Office de la Propriété Intellectuelle du Canada
Un organisme d'Industrie Canada

Canadian Intellectual Property Office
An agency of Industry Canada

CA 2388989 C 2007/08/28

(11)(21) 2 388 989

(12) BREVET CANADIEN
CANADIAN PATENT

(13) C

(22) Date de dépôt/Filing Date: 2002/06/05

(41) Mise à la disp. pub./Open to Public Insp.: 2002/12/14

(45) Date de délivrance/Issue Date: 2007/08/28

(30) Priorité/Priority: 2001/06/14 (FR01 07792)

(51) Cl.Int./Int.Cl. *F16B 15/00* (2006.01),
B25C 5/02 (2006.01)

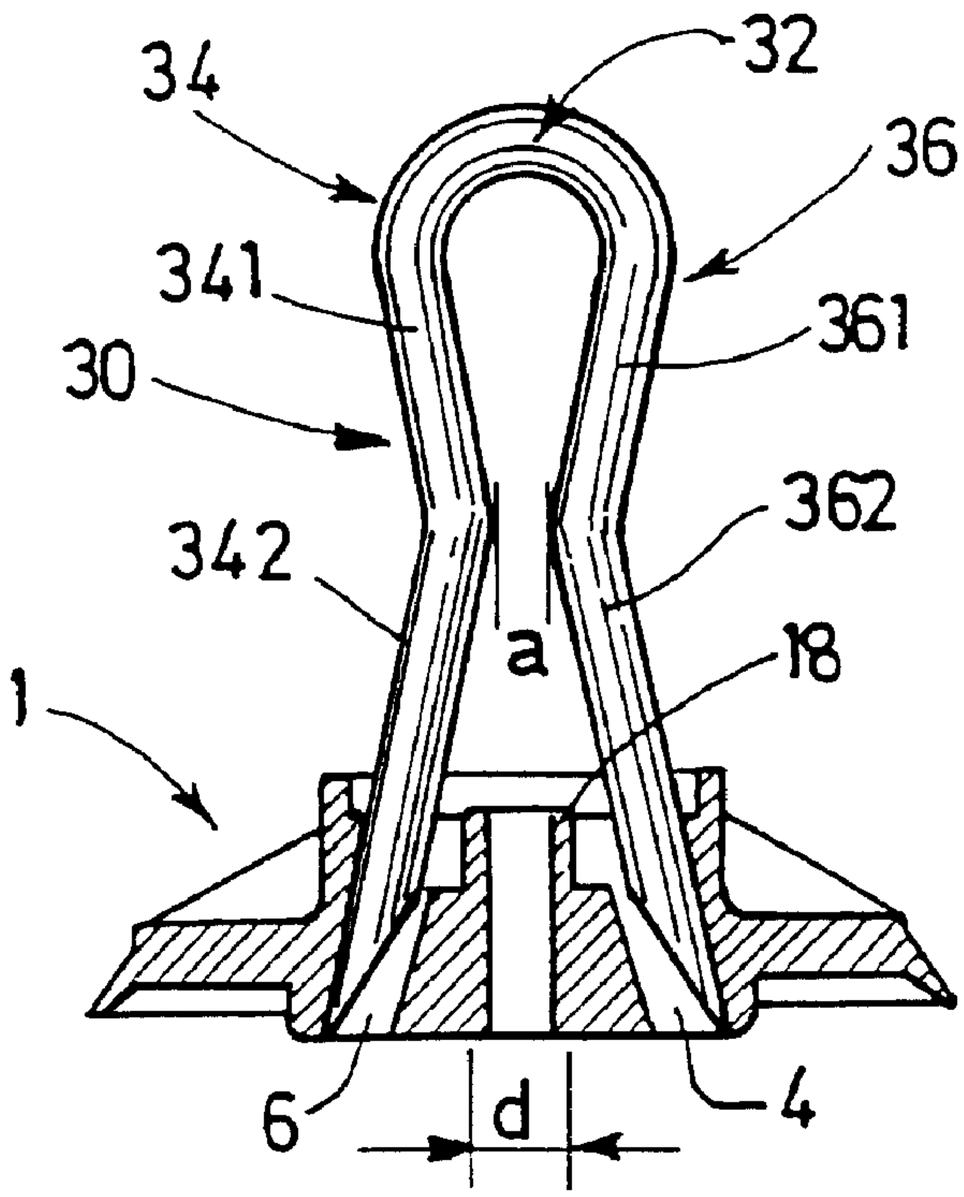
(72) Inventeur/Inventor:
ALMERAS, ROLAND, FR

(73) Propriétaire/Owner:
SOCIETE DE PROSPECTION ET D'INVENTIONS TECHNIQUES SPIT, FR

(74) Agent: FINLAYSON & SINGLEHURST

(54) Titre : CONNECTEUR POUR FIXER UN ELEMENT A UN SUPPORT, DISPOSITIF L'INCORPORANT, ET METHODE DE FIXATION

(54) Title: CONNECTOR FOR FIXING A FIXTURE TO A SUPPORT, DEVICE INCORPORATING THIS AND FIXING METHOD



(57) Abrégé/Abstract:
The invention relates to a connector for fixing a fixture to a support, comprising two ramps (4, 6) for guiding the legs of a staple (30), characterized in that it comprises an element (18) capable of deforming in such a way as to act as an end-of-travel shock absorber for the said staple, which element is positioned between the two ramps. In particular, it comprises a nail guide channel leading into the said element. The invention also relates to a device comprising, preassembled the said connector and a staple whose legs are bent, as well as to a device comprising the said connector and a nail.

CONNECTOR FOR FIXING A FIXTURE TO A SUPPORT, DEVICE INCORPORATING THIS AND FIXING METHOD

ABSTRACT

The invention relates to a connector for fixing a fixture to a support, comprising two ramps (4, 6) for guiding the legs of a staple (30), characterized in that it comprises an element (18) capable of deforming in such a way as to act as an end-of-travel shock absorber for the said staple, which element is positioned between the two ramps. In particular, it comprises a nail guide channel leading into the said element. The invention also relates to a device comprising, preassembled the said connector and a staple whose legs are bent, as well as to a device comprising the said connector and a nail.

CONNECTOR FOR FIXING A FIXTURE TO A SUPPORT, DEVICE INCORPORATING THIS AND FIXING METHOD

The present invention relates to the fixing of fixtures to a support by means of stapes or mails. In particular, the subject of the invention is intended for fixing to a lightweight support offering little mechanical strength, such as plasterboard between two sheets of heavy paper, but also fixing to a compact, very hard support such as concrete.

It is part of the prior art to attach fixtures, for example a conduit carrying electric wires, to a plaster support. For this purpose a connector is used to grip the fixture and enable it to be immobilized against the support. The connector is fixed to the support with a staple. An automatic tool can be used for this purpose to propel the staple into the support by means of a piston driven by a compressed gas.

A staple suitable for this use is disclosed in patent application FR 9 915 964 filed December 17, 1999, Almeras et al., filed by the Applicant company. The staple comprises a transverse joining head and two flexible legs perpendicular to the head. It is a feature of the legs of the staple that they are bent in such a way as to define with each other an X with a converging part and a diverging end. This shape increases the angle of divergence at the moment when the staple is driven in. This provides between anchorage of the staple.

Also known is a clip for fastening cables or pipes to plasterboard. It forms a connector with two ramps for guiding the legs of a staple and is disclosed in patent application WO 8503560 published August 15, 1985, Forsgren et al. The two ramps are divergent.

It is observed however that the connector is sometimes made fragile by the shock it receives at the moment when the staple is punched by the automatic driving tool. A means of avoiding this weakening of the connector is desirable.

Accordingly the present invention seeks to provide a staple comprising a means of driving the staple and absorbing the excess energy.

Further, the present invention seeks to improve the anchoring of the connector to its support when using a staple, and in particular the staple as disclosed in patent application FR 9 915 964 filed December 17, 1999, Almeras et al. (See US Patent 6,386,811 B2 May 14, 2002).

The connector in accordance with the invention is characterized in that it comprises, at the entrance to the two diverging staple guide ramps, an element capable of deforming under the pressure exerted by the staple when the staple is punched by an automatic driving tool, acting as an end-of-travel shock absorber for the staple.

The guide ramps diverge in the direction of movement of the staple.

In particular the said element has a cylindrical shape and is placed between the two staple guide ramps. This element, which projects from the plane of the connector, is made of a material capable of deforming when the staple reaches the end of its travel. The deformation of this part absorbs the excess kinetic energy and thus reduces the risk of splitting the connector.

In accordance with another feature, the said element forms a guide channel for a nail between the said two divergent ramps.

Thus, the present invention can be used for fixing equally well by nail as by staple.

The reason for this is that it is also known practice to attach fixtures to concrete. For this purpose it is usual to use a connector with an associated plug or nail because a staple would deform without penetrating the concrete.

A connector for use in fastening a fixture to a concrete-type support is disclosed in patent application FR 9 914 131 published May 1, 2001, Gonnet, filed in the name of the Applicant company. This connector comprises in particular a passage for a fixing plug forming a guiding and shock-absorbing chimney.

On building sites, when fixing an electrical conduit, supports made of plaster or other equivalent material are sometimes encountered, but also very hard supports of concrete type. This obliges the worker to have about him different types of fixing devices for his conduit. The fixing device in accordance with the invention can be adapted to either support, as and when encountered, with the minimum of adjustments.

It also means that very few different parts are required on the site, giving an obvious advantage in terms of efficiency and cost.

The invention gives the user the advantage of having a single connector for all types of support, thus facilitating the manufacture of the fixing devices and making them more economical to produce. They also simplify the work of the worker on the site, which is always desirable.

In accordance with another characteristic, the connector forms a well for receiving the head of the nail or the joining head of the staple. In particular, the element projects from the bottom of the well.

In accordance with another characteristic, the connector comprises a means for guiding the end of a nail guide or staple guide. In particular, this guide takes the form of a skirt. The skirt holds the nail guide or staple guide in place via its outside surface.

The present invention also relates to a ready-to-use fixing device incorporating the said connector. It is characterized in that it also includes a staple whose legs are bent and in which the ends of the legs are engaged in the entrances of the said two guide ramps.

In accordance with another characteristic, the device includes a nail engaged in the nail guide channel.

The invention in one broad aspect provides a connector for fixing a fixture to a support, comprising an upper surface and having two ramps for guiding legs of a staple, the legs being joined by a head portion. The connector has a well for the reception of the head of the staple, characterized in that an element having an upper surface projects upwardly from a bottom of the well the upper surface of the element (18) being below the upper surface of the connector, the element being adapted to deform when contacted by the head portion of the staple so as to act as an end-of-travel shock absorber for the staple when the legs are disposed in the ramps and the head is between the two ramps.

The invention also comprehends a device for fixing a fixture to a support comprising a connector of the type noted above in combination with a staple, the staple having bent legs with ends engaging entrances of the two ramps.

The present invention also relates to a method of fixing a fixture to a support.

This method is characterized in that use is made of a guide that can be used equally well to guide a nail or a staple. The guide to be used comprises a central nail guide channel and two internal grooves alongside the channel capable of receiving a staple. The worker thus has simply to load his tool with the nail or staple without having to change the guide.

The method of the invention therefore has the advantage of greatly reducing the adjustments required to be made by the worker on site.

Other features and advantages will become apparent on reading the following description of a preferred embodiment of the connector with reference to the accompanying drawings.

Figure 1 shows, in the section taken on I-I in Figure 2, the connector of the invention.
Figure 2 shows a top view of the connector of Figure 1.
Figure 3 shows the device comprising the connector and a staple in place before use.
Figure 4 shows the device anchored in the support.
Figure 5 shows diagrammatically and in section a guide able to take a nail or a staple.

The connector 1, shown in Figures 1 and 2, is made of a plastic such as polypropylene. It comprises a platform 2 of a shape suitable for its intended purpose. In the example illustrated, it is roughly rectangular with two sides in the form of arcs of a circle. The platform is thicker in the middle where it contains two through channels or ramps 4 and 6, the directions of which are divergent when viewed from above. The connector illustrated can be used equally well either with a central nail or with a staple. It will be observed that there is also a central channel 8 running through and at right angles to the plane of the platform. A well of circular shape 10 is centred on the channel 8. It forms an intersection with each of the ramps 4 and 6 and its bottom is roughly in the plane of the platform 2. The wall 12 of the well 10 is made higher by an annular skirt 14 creating a space whose bottom 16 is perpendicular to the axis of the channel 8. The ramps 4 and 6 lead into the bottom 16.

The channel 8 is extended by an element 18 which projects from the bottom 11 of the well. In the embodiment depicted, this element 18 is chimney-shaped. The top 181 of the chimney is slightly below the free edge 141 of the skirt. However, it rises above the plane 16. The plane 181 is between the plane 16 and the plane 141. The element 18 is cylindrical and its wall is relatively thin. Its outside diameter d is less than the distance between the axes of the two ramps where they intersect both the plane 16 and the plane 11.

On the underside, where the staple or nail sticks out, the connector comprises a boss 22 projecting from the plane 21 which actually sits on the fixture. This boss 21 must sit in an opening prepared in the fixture that is to be immobilized. It serves both to centre the connector relative to the fixture before it is fixed in position and to grip the fixture and immobilize it when

the connector is sealed.

Figure 3 shows the connector 1 equipped with a staple 30. This staple is disclosed in patent application FR 9 915 964 in the name of the Applicant company. It has a transverse joining head 32 and two legs 34 and 36 in a direction perpendicular to the head. The two legs form an X: they comprise two parts, 341, 342 and 361, 362, respectively. The parts 341 and 361 converge. The parts 342 and 362 diverge. There is thus a narrow part between the two legs. When the staple is in position, as shown in Figure 3, the shortest distance (a) between the two legs is less than the outside diameter (d) at the entrance to the chimney 18. The ends 342 and 362 of the legs are partially engaged in the ramps 4 and 6. The staple is under tension and is subjected to internal stresses tending to drive two legs apart. As a result, the pre-engaged ends press on the parts of the walls of the ramps 4 and 6 which are furthest from the axis of the connector. Consequently, at the top 181, the legs do not touch the chimney 18.

No fixing device with a connector in which a nail has been inserted is illustrated, but the invention includes it nonetheless. In this situation, the nail is partially engaged in the channel 8.

Figure 4 shows the staple driven into the support (S). It holds the connector against the fixture (P) which is immobilized against the support (S). As will be observed, the boss 22 is engaged in an opening in the fixture (P), so gripping it. The head 32 of the staple compresses the chimney 18, which has fulfilled its role as an end-of-travel shock absorber, by deforming.

Figure 5 shows diagrammatically the end of a nail/staple guide 40. This guide is mounted on an automatic tool which is not shown and is known per se. The guide 40 comprises a central bore 42 in which the

desired nail can be inserted. Alongside this bore, two straight grooves have been cut, these two grooves 44 and 45 acting as a seating for a staple.

The method of fixing a fixture (P) to a support consists in selecting a pre-assembled fixing device - connector with staple or connector with nail - depending on the type of support. Assuming the support to be plaster, the device shown in Figure 3 will be chosen. The staple is inserted into the grooves 44-45 of the guide until the guide engages in the skirt and then stops against the plane 16 of the connector. The connector is positioned with the boss 22 in the orifice of the fixture (P) and all these various parts are held firmly against the support (S). When the staple is propelled against the support by the piston of the tool, its legs spread out, guided in their movement by the two ramps 4, 6. The height of the chimney is sufficient so that as the staple advances, its legs contact its outside edge. As the width of the chimney is greater than the free space between the legs, the chimney will accentuate the bending force exerted on the legs. The legs will spread out even further, thus ensuring an improved anchorage of the connector on the support.

At the end of the stroke the head presses against the chimney element which will bend and flow if the energy of the staple is great enough. As it deforms, the element absorbs the energy and decelerates the staple. As can be seen in Figure 4, the chimney has deformed and absorbed the shock produced by the impact of the staple.

If the worker decides that a nailed device is preferable, he simply places such a device in the guide via the nail. The head of the nail will strike the chimney which, as it deforms, will absorb the energy in the same way.

The invention also includes the embodiment in which the base can only be used with a staple. In this case, the channel for the nail can be omitted, and the element 18 is not longer hollow. It can be at least partly solid. This embodiment is not illustrated.

WHAT IS CLAIMED IS:

1. A connector for fixing a fixture to a support, comprising an upper surface and having two ramps (4, 6) for guiding legs of a staple (30), the legs being joined by a head portion, the connector having a well for the reception of the head of the staple, characterized in that an element (18) having an upper surface projects upwardly from a bottom of the well, the upper surface of the element (18) being below the upper surface of the connector, the element being adapted to deform when contacted by the head portion of the staple so as to act as an end-of-travel shock absorber for said staple when the legs are disposed in the ramps and the head is between the two ramps.

2. The connector according to claim 1 further comprising a nail guide channel (8) leading into said element (18).

3. The connector according to claim 1 or 2 wherein the element (18) has a cylindrical external shape.

4. The connector according to any one of claims 1, 2 or 3 further comprising means for guiding an end of a nail guide or staple guide (40).

5. The connector according to claim 4 wherein the guide means forms a skirt (14).

6. The connector according to claim 5 wherein the element (18) projects into the skirt (14).

7. The connector according to any one of claims 1-6 further comprising a boss element (22) for centering and locking the connector with respect to an opening in the fixture to be secured to the support.

8. The connector according to any one of claims 1-7 wherein the staple has concavely bent legs (34, 36) and an outer diameter of an end of the element (18) is greater than a shortest distance between said bent legs whereby the legs of the staple are forced apart as the staple moves towards the support in fixing the fixture.

9. A device for fixing a fixture to a support comprising a connector according to any one of claims 1-7 and a staple (30) in combination with the connector, the staple having concavely bent legs with free ends of the legs engaging entrance portion of the two ramps (4, 6).

10. The device according to claim 9 wherein the concavely bent staple legs have two upper convergent portions (341, 361) and two lower divergent portions (342, 362), the shortest distance between the legs being defined at a point of transition between the convergent leg portions and divergent leg portions, the legs being under tension tending to spread the ends apart and the ends of the legs pressing on outer portions of said ramp entrances.

11. A method of fixing a fixture to a support by means of a fixing device, the fixing device being in accordance with claim 9, comprising:

providing an automatic driving device equiped with a guide for the staple wherein the guide (40) comprises a central channel (42) and two opposing grooves (44, 45) alongside the channel for receiving and guiding the staple;

inserting the head of the staple into the channel and grooves of the driving device, whereby upper ends of the legs of the staple are partly within the grooves;

aligning the fixing device with the fixture and support; and

driving the staple legs into the support whereby the head of the staple contacts and deforms the element (18).

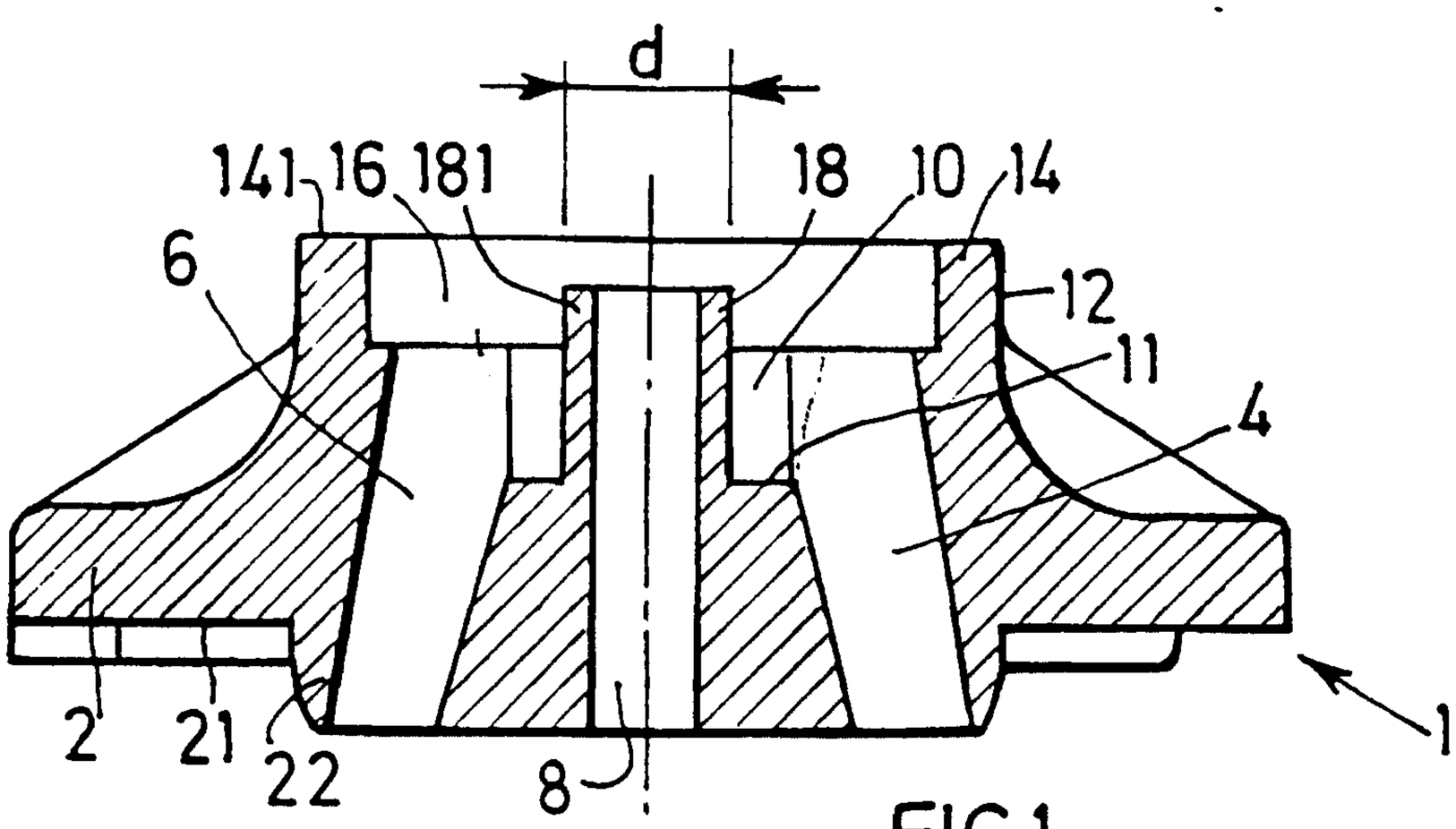


FIG.1

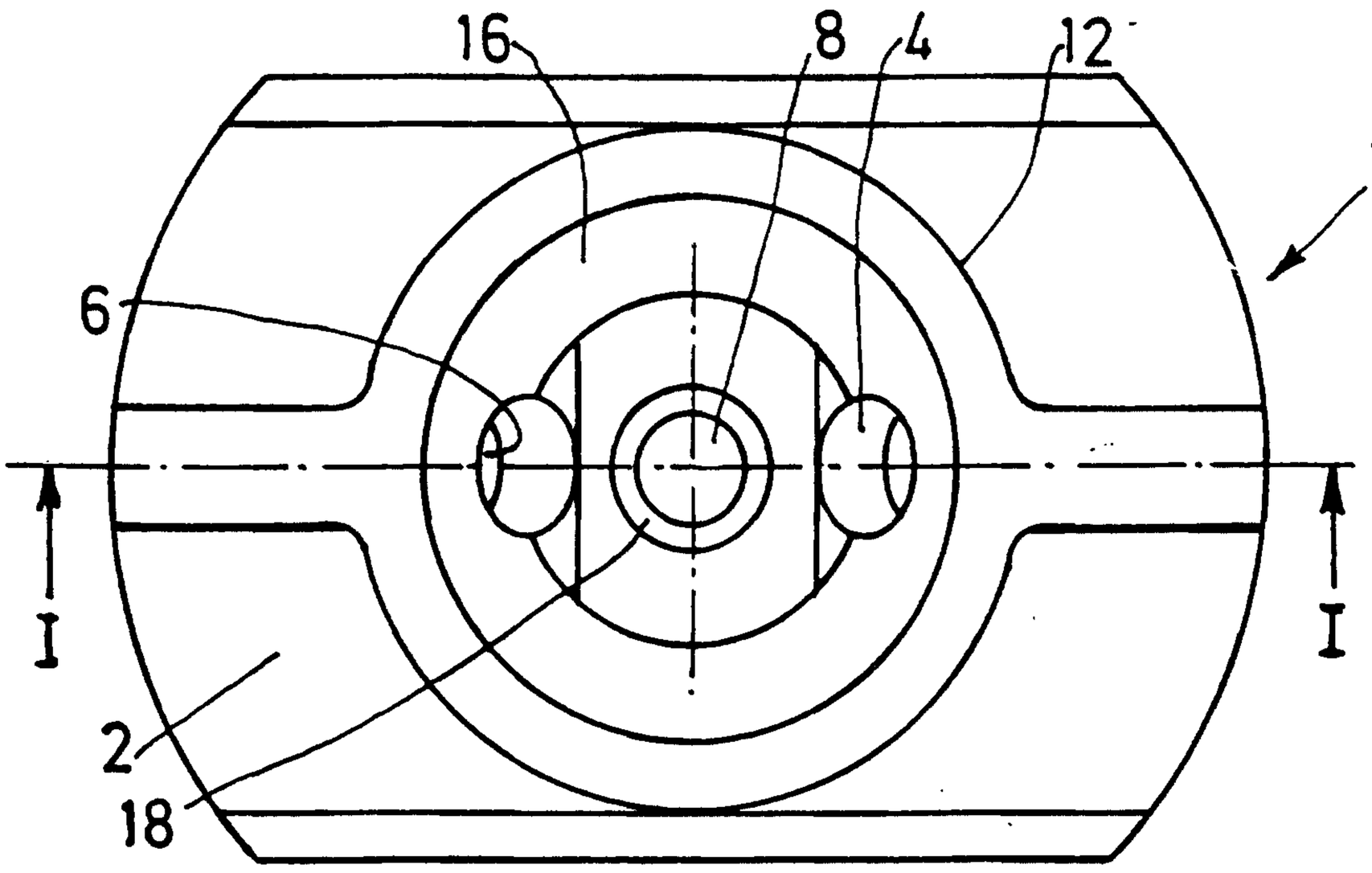


FIG.2

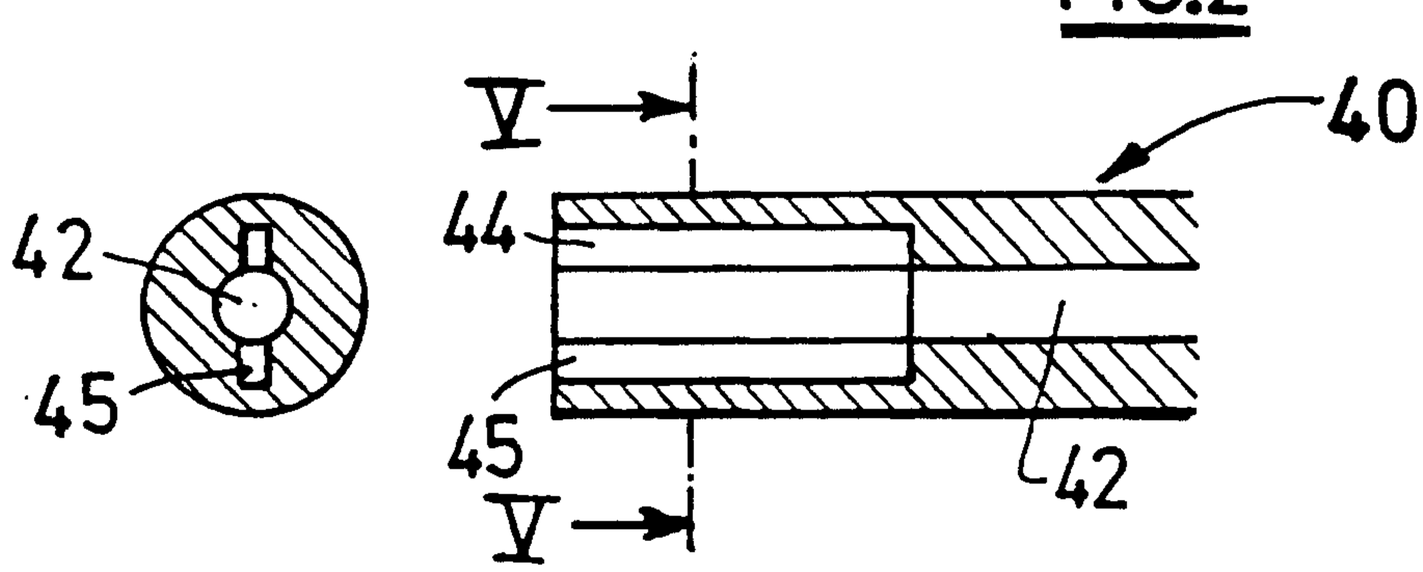


FIG.5

PATENT AGENTS

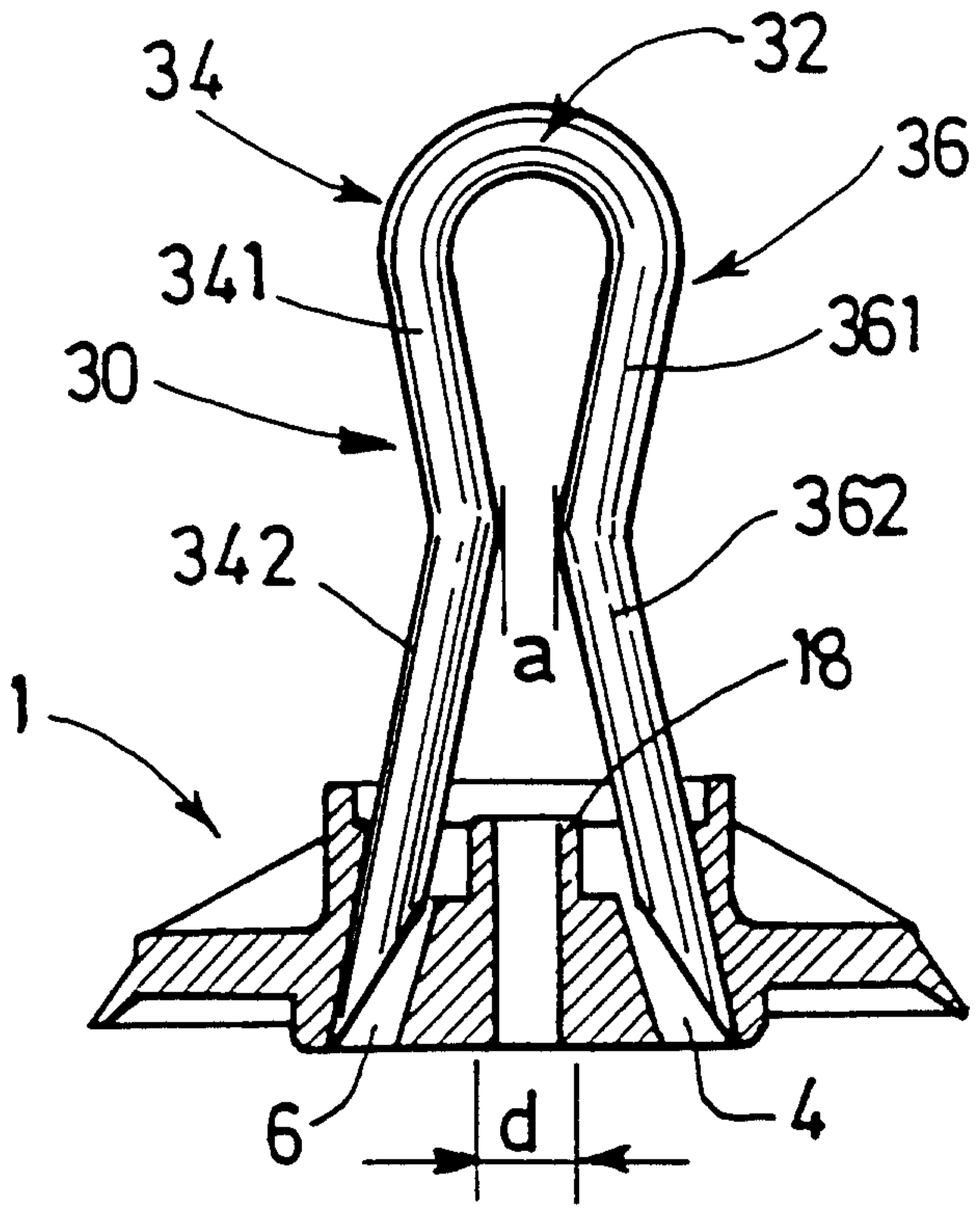


FIG.3

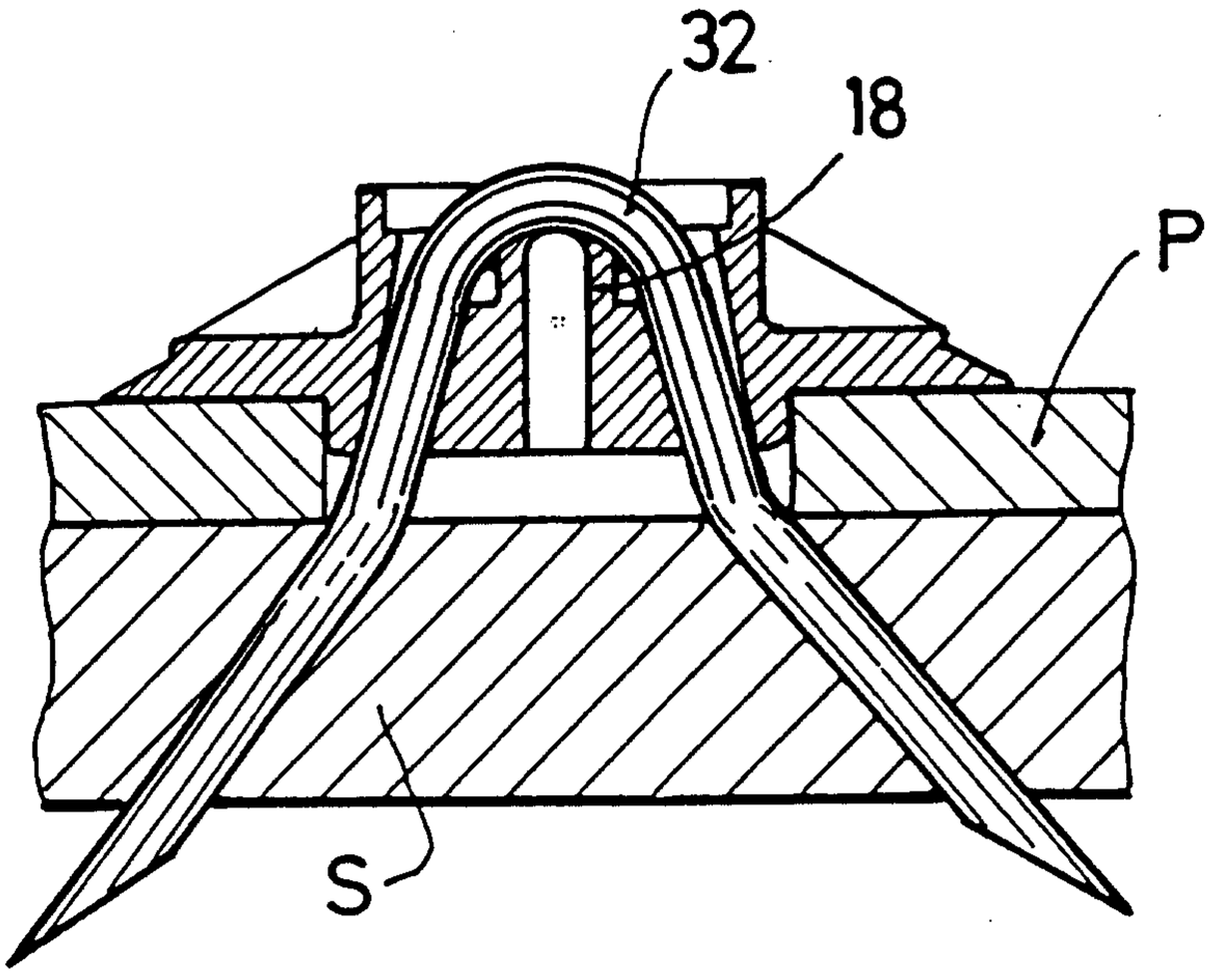
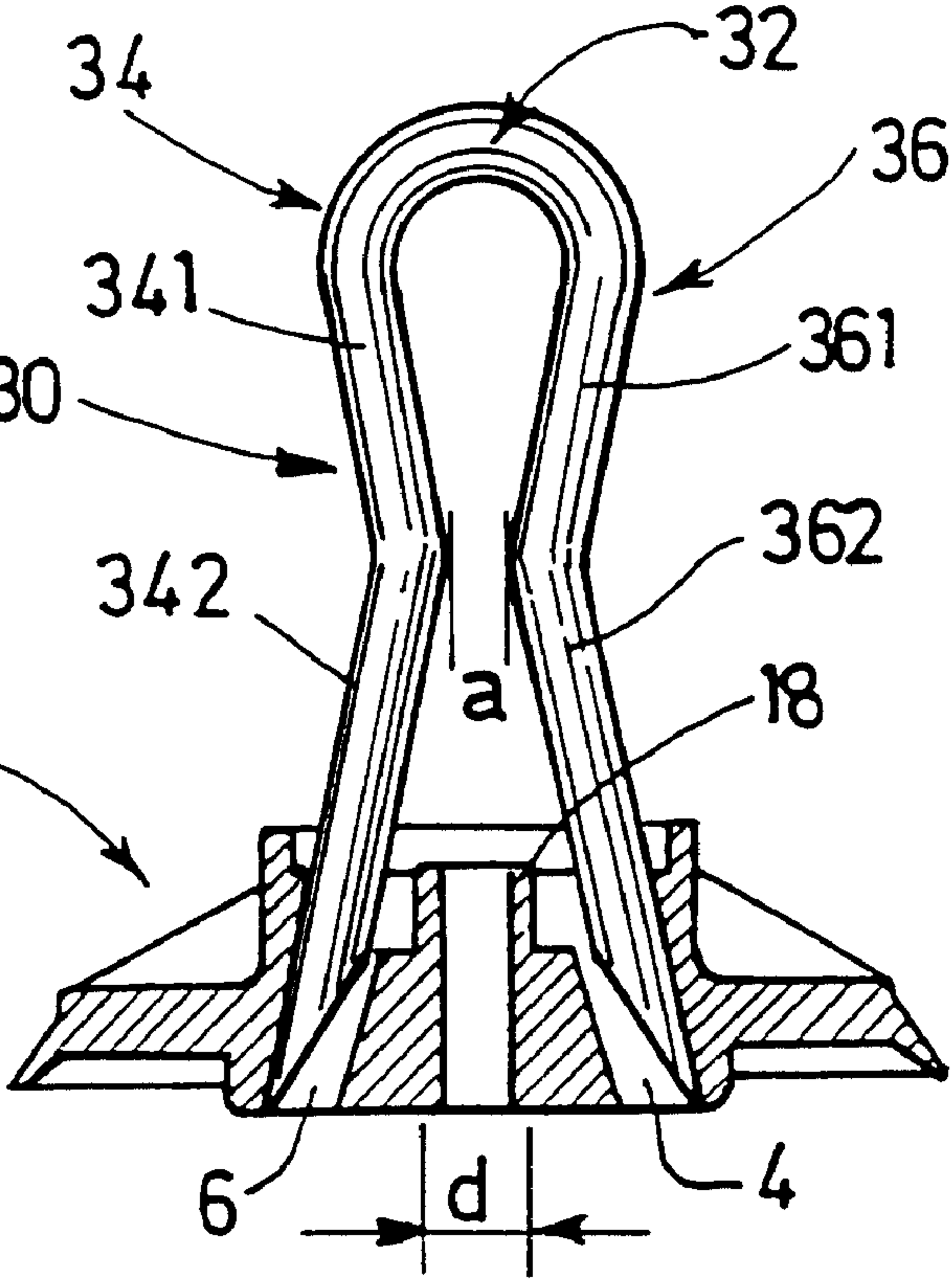


FIG.4

Sudayo-Wellington Deluxe

PATENT AGENTS


34
32
36
341
361
30
342
362
a
18
1
6
d
4