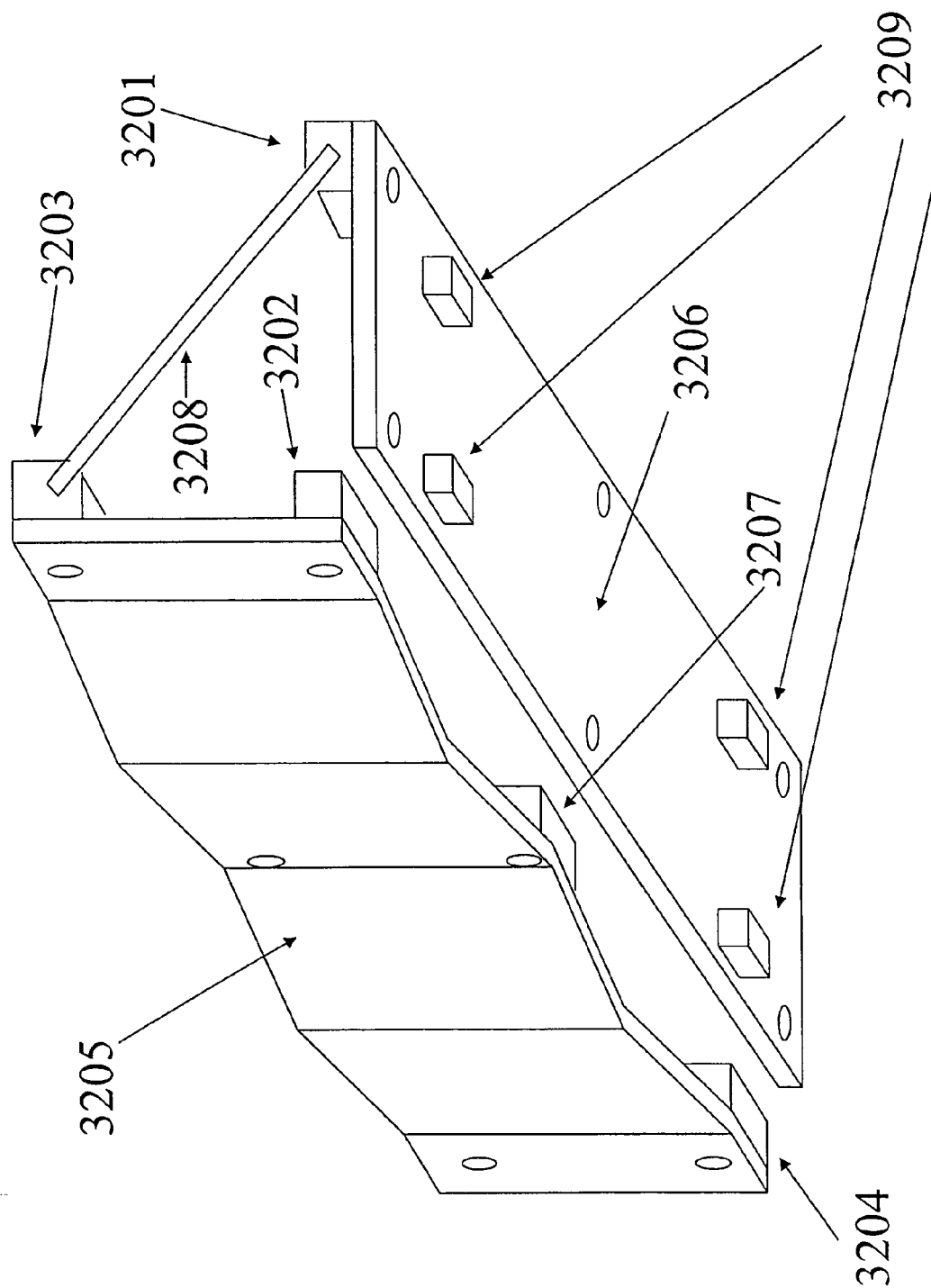


FIG. 32

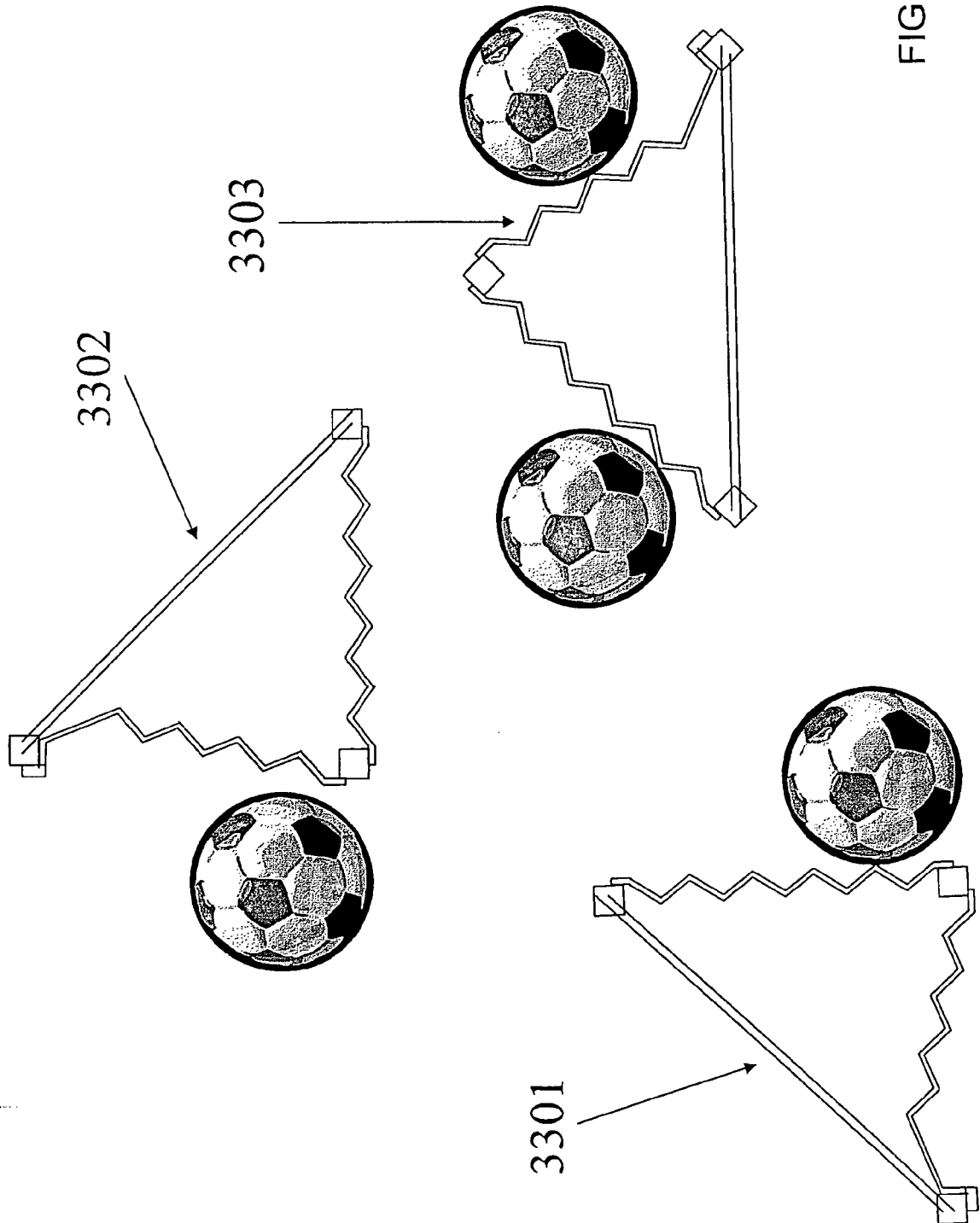


FIG. 33

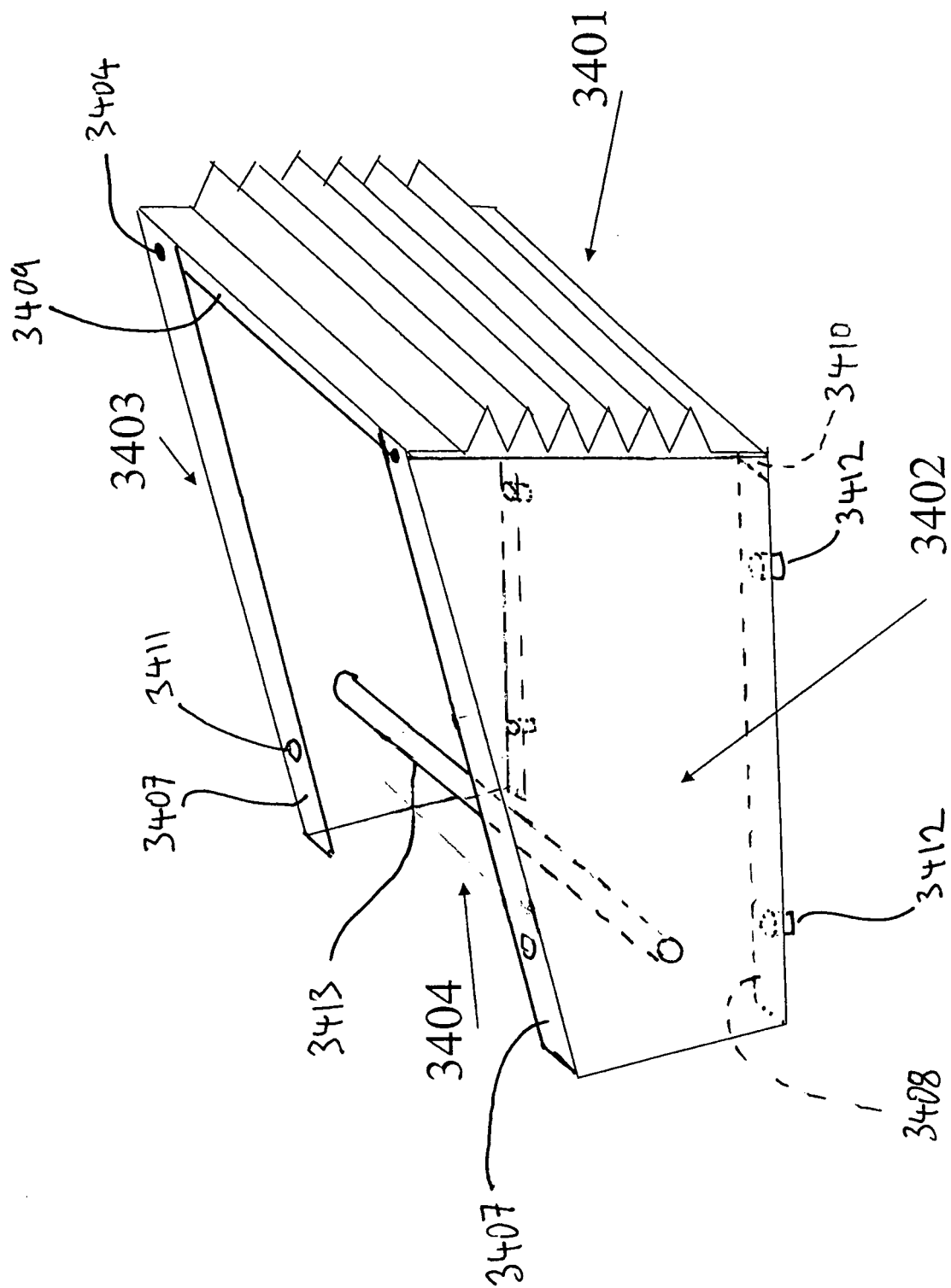


FIG. 34

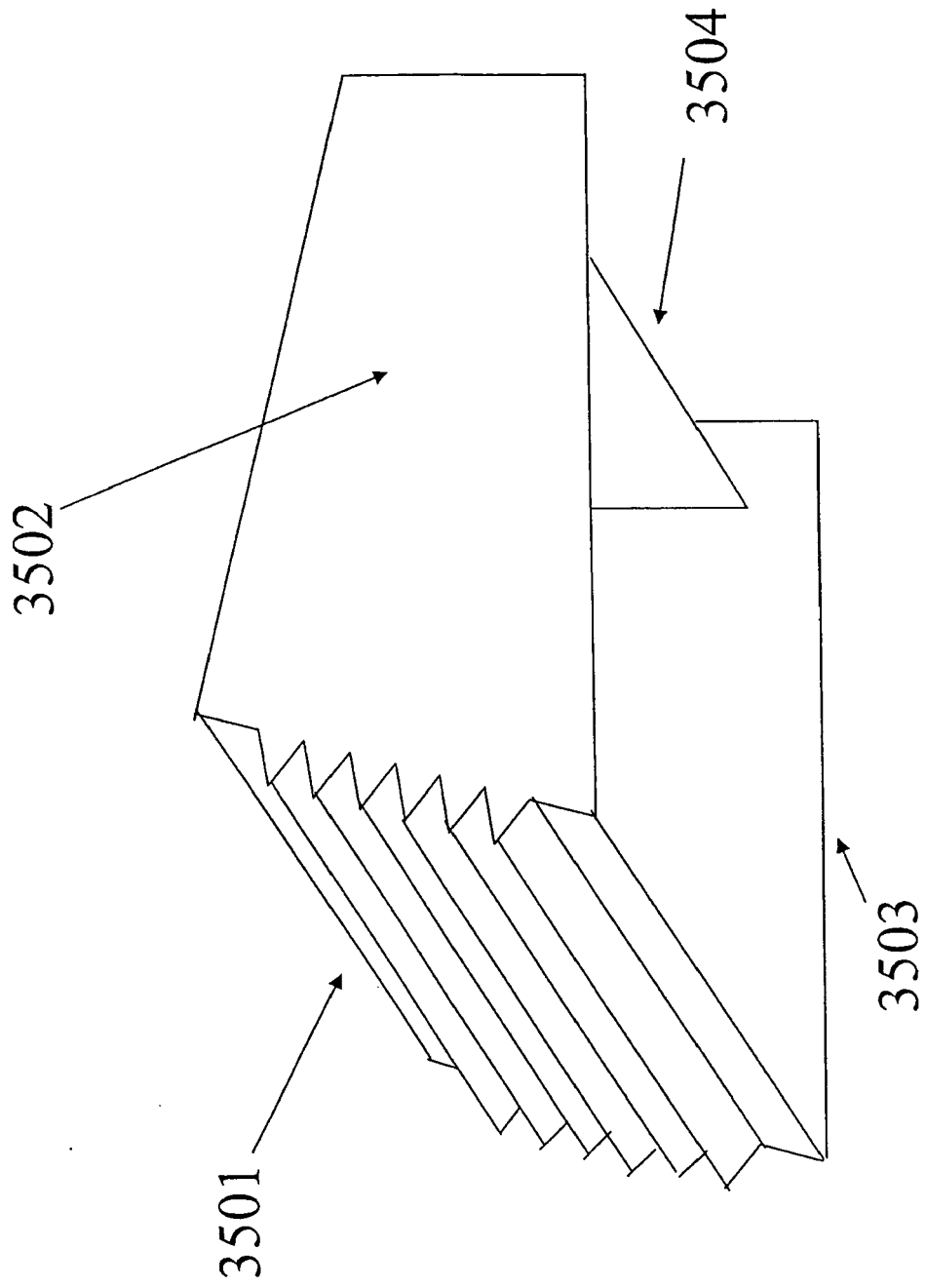
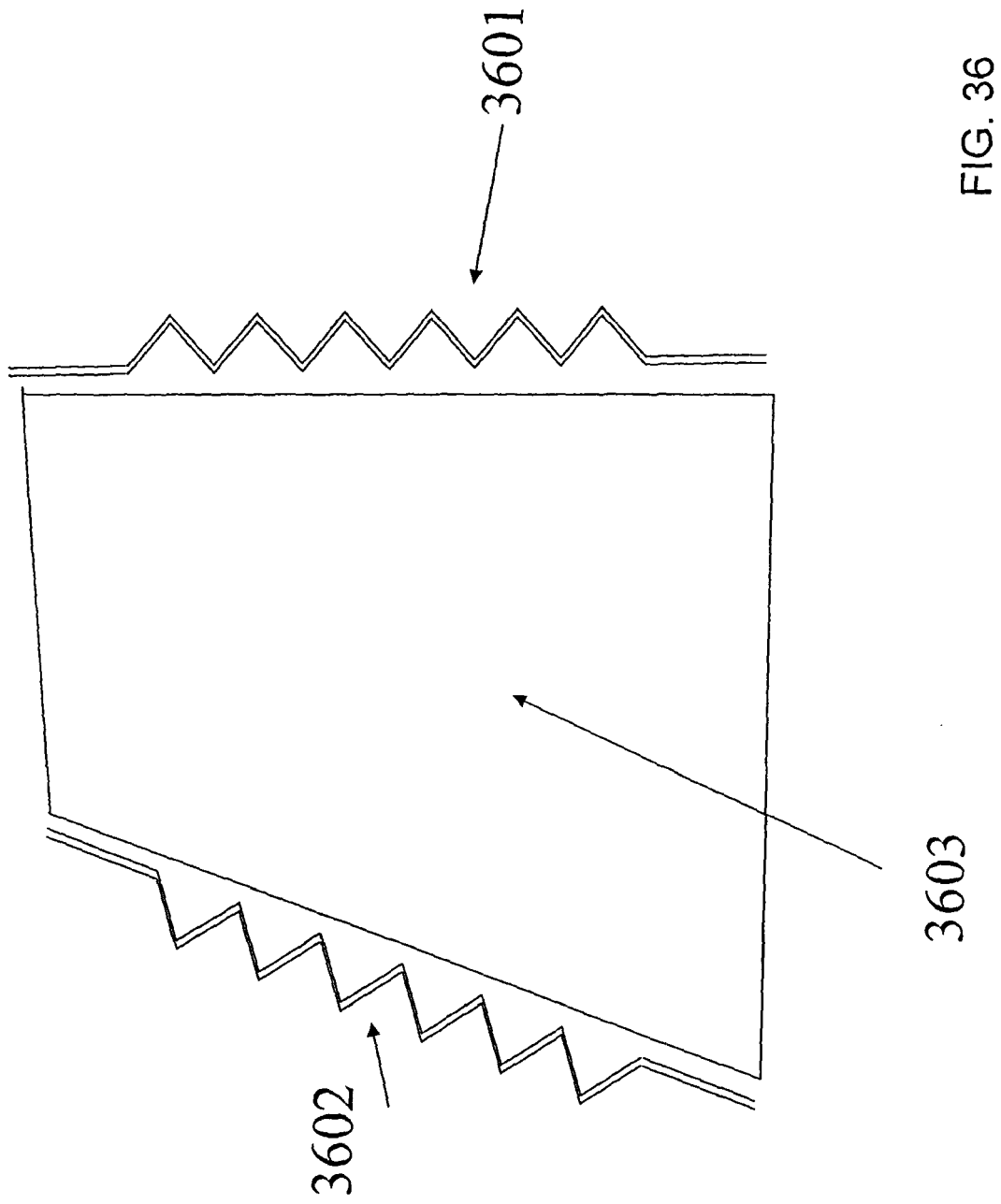
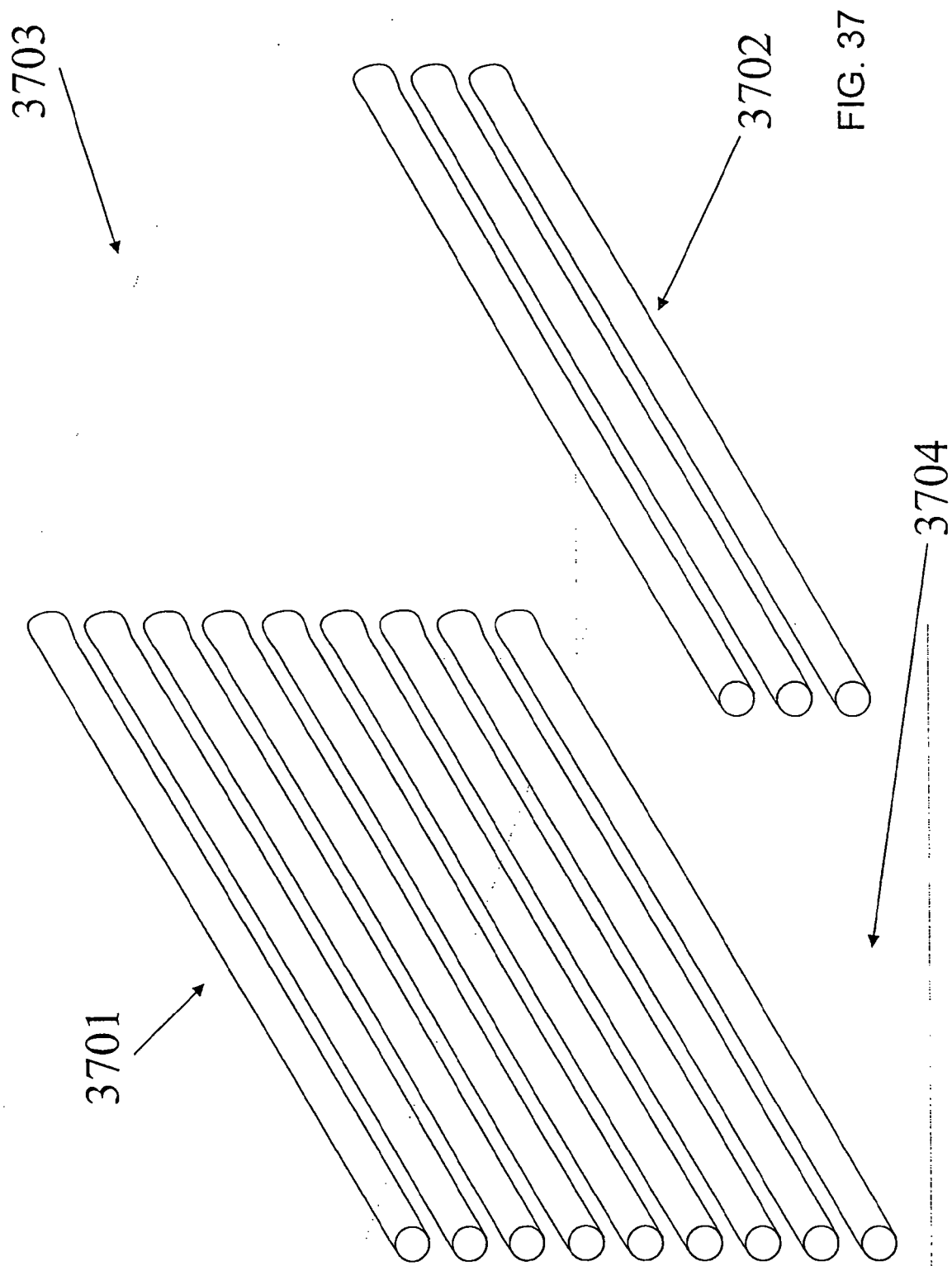
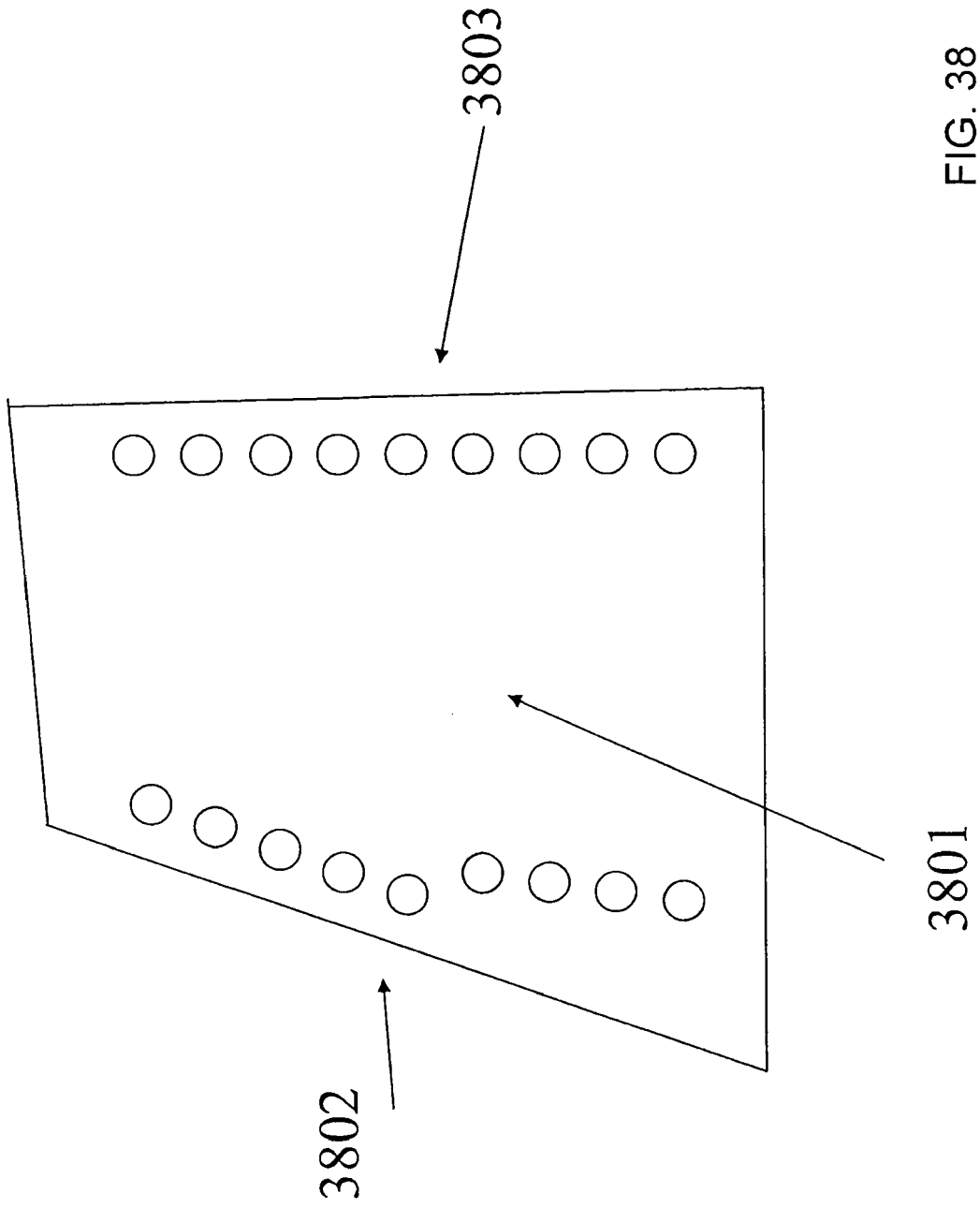


FIG. 35







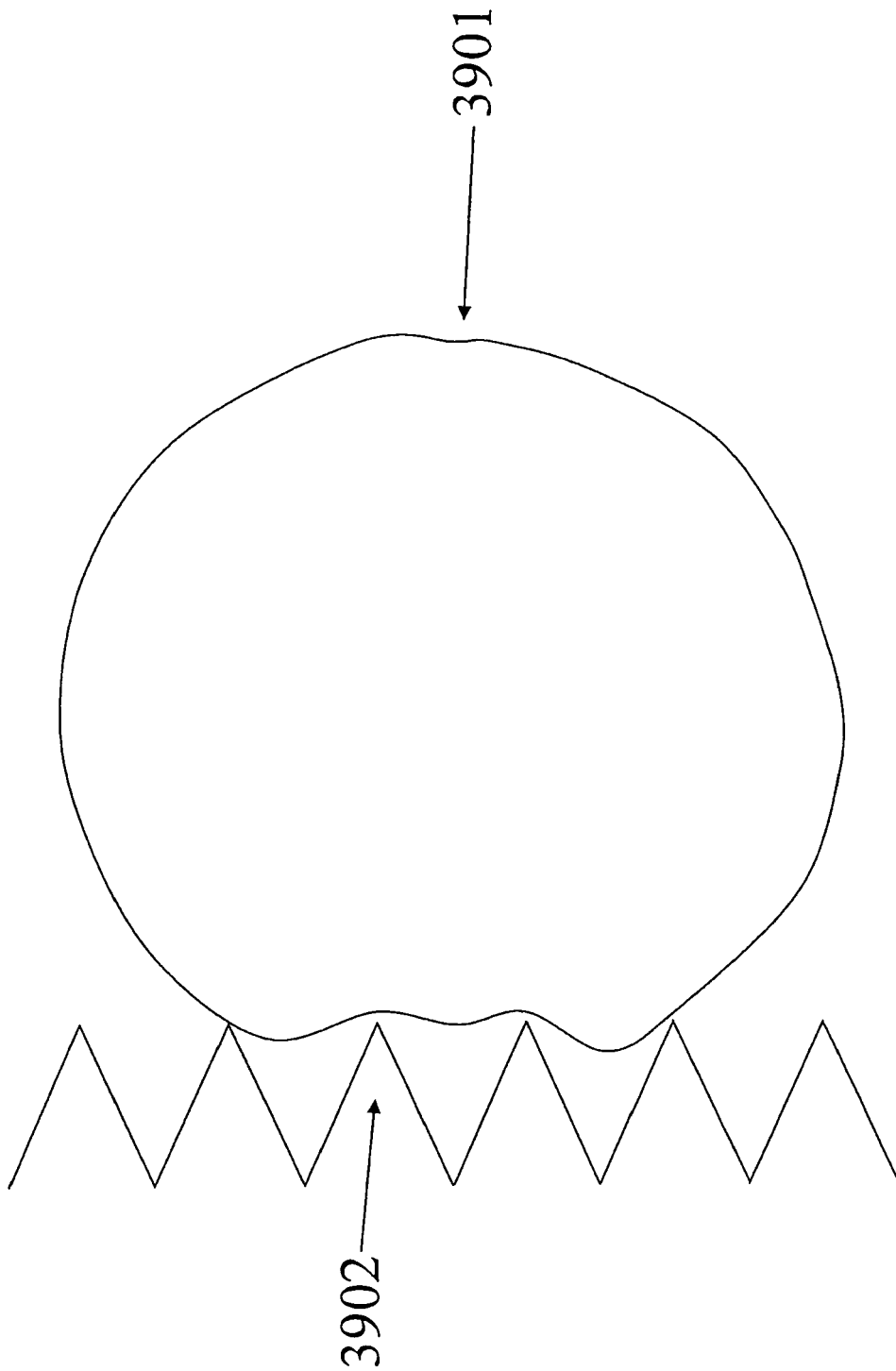


FIG. 39

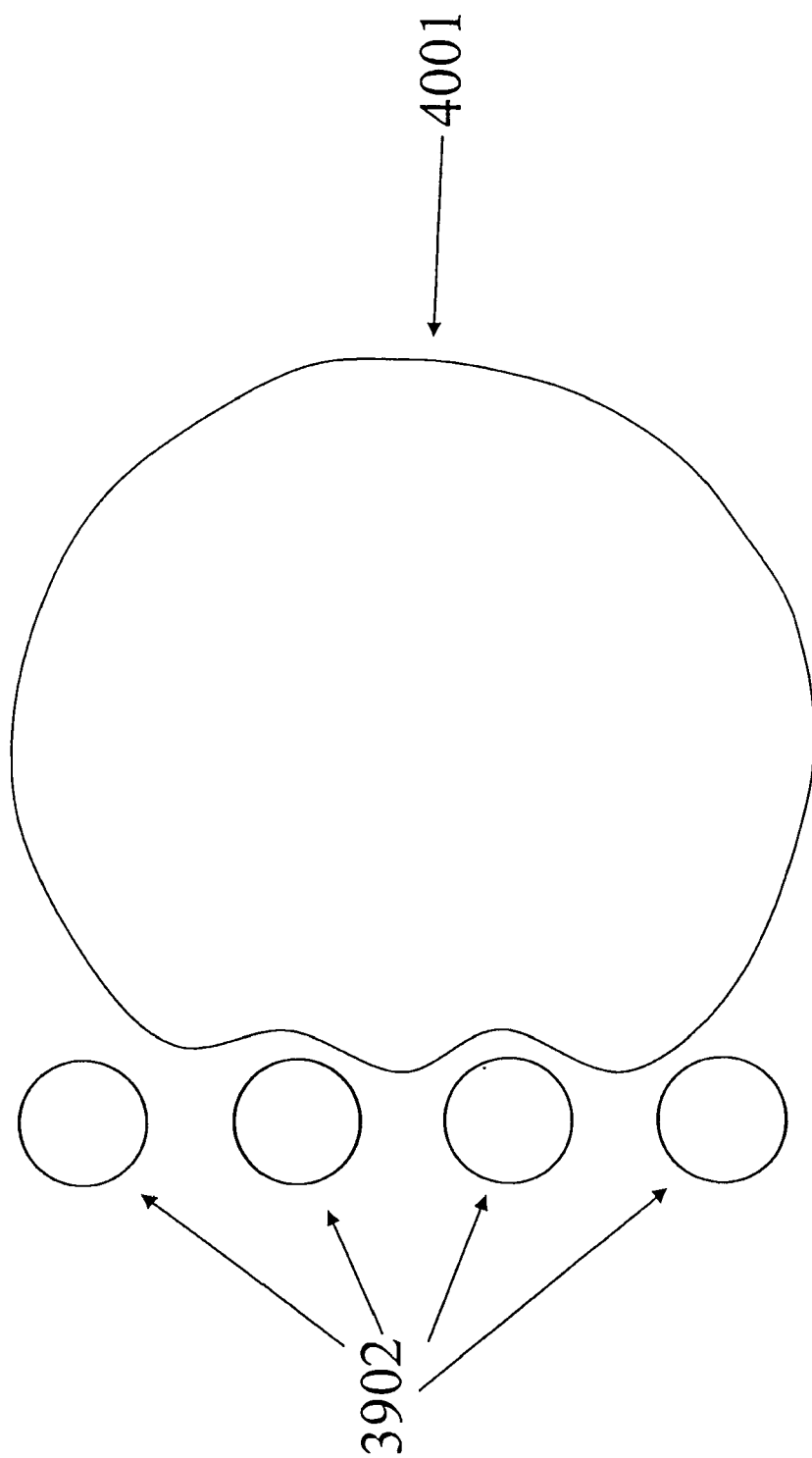


FIG. 40

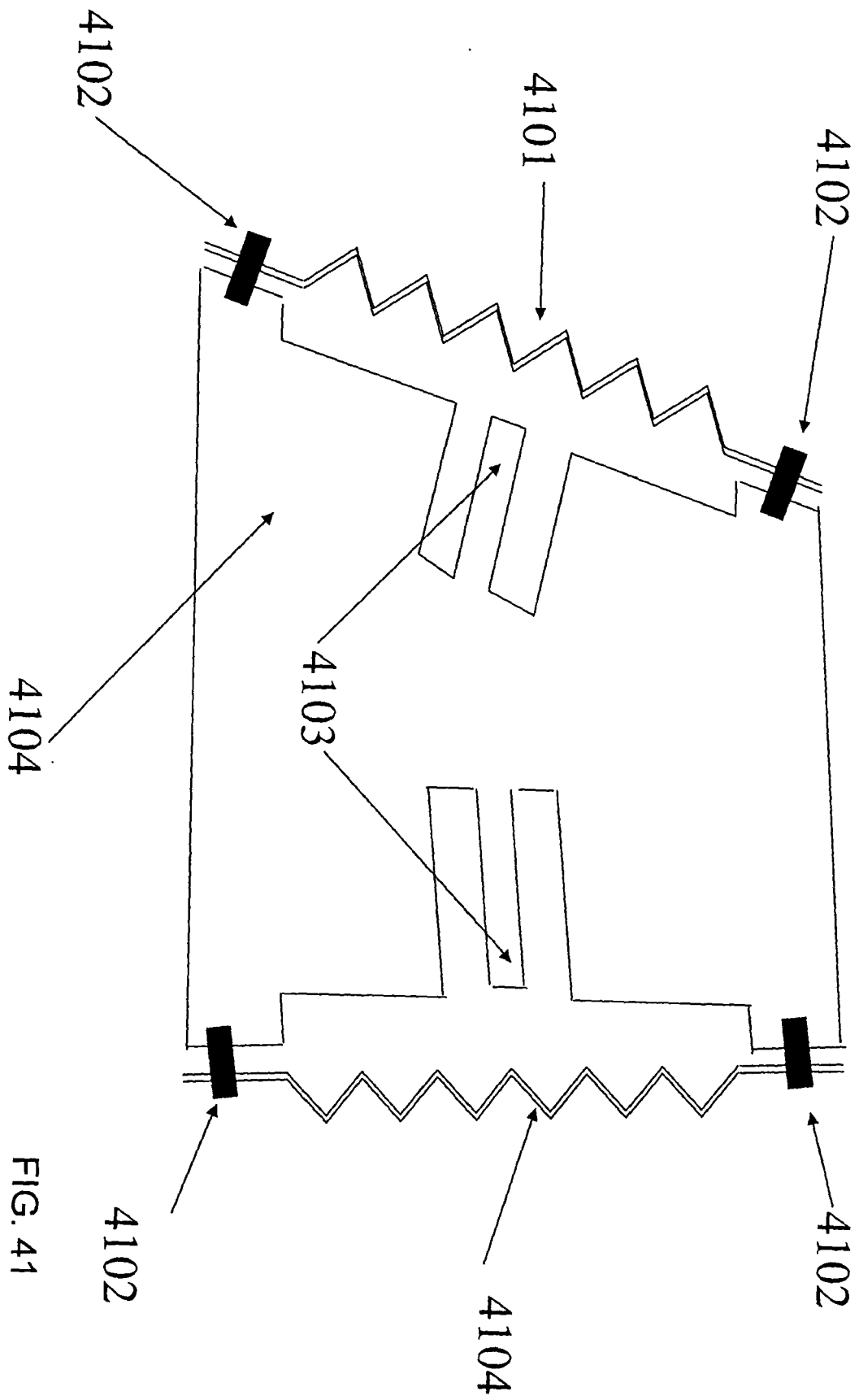


FIG. 41

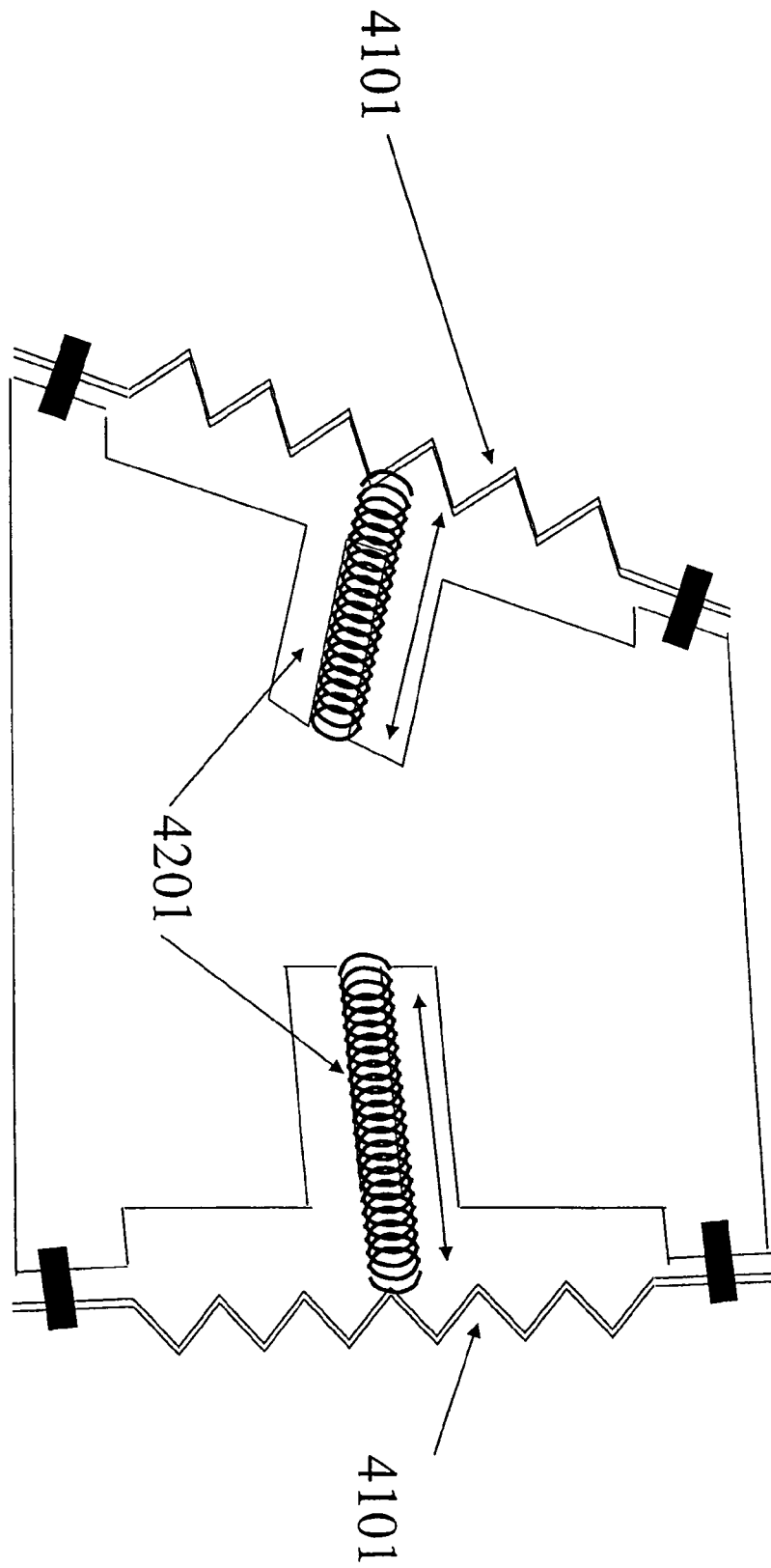


FIG. 42



EUROPEAN SEARCH REPORT

Application Number
EP 08 25 2440

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 4 026 551 A (LARSON CHARLES W) 31 May 1977 (1977-05-31)	1-4, 6, 8-10, 13, 14	INV. A63B69/00
Y	* the whole document *	7, 11, 12	

X	US 2004/176193 A1 (VALLIQUETTE DANIEL [CA]) 9 September 2004 (2004-09-09)	15	
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Y	* abstract; figures *	5	

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			TECHNICAL FIELDS SEARCHED (IPC)
			A63B
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 10 October 2008	Examiner Squeri, Michele
CATEGORY OF CITED DOCUMENTS		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	
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**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 08 25 2440

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The members are as contained in the European Patent Office EDP file on
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10-10-2008

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