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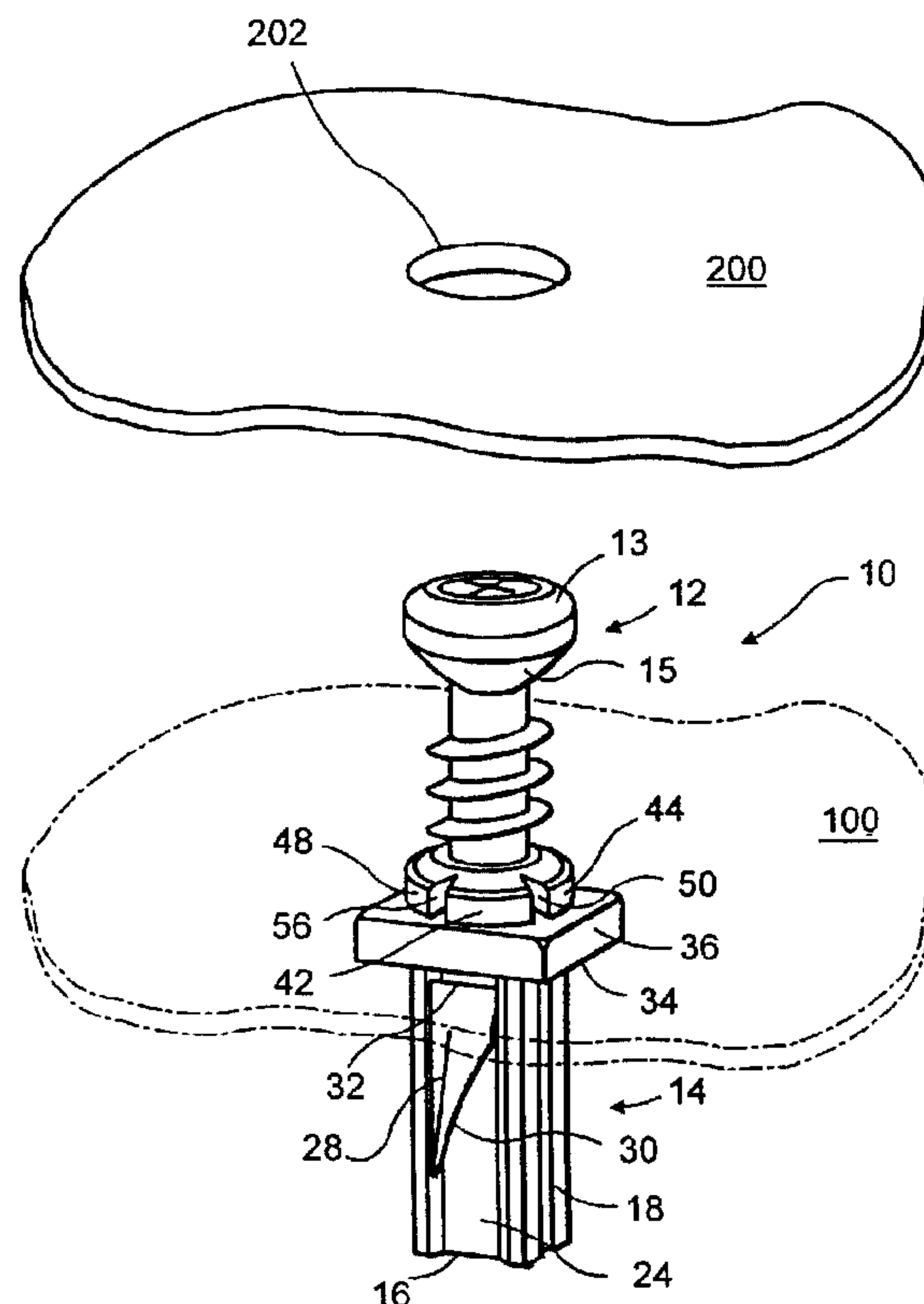
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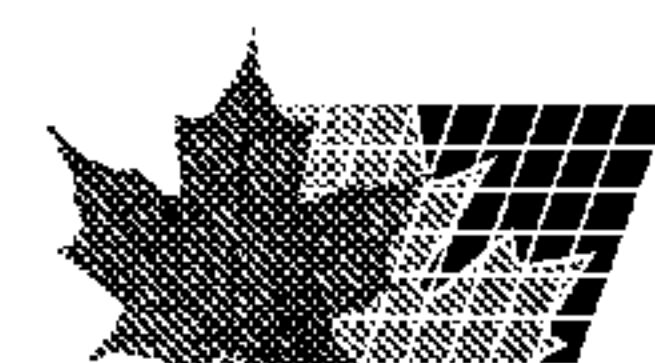
(54) Titre : PASSE-CABLE A VIS

(54) Title: SCREW INSTALLED GROMMET



(57) Abrégé/Abstract:

The grommet includes a shank with a planar surface through which an aperture is formed. A screw is inserted into the aperture. Boss segments are formed peripherally outwardly adjacent from the aperture. The outer walls of the boss segments form a diameter equal to the diameter of an aperture of a secondary panel to be engaged. The diameter of the screw head does not exceed the diameter of the aperture to be engaged. When the screw is in the fully driven position, the lower chamfered surface of the head of the screw urges the boss segments outwardly so as to engage the secondary panel. The shank of the grommet further includes lateral flexible wings for detent engaging a primary panel with a square aperture.



SCREW INSTALLED GROMMET

ABSTRACT OF THE DISCLOSURE

The grommet includes a shank with a planar surface through which an aperture is formed. A screw is inserted into the aperture. Boss segments are formed peripherally outwardly adjacent from the aperture. The outer walls of the boss segments form a diameter equal to the diameter of an aperture of a secondary panel to be engaged. The diameter of the screw head does not exceed the diameter of the aperture to be engaged. When the screw is in the fully driven position, the lower chamfered surface of the head of the screw urges the boss segments outwardly so as to engage the secondary panel. The shank of the grommet further includes lateral flexible wings for detent engaging a primary panel with a square aperture.

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SCREW INSTALLED GROMMETBACKGROUND OF THE INVENTIONField of the Invention

This invention pertains to a grommet wherein the screw can be partially inserted or pre-driven into an aperture with outwardly adjacent peripheral boss segments about the mouth of the aperture which are intended to extend through the aperture of a panel to be engaged. As the screw is fully driven, the chamfer of the screw urges the boss segments outwardly to engage the panel.

Description of the Prior Art

In the prior art, grommets can require several steps for installation which can complicate an assembly process. For instance, if the grommet requires that a screw be inserted after the grommet has contacted the panel to be engaged, rather than before such contact, then an extra step is included in the assembly process in that a screw must be picked from stock on the assembly line and inserted into a torque driver. This furthermore adds the screw as an additional part to inventory.

While grommets with partially driven screws can be used to engage keyhole slots in the secondary panel, this can be likewise disadvantageous in that a keyhole slot rather than a round aperture is required in the secondary panel and further requires separate forward and downward motions for installation, which is not always possible in confined spaces, such as would be encountered in automotive applications.

Examples of prior art in this field include U.S. Patent No.

4,506,419 entitled "Part-Fixing Clip" issued on March 26, 1985 to Mitomi; U.S. Patent No. 4,082,030 entitled "Plastic Screw Grommet" issued on April 4, 1978 to Erickson; and U.S. Patent No. 4,077,300 issued on March 7, 1978 to Yoda.

SUMMARY OF THE INVENTION

Accordingly, this invention seeks to provide a grommet which can be used to simplify the assembly process.

Further, this invention seeks to provide a grommet in which the screw can be engaged or pre-driven into the grommet prior to installation of the grommet thereby simplifying the assembly process and eliminating a part from inventory for the automated process.

Still further, this invention seeks to provide a grommet which can be engaged to a panel by a single forward movement.

Further still, this invention seeks to provide a grommet which can engage a secondary panel.

These and other aspects are attained by providing a grommet with an aperture and outwardly adjacent peripheral boss segments about the mouth of the aperture. A screw can be pre-driven or partially inserted into the aperture, with the head of screw typically of a diameter typically equally to, or at least not larger than, the diameter defined by the distance between the outer walls of the boss segments. The aperture in the secondary panel to be engaged is intended to be of a diameter substantial equal to the diameter defined by the distance between the outer walls of the

boss segments. Therefore, the head of the pre-driven screw can be inserted by a single forward motion through the aperture in the secondary panel thereby inserting the boss segments through the aperture in the secondary panel. The screw is then fully inserted into the aperture of the grommet so that the chamfer of the screw head forces the boss segments outwardly thereby engaging the secondary panel.

BRIEF DESCRIPTION OF THE DRAWINGS

Further objects and advantages of the invention will become apparent from the following description and claims, and from the accompanying drawings, wherein:

Figure 1 is a perspective view of the grommet of the present invention, showing the screw in a partially inserted or pre-driven position.

Figure 2 is a perspective view of the grommet of the present invention, illustrating how the pre-driven screw is inserted through the aperture of the secondary panel.

Figure 3 is a top plan view of the grommet of the present invention, with the screw removed.

Figure 4 is a bottom plan view of the grommet of the present invention.

Figure 5 is a cross-sectional view showing the primary and secondary panels installed on the grommet of the present invention.

Figures 6A-6F are a series of perspective views illustrating the installation of the grommet of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawings in detail wherein like numerals refer to like elements throughout the several views, one sees that Figure 1 is a perspective view of grommet 10 with screw 12 in a partially inserted or pre-driven position. Grommet 10 includes shank 14 formed by walls 16, 18, 20, 22 as shown in Figure 4. Walls 16, 20, however, include broad longitudinal channels 24, 26 over which flexible wing elements 28, 29 extend. Walls 18, 22 likewise include narrow longitudinal channels 19, 23. Alternative structures can be used in lieu of the illustrated flexible wing elements 28, 29 to perform the functions described hereinafter. As shown in Figure 1, flexible wing element 28 includes downwardly pointing oblique surface 30 for urging wing element 28 toward wall 16 and into broad longitudinal channel 24 as grommet 10 is inserted into a square aperture of primary panel 100 (see Figure 5). Wing element 28 further includes upper horizontal surface 32 which is parallel to lower surface 34 of planar plate 36. Upper horizontal surface 32 detent engages primary panel 100 against lower surface 34 of planar plate 36 in the installed position as shown in Figure 5. Flexible wing element 29, of course, has an identical structure.

As shown in Figure 3, aperture 40 is formed on the center of upper surface 38 of planar plate 36 and extends longitudinally into shank 14. Boss segments 42, 44, 46, 48 are formed peripherally outwardly adjacent from aperture 40 with gaps 50, 52, 54, 56 formed therebetween. Gaps 50, 52, 54, 56 can optionally includes

isthmuses between adjacent boss segments which are broken as the boss segments 42, 44, 46, 48 are spread apart or split in the fully driven position shown in Figure 5. As shown in Figure 2, the aperture 202 in secondary panel 200 to be engaged has a diameter preferably equal to the diameter formed by the outermost walls 58, 60, 62, 64 of boss segments 42, 44, 46, 48. Likewise, head 13 of screw 12 preferably has a diameter equal to or less than the diameter of aperture 202 (equivalent, equal to or less than the diameter formed by the outermost walls 58, 60, 62, 64 of boss segments 42, 44, 46, 48) so that head 13 of screw 12 can pass through aperture 202.

After boss segments 42, 44, 46, 48 have been inserted through aperture 202, screw 12 is driven into aperture 40 in a conventional manner (i.e., with a screw driver, torque driver, or similar tool) so that the lower chamfered surface 15 of head 13 of screw 12 urges boss segments 42, 44, 46, 48 laterally outward as shown in Figure 5 to engage secondary panel 200.

To use grommet 10, as shown in the sequence of views of Figures 6A-6F, the customer typically receives grommet 10 with partially inserted or pre-driven screw 12 as shown in Figure 1. The customer or user then typically inserts shank 14 into square aperture 102 of primary panel 100 so that wing elements 28, 29 engage primary panel 100 against lower surface 34 of planar plate 36. The customer or user then inserts boss segments 42, 44, 46, 48 through aperture 202 of secondary panel 200 and, as described above, drives screw 12 into aperture 40 so that boss segments 42,

laterally outward to engage secondary panel 200.

Thus the several aforementioned objects and advantages are most effectively attained. Although a single preferred embodiment of the invention has been disclosed and described in detail herein, it should be understood that this invention is in no sense limited thereby and its scope is to be determined by that of the appended claims.

WHAT IS CLAIMED IS:

1. A screw retainer for securing two panels together, comprising:

a head portion having a predetermined diametrical extent, undersurface means for engagement with an upper surface portion of a first one of said two panels, and upper surface means for engagement with an undersurface portion of a second one of said two panels;

an engagement portion projecting from the top of said head portion, and having a diametrical extend which is less than that of said head portion, for disposition through hole means defined within said second one of said two panels in a direction extending from said undersurface portion of said second one of said two panels to an upper surface portion of said second one of said two panels such that locking means thereon engage said upper surface portion of said second one of said two panels so as to secure said screw retainer within said second one of said two panels;

a leg portion depending from said head portion for disposition through hole means defined within said first one of said two panels in a direction extending from said upper surface portion of said first one of said two panels to an undersurface portion of said first one of said two panels and provided with flexible, snap-fitting locking means for engaging said undersurface portion of said first one of said two panels so as to secure said screw retainer within said first one of said two panels;

a screw retainer bore defined within said screw retainer so as to extend from the top of said engagement portion through said head and leg portions for receiving a threaded bolt which when inserted within said screw retainer bore radially expands said engagement portion and said leg portion into engagement with sidewall portions of said hole means defined within said first and second panels for securing said screw retainer within said two panels and for securing said two panels together;

said hole means defined within said second one of said two panels has an elongated configuration with a first large diametrical extent extending in a first direction, and a second smaller diametrical extent extending in a second direction perpendicular to said first direction;

said engagement portion, including said locking means thereof, has an elongated configuration with a first large diametrical extent extending in a first direction, and a second small diametrical extent extending in a second direction perpendicular to said first direction, and wherein said first diametrical extent of said engagement portion locking means is less than said first diametrical extent of said hole means yet larger than said second diametrical extent of said hole means such that said engagement portion can be mounted within said hole means of said second one of said two panels by means of a rotational locking movement wherein said first diametrical extent of said engagement means is aligned with said first diametrical extent of said

hole means, and after insertion of said engagement portion locking means through said hole means, said engagement portion is rotated 90° so as to align said first diametrical extent thereof with said second diametrical extent of said hole means; and

upstanding projections disposed upon said upper surface means of said head portion for engagement with said hole means of said second one of said two panels so as to prevent further rotation of said screw retainer relative to said second one of said two panels beyond said 90° rotational movement.

2. The screw retainer as set forth in claim 1, wherein:

said engagement portion is integrally attached to and projects upwardly from said upper surface means of said head portion; and

said leg portion is integrally attached to and depends downwardly from said undersurface means of said head portion.

3. The screw retainer as set forth in claim 1, wherein:

said upstanding projections comprises a pair of projections disposed upon opposite sides of said engagement portion for engaging opposite sidewall portions of said hole means of said second one of said two panels.

4. The screw retainer according to claim 1, wherein said engagement portion is cylindrical.

5. The screw retainer according to claim 1, wherein said engagement portion is cylindrical and has a plurality of longitudinal slits extending downwardly from the top thereof.

6. The screw retainer as set forth in claim 1, wherein:
said screw retainer comprises a one-piece molding fabricated from a thermoplastic synthetic resin material.

7. The screw retainer as set forth in claim 1, wherein:
said locking means of said engagement portion comprise locking pawls.

8. The screw retainer as set forth in claim 5, wherein:
said locking means of said engagement portion comprises a plurality of pawls wherein one pawl is integrally formed with each section of said engagement portion defined by said longitudinal slits.

9. The screw retainer as set forth in claim 1, wherein:
said leg portion has a substantially rectangular configuration in cross-section; and
said locking means thereof comprise leaf-type engagement pieces mounted in a cantilevered manner so as to project outwardly from long side portions of said substantially rectangular leg portion of said retainer.

10. The screw retainer as set forth in claim 1, wherein:

a lower end portion of said leg portion is tapered radially inwardly so as to facilitate insertion of said leg portion within said hole means defined within said first one of said two panels.

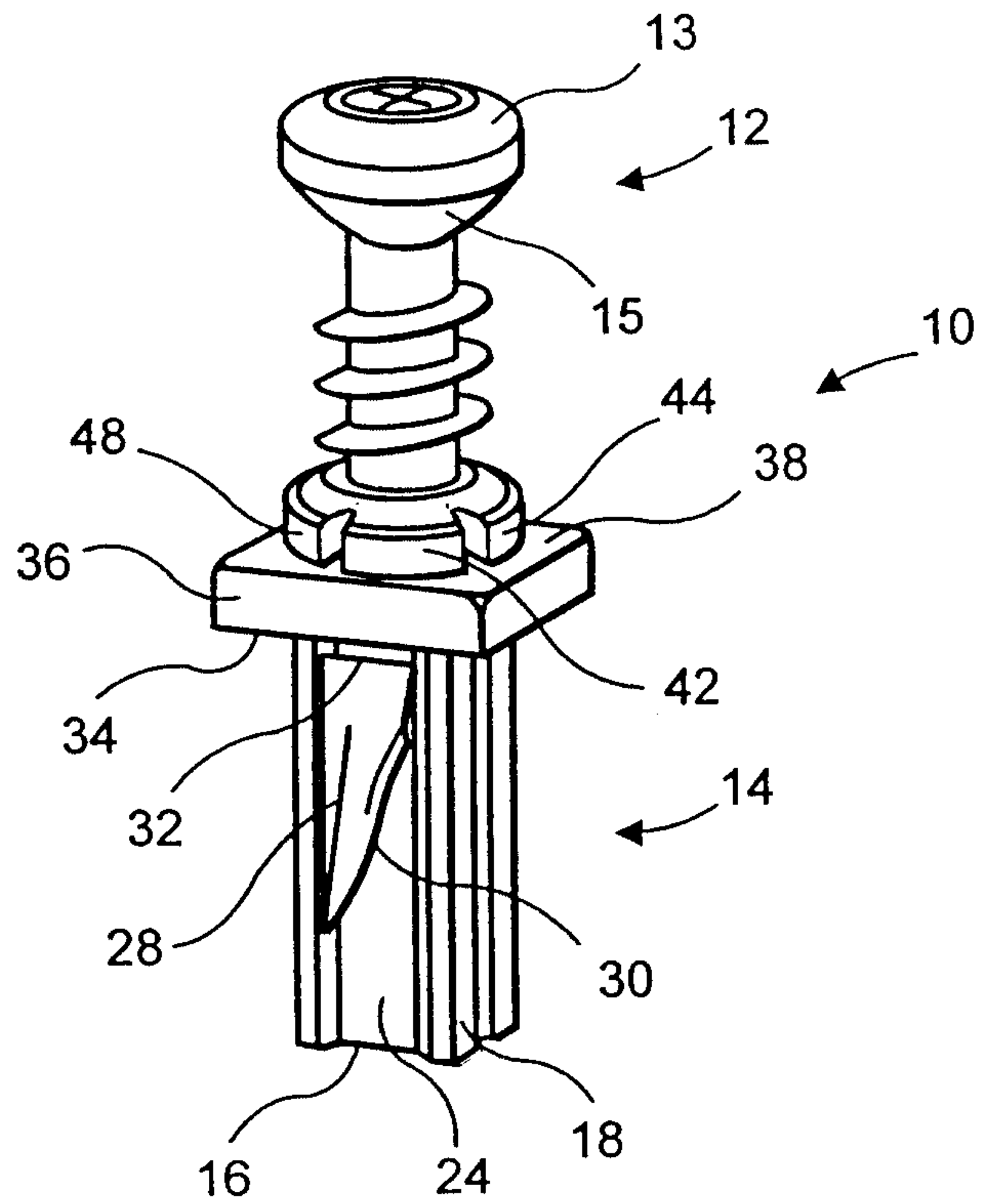


FIG. 1

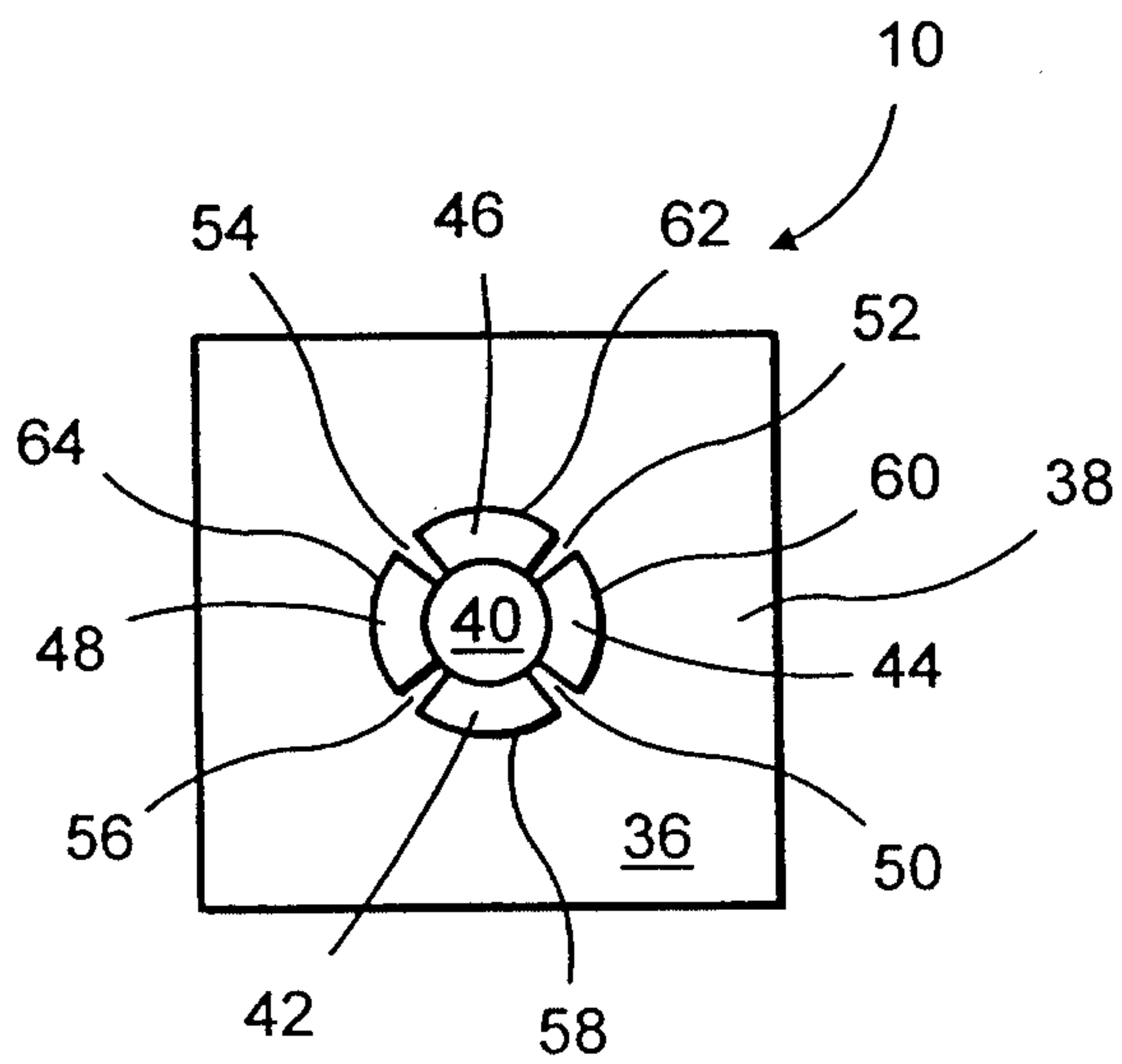


FIG. 3

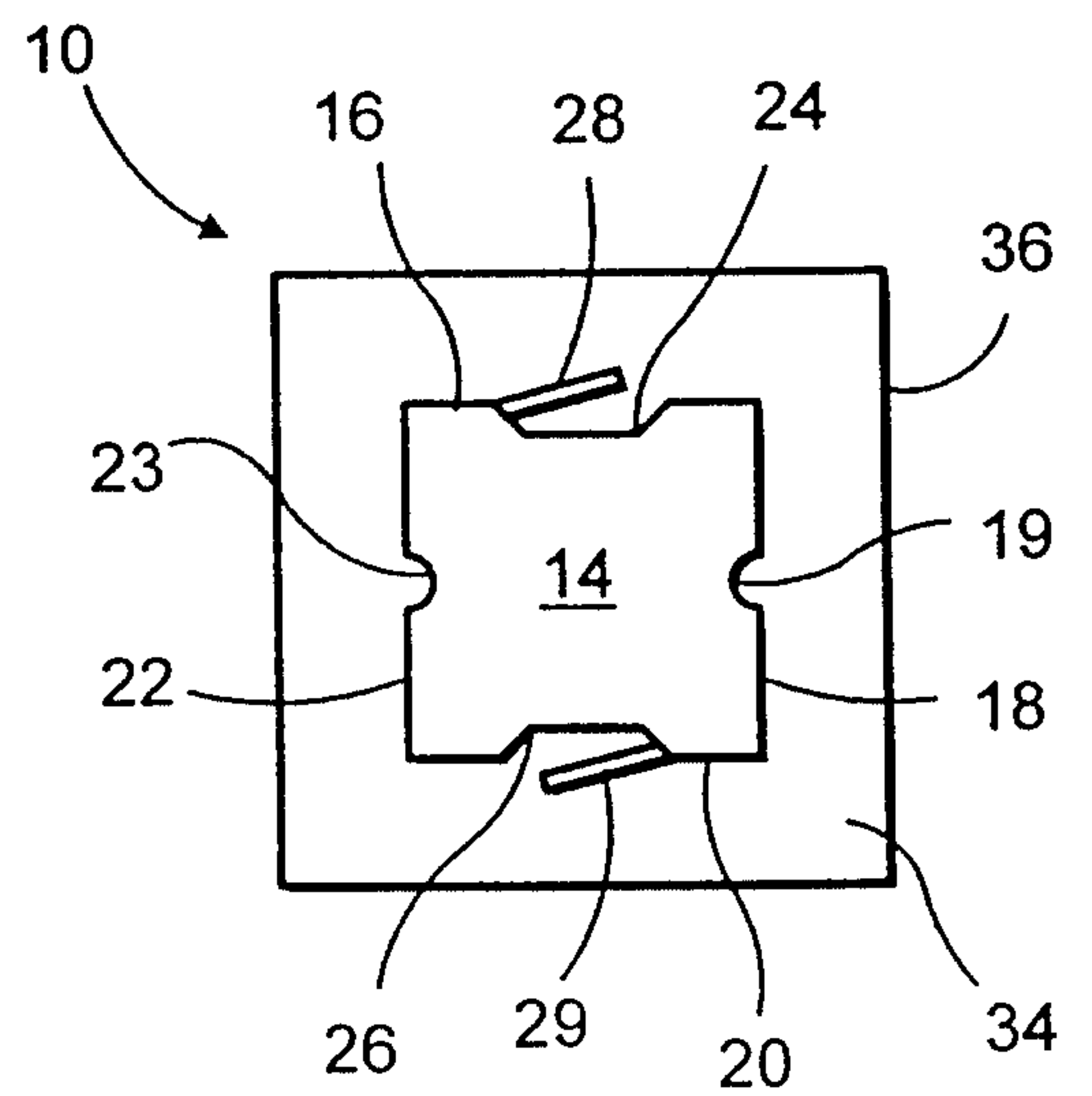
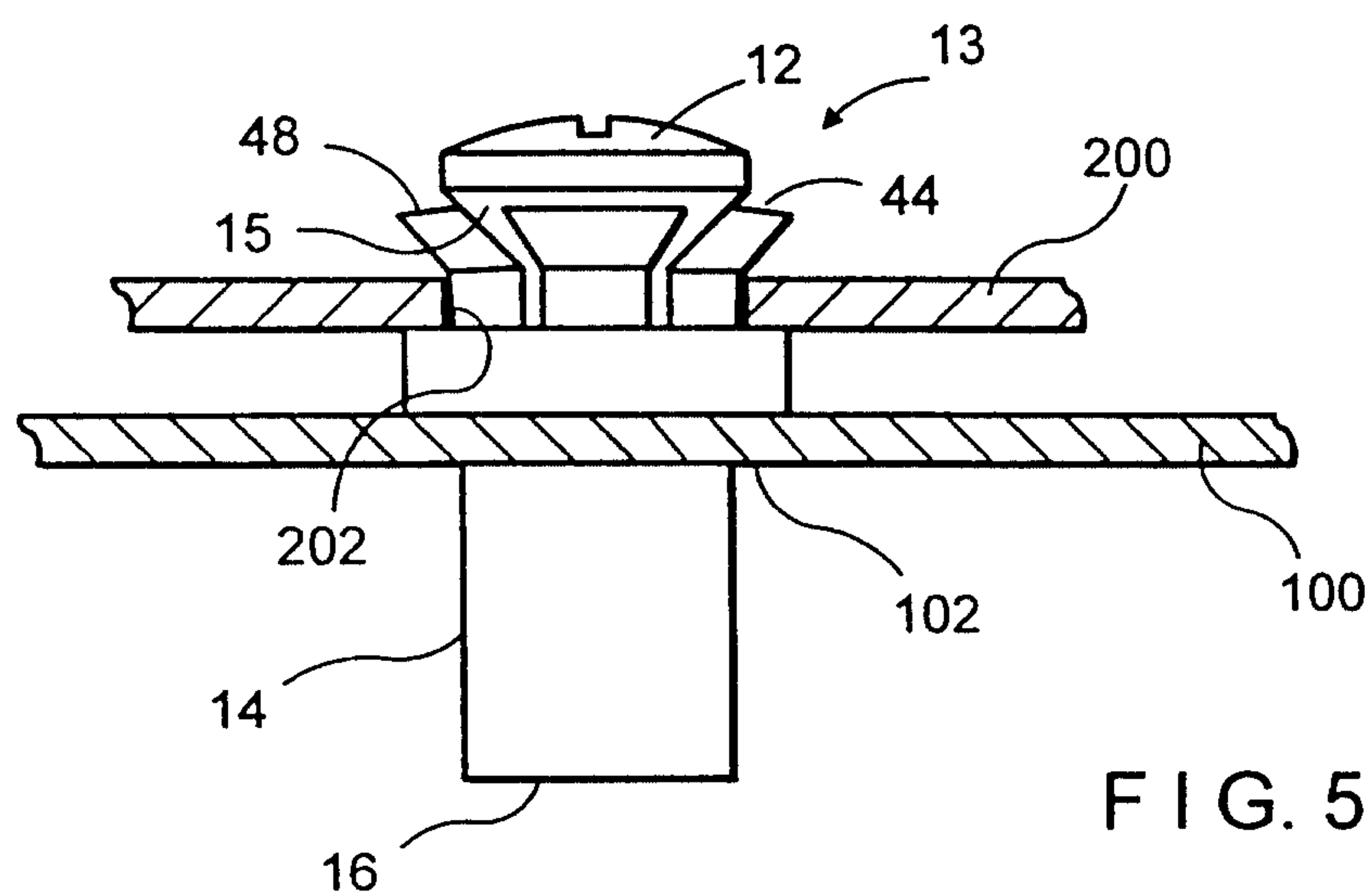
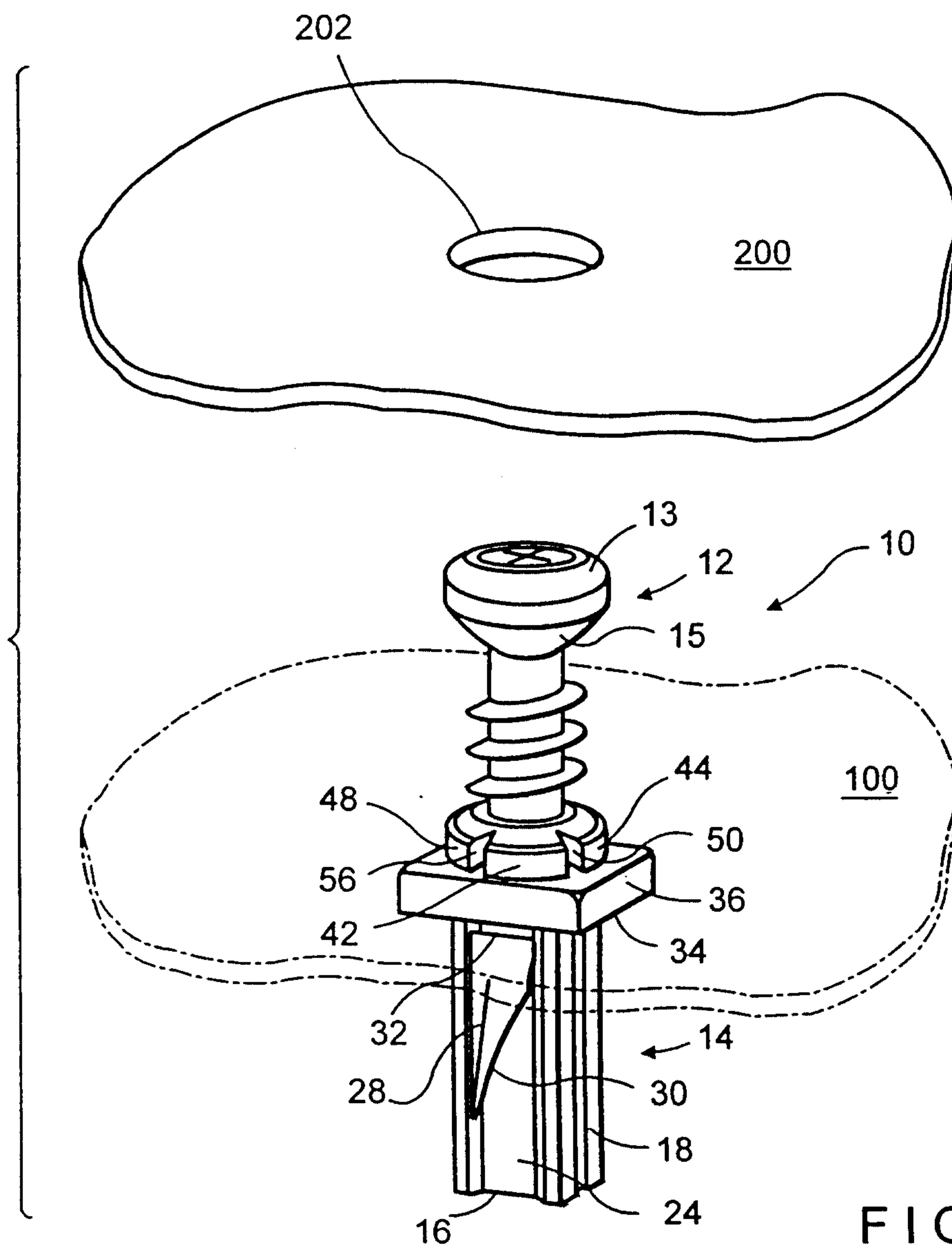


FIG. 4



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PATENT AGENTS

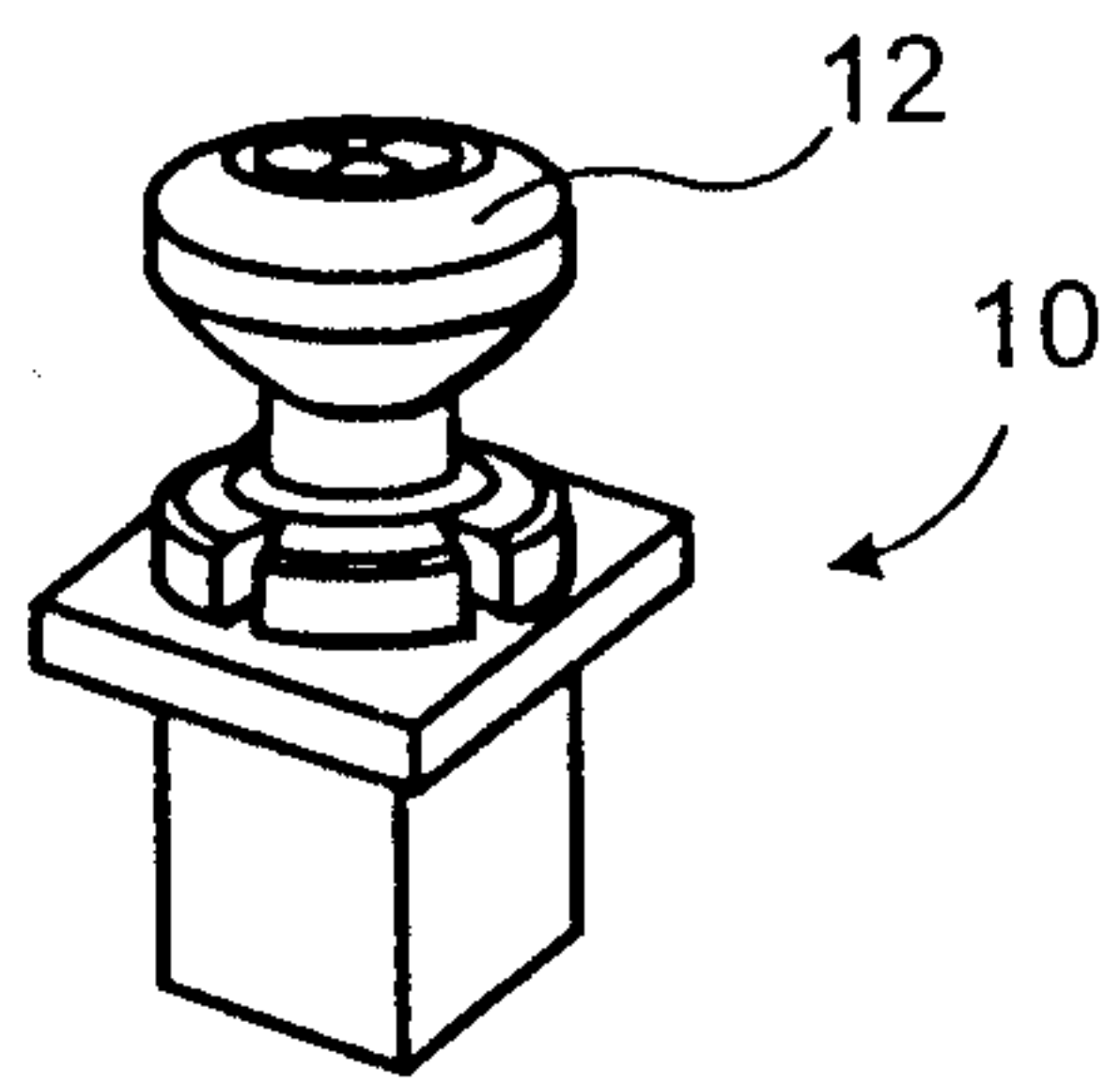


FIG. 6A

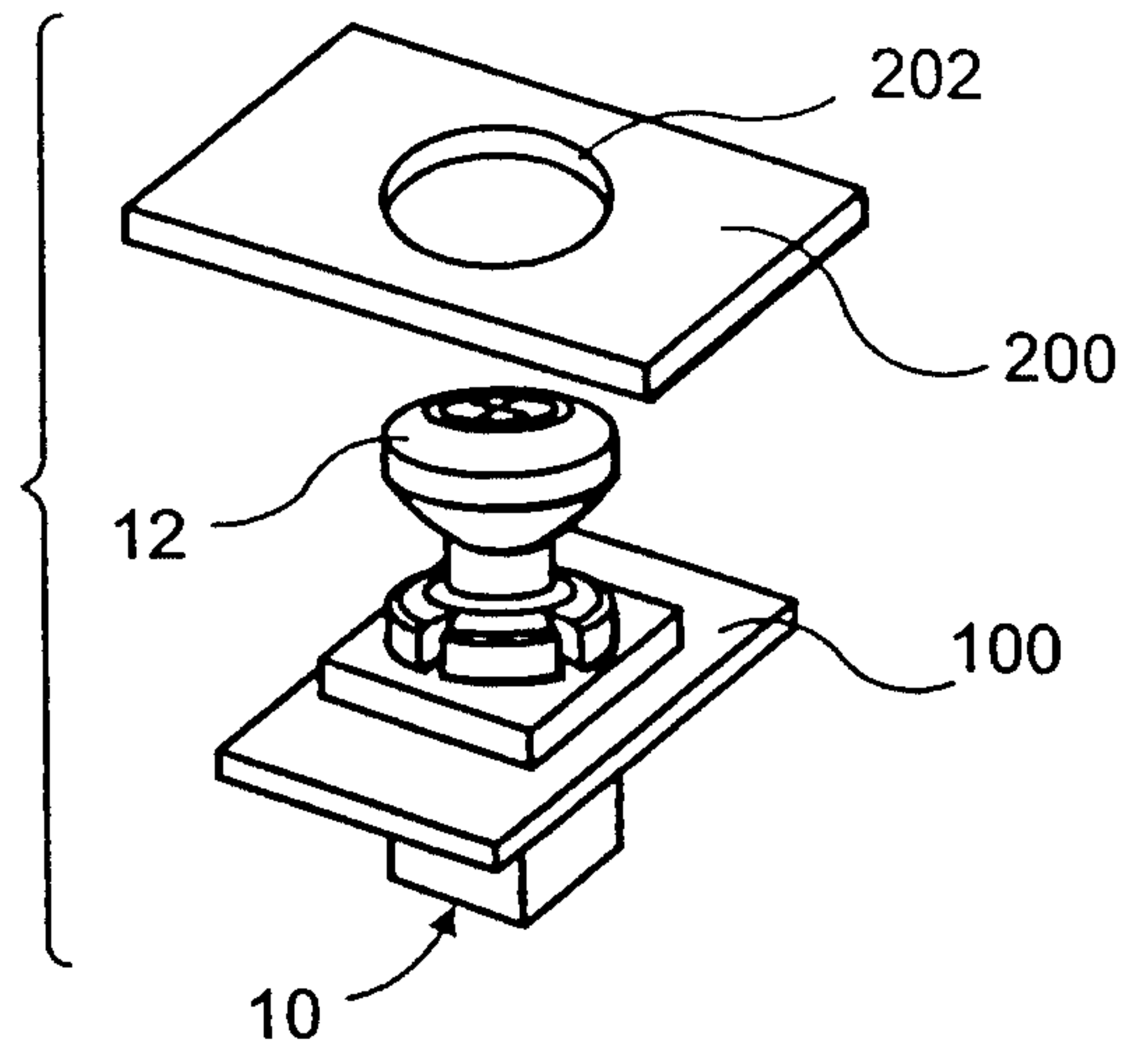


FIG. 6D

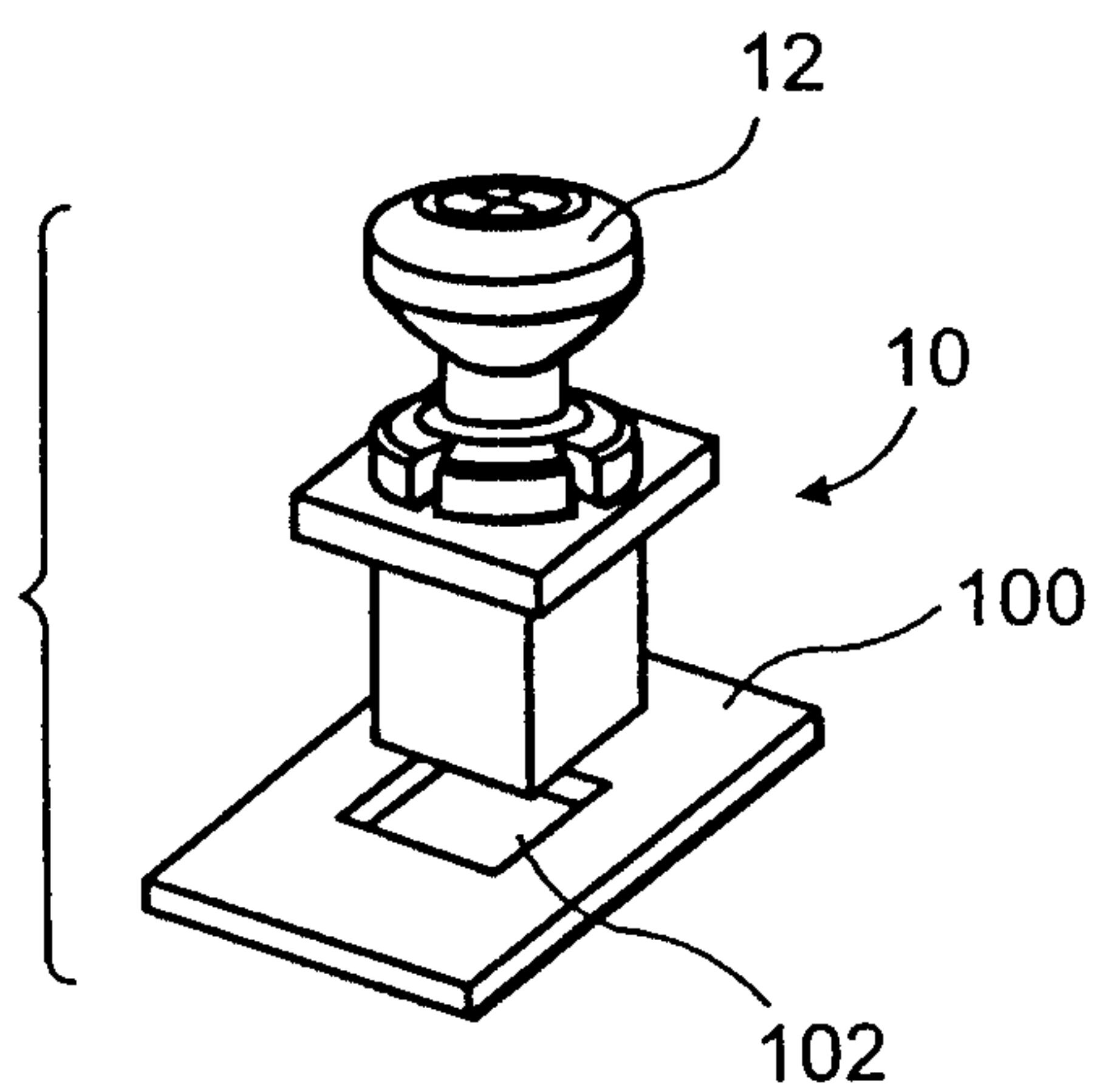


FIG. 6B

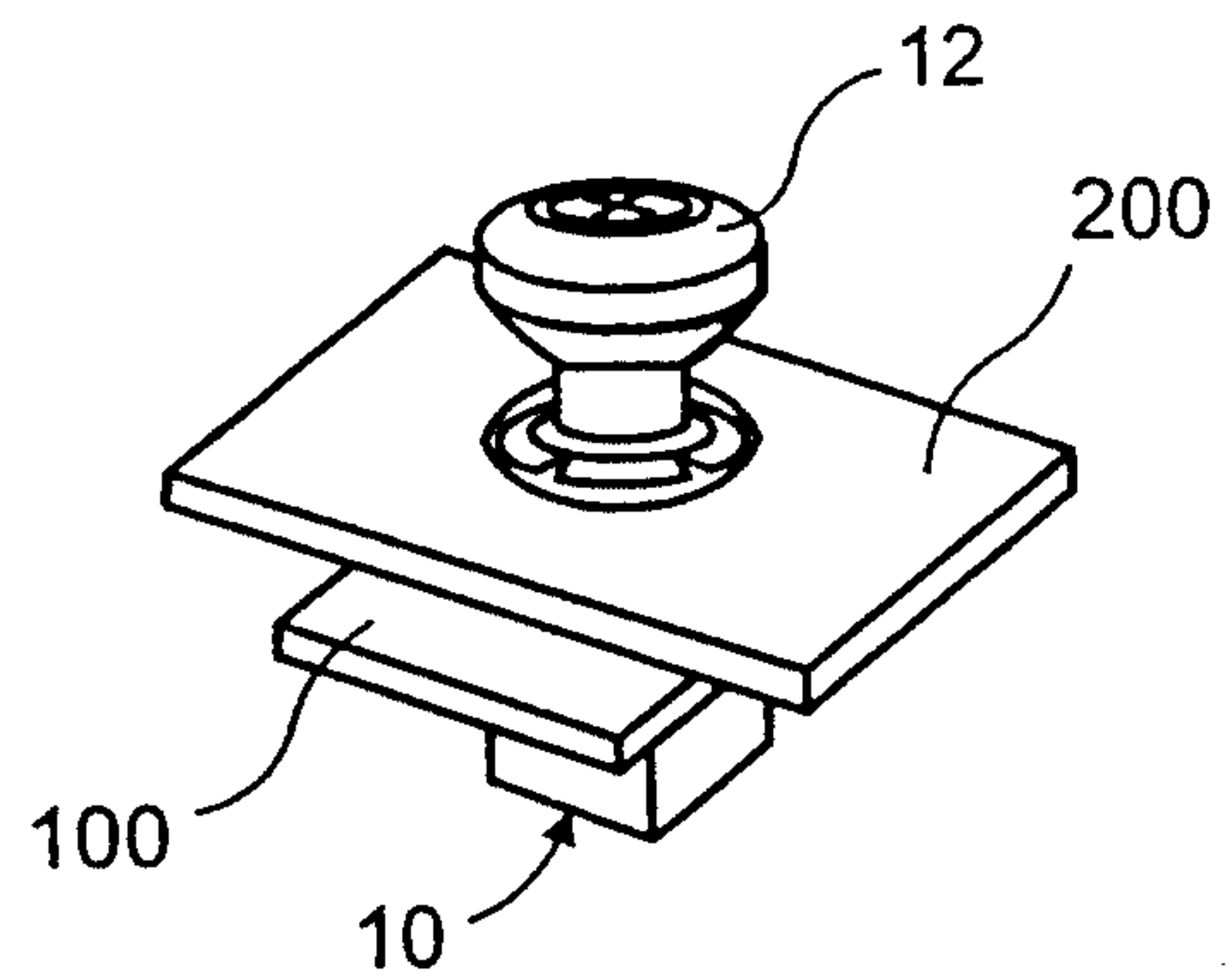


FIG. 6E

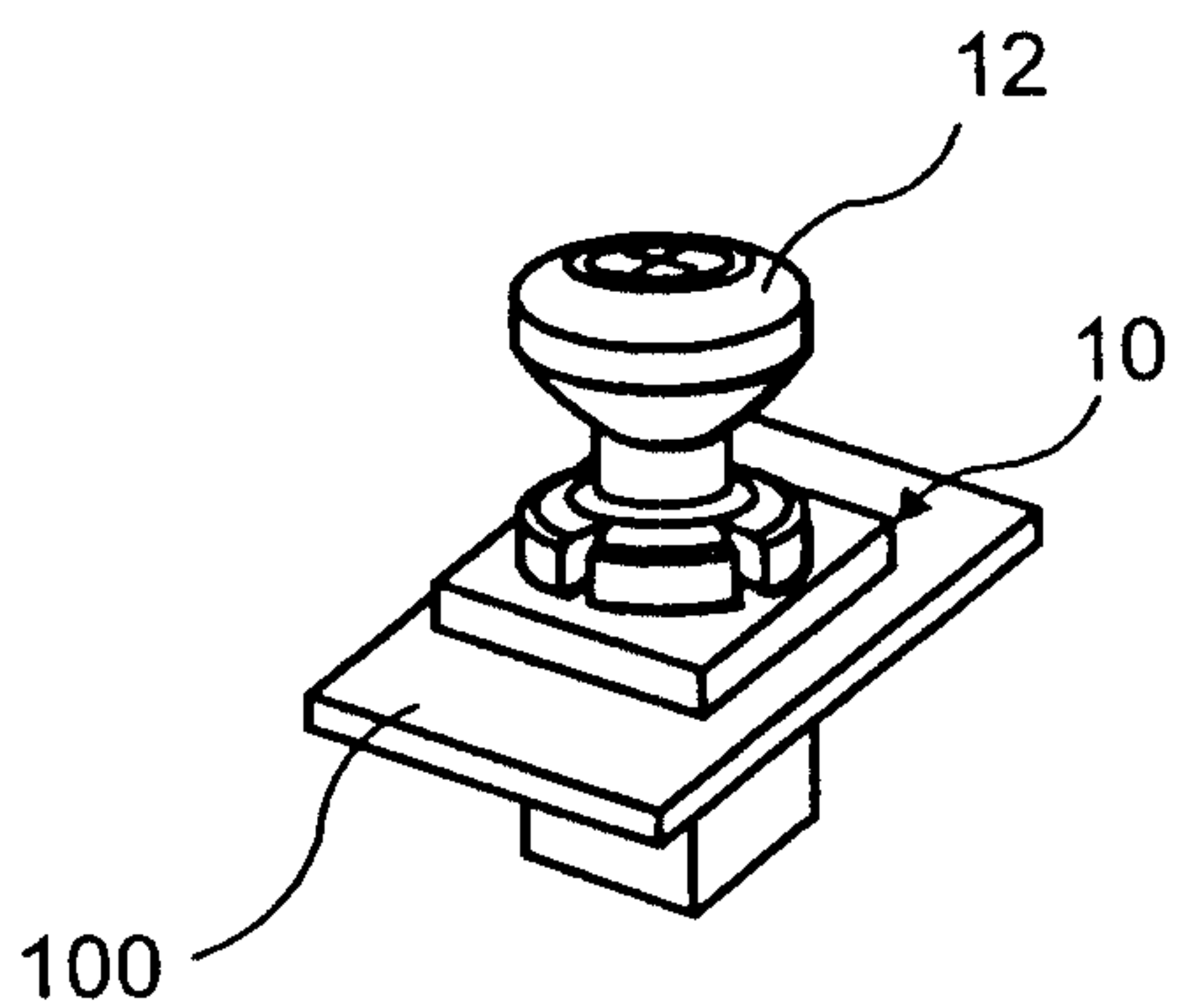


FIG. 6C

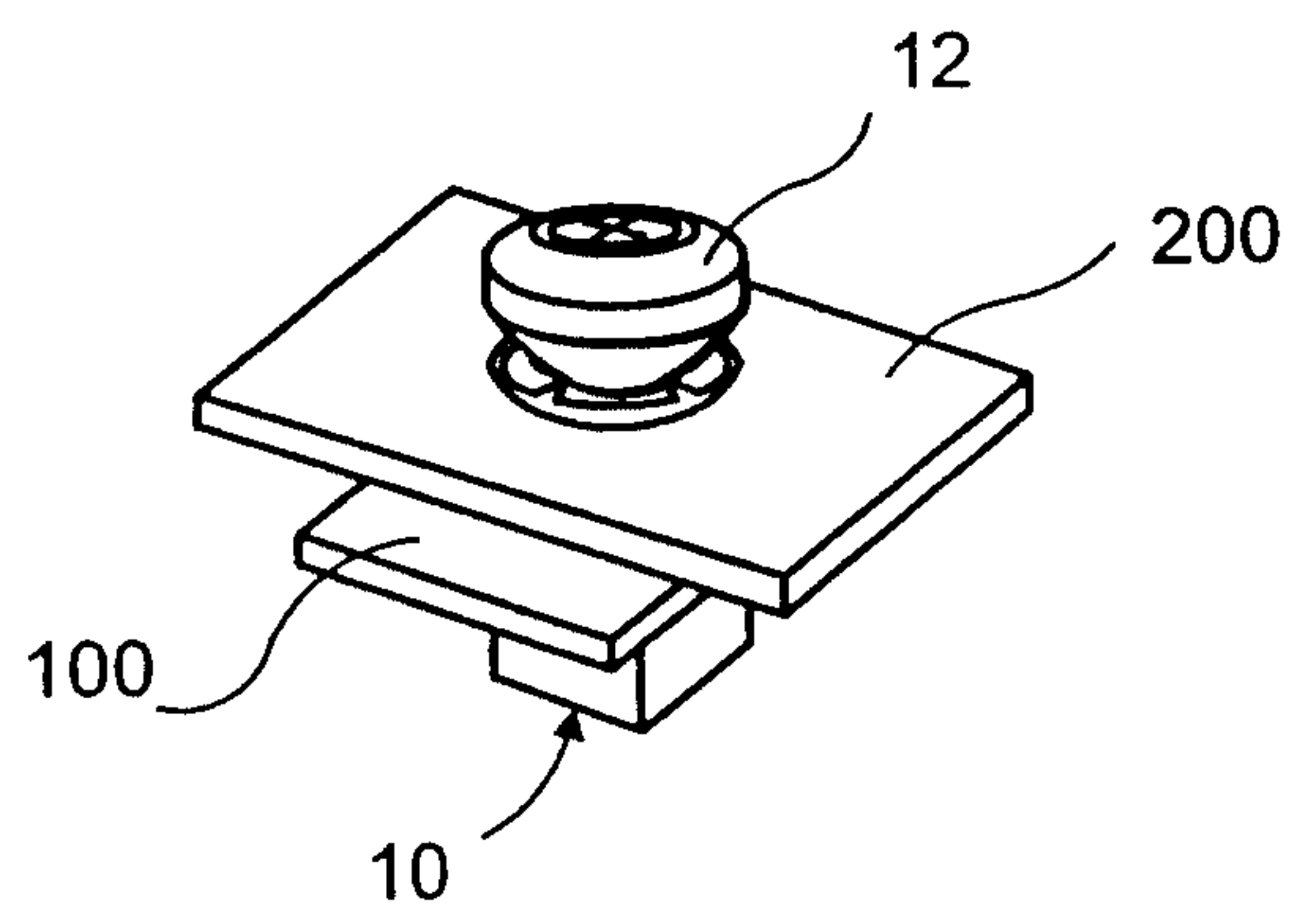


FIG. 6F

