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(54) **METAL PIERCING TERMINAL AND LAMP**

(57) The present application discloses a metal piercing terminal, including: a bottom plate, a first vertical plate and a second vertical plate respectively connected with the bottom plate; wherein the first vertical plate and the bottom plate are arranged at a first preset angle, the second vertical plate and the bottom plate are arranged at a second preset angle, the first vertical plate and the second vertical plate are arranged to be opposite and spaced apart from each other; the first vertical plate is provided with a first retention slot, a bottom of the first retention slot is provided with a first piercing tip, the second vertical plate is provided with a second retention slot that faces the first retention slot, and a bottom of the second retention slot is provided with a second piercing tip; the bottom plate is provided with a first reflow pad. A power line includes a metal wire and a plastic insulation layer wrapped around the metal wire. Thus, after the power line is pressed into the first retention slot and the second retention slot, the first piercing tip in the first retention slot pierces the plastic insulation layer and then is electrically connected with the metal wire, the second piercing tip in the second retention slot pierces the plastic insulation layer and then is electrically connected with the metal wire, so that an electric connection between the power line and the metal piercing terminal is realized.

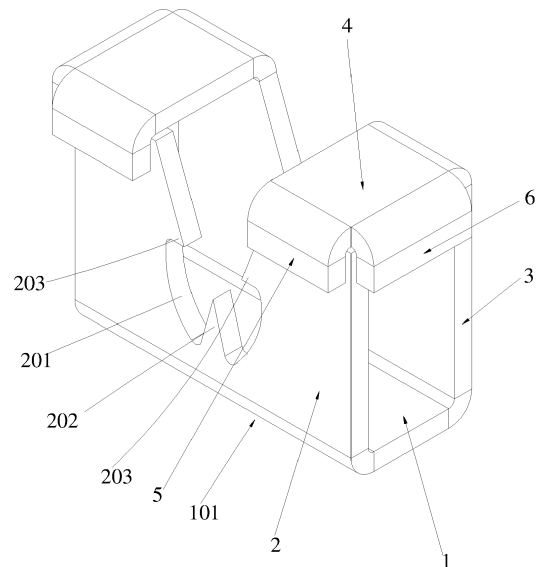


FIG. 1

Description

TECHNICAL FIELD

[0001] The present application belongs to the technical field of illumination device, and particularly relates to a metal piercing terminal and a lamp.

BACKGROUND

[0002] Connection terminals on aluminum substrate of a light source in a lamp need to be electrically connected with a power line, electrical connection between the connection terminals and the power line is usually realized by welding in the prior art. A welding manner is prone to scald the light source and cause a damage to light beads, thereby affects the whole luminous flux of the lamp; moreover, with respect to the welding manner, a high operation proficiency level is required for the staff, phenomena of pseudo soldering and short circuit are prone to occur in actual operation, one hundred percent probability of conductivity cannot be guaranteed, so that abnormality in quality is caused.

SUMMARY

[0003] An objective of the present application is to provide a metal piercing terminal, which aims at solving a problem in the related art that the connection terminals of the lamp can only be electrically connected with the power line by welding.

[0004] In order to achieve this objective, the technical solutions involved in the embodiments of the present application are as follows:

A metal piercing terminal is provided, the metal piercing terminal includes a bottom plate, a first vertical plate and a second vertical plate connected with the bottom plate; wherein the first vertical plate and the bottom plate are arranged at a first preset angle, the second vertical plate and the bottom plate are arranged at a second preset angle, the first vertical plate and the second vertical plate are arranged to be opposite and spaced apart from each other; the first vertical plate is provided with a first retention slot, a bottom of the first retention slot is provided with a first piercing tip, the second vertical plate is provided with a second retention slot that faces the first retention slot, and a bottom of the second retention slot is provided with a second piercing tip; the bottom plate is provided with a first reflow pad.

[0005] In one embodiment, an inner side wall of the first retention slot is provided with two oppositely arranged first barb tips, and the first piercing tip is located between the two first barb tips.

[0006] In one embodiment, an inner side wall of the second retention slot is provided with two oppositely arranged second barb tips, and the second piercing tip is located between the two second barb tips.

[0007] In one embodiment, the first vertical plate and

the bottom plate are perpendicular to each other, and the second vertical plate and the bottom plate are perpendicular to each other.

[0008] In one embodiment, the metal piercing terminal further includes a top plate connected with one end of the second vertical plate away from the bottom plate, and one end of the top plate away from the second vertical plate abuts against the first vertical plate.

[0009] In one embodiment, the metal piercing terminal further includes a first limiting plate connected with one end of the top plate away from the second vertical plate, wherein the first limiting plate and the top plate are perpendicular to each other, and the first limiting plate abuts against one side of the first vertical plate away from the second vertical plate.

[0010] In one embodiment, the metal piercing terminal further includes a second limiting plate connected with the top plate, wherein the second limiting plate and the top plate are perpendicular to each other, one end of the second limiting plate abuts against the first vertical plate, and the other end of the second limiting plate abuts against the second vertical plate.

[0011] In one embodiment, the bottom plate, the first vertical plate, the second vertical plate, the top plate, the first limiting plate and the second limiting plate are integrally molded.

[0012] Another objective of the present application is to provide a metal piercing terminal, including: a third vertical plate, a fourth vertical plate parallel to the third vertical plate, an arcuate transition plate connected between the third vertical plate and the fourth vertical plate, a first support plate connected with one end of the third vertical plate away from the arcuate transition plate, and a second support plate connected with one end of the fourth vertical plate away from the arcuate transition plate; wherein the first support plate and the third vertical plate are perpendicular to each other, the second support plate and the fourth vertical plate are perpendicular to each other; a second reflow pad is provided on the first support plate and/or the second support plate; the third vertical plate is provided with a third retention slot, and an inner wall of the third retention slot is provided with two third barb tips arranged to be opposite and spaced apart from each other, the fourth vertical plate is provided with a fourth retention slot, and an inner wall of the fourth retention slot is provided with two fourth barb tips arranged to be opposite and spaced apart from each other.

[0013] Another objective of the present application is to provide a lamp, including: a light source plate and the metal piercing terminal according to any one of the aforementioned embodiments.

[0014] Advantageous effects of the embodiments of the present application are described below:

the power line includes a metal wire and a plastic insulation layer wrapped around the metal wire. After the power line is pressed into the first retention slot and the second retention slot, the first piercing tip in the first retention slot pierces the plastic insulation layer, and then is elec-

trically connected with the metal wire, the second piercing tip in the second retention slot pierces the plastic insulation layer, and then is electrically connected with the metal wire, thereby realizing the electrical connection between the power line and the metal piercing terminal. Compared with welding, a problem of pseudo soldering can be avoided, pollution of soldering tin to light source is avoided, and a production efficiency is improved.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015] In order to describe the embodiments of the present application more clearly, a brief introduction regarding the accompanying drawings that need to be used for describing the embodiments of the present application or the prior art is given below; it is apparent that the accompanying drawings described below are merely some embodiments of the present application, the person of ordinary skill in the art may also acquire other drawings according to the current drawings without paying creative labor.

FIG. 1 illustrates a schematic structural diagram of a metal piercing terminal in one embodiment of the present application;

FIG. 2 illustrates a schematic structural diagram of the metal piercing terminal as shown in FIG. 1, but viewed from a different angle;

FIG. 3 illustrates a schematic structural diagram of the metal piercing terminal as shown in FIG. 1, when the power line is arranged on the metal piercing terminal; and

FIG. 4 illustrates a schematic structural diagram of a metal piercing terminal in another embodiment of the present application; in the figures:

1-bottom plate, 101-first reflow pad;
2-first vertical plate; 201-first retention slot; 202-first piercing tip; 203-first barb tip;
3-second vertical plate; 301-second retention slot; 302-second piercing tip; 303-second barb tip;
4-top plate;
5-first limiting plate;
6-second limiting plate;
7-third vertical plate; 701-third retention slot; 702-third barb tip;
8-fourth vertical plate; 801-fourth retention slot; 802-fourth barb tip;
9-arcuate transition plate; 10-first support plate;
11-second support plate; 12-second reflow pad;
13-power line.

DESCRIPTION OF THE EMBODIMENTS

[0016] In order to make the purpose, the technical solution and the advantages of the present application be

clearer and more understandable, the present application will be further described in detail below with reference to accompanying figures and embodiments. It should be understood that the specific embodiments described herein are merely intended to illustrate but not to limit the present application.

[0017] It needs to be noted that, when one component is described to be "fixed to" or "arranged on" another component, this component may be directly or indirectly arranged on another component. When it is described that one component "is connected with" another component, this component may be directly or indirectly connected to the another component.

[0018] In the description of the present application, it should be appreciated that, directions or location relationships indicated by terms such as "length", "width", "up", "down", "front", "rear", "left", "right", "vertical", "horizontal", "top", "bottom", "inside", "outside", and so on are the directions or location relationships shown in the accompanying figures, which are only intended to describe the present application conveniently and simplify the description, but not to indicate or imply that an indicated device or component must have specific locations or be constructed and manipulated according to specific locations; therefore, these terms shouldn't be considered as any limitation to the present application.

[0019] In addition, terms "the first" and "the second" are only used for description purposes, and should not be considered as indicating or implying any relative importance, or implicitly indicating the number of indicated technical features. As such, technical feature(s) restricted by "the first" or "the second" can explicitly or implicitly comprise one or more such technical feature(s). In the description of the present application, "a plurality of" means two or more, unless there is additional explicit and specific limitation.

[0020] The implementation of the present application is described in detail with reference to the specific embodiments below:

As shown in Figs. 1-3, a metal piercing terminal includes a bottom plate 1, a first vertical plate 2 and a second vertical plate 3 connected with the bottom plate 1 respectively; the first vertical plate 2 and the bottom plate 1 are arranged at a first preset angle, the second vertical plate 3 and the bottom plate 1 are arranged at a second preset angle, the first vertical plate 2 and the second vertical plate 3 are arranged to be opposite and spaced apart from each other; the first vertical plate 2 is provided with a first retention slot 201, a bottom of the first retention slot 201 is provided with a first piercing tip 202, the second vertical plate 3 is provided with a second retention slot 301 that faces the first retention slot 201, and a bottom of the second retention slot 301 is provided with a second piercing tip 302; a first reflow pad 101 is provided on the bottom plate 1.

[0021] In one embodiment of the present application, when the metal piercing terminal is applied to a light source plate of a lamp, the metal piercing terminal is se-

cured on the light source plate in advance through reflow soldering (reflow soldering is not prone to damage components of the light source plate). The power line includes a metal wire and a plastic insulation layer wrapped around the metal wire (it should be appreciated that, the plastic insulation layer has a hardness less than the metal, and thus can be pierced by the first piercing tip 202 and the second piercing tip 302 of the metal). Thus, after the power line is pressed into the first retention slot 201 and the second retention slot 301, the first piercing tip 202 in the first retention slot 201 pierces the plastic insulation layer, and then is electrically connected with the wire, the second piercing tip 302 in the second retention slot 301 pierces the plastic insulation layer, and then is electrically connected with the metal wire, such that the electrical connection between the power line and the metal piercing terminal can be realized. Compared with the prior art, according to the method of fixing the power line on the terminal of the light source plate through welding, a problem of pseudo soldering can be avoided, a pollution of soldering tin to the light source is avoided, and a production efficiency is improved.

[0022] The first vertical plate 2 and the second vertical plate 3 are arranged to be opposite to each other, in one aspect, a supporting effect of the metal piercing terminal on the power line can be improved, so that the power line can be supported stably; in another aspect, both the first piercing tip 202 on the first vertical plate 2 and the second piercing tip 302 on the second vertical plate 3 can be electrically connected with the metal wire by piercing the plastic insulation layer of the power line, that is, one of the first piercing tip 202 and the second piercing tip 302 is electrically connected with the metal wire to realize the electrical connection between the metal piercing terminal and the power line. A problem that the power line cannot be electrically connected with the metal piercing terminal due to error in operation process can be effectively avoided.

[0023] Please refer to Figs. 1-3 again, in one preferable embodiment of the metal piercing terminal according to the present application, an inner side wall of the first retention slot 201 is provided with two oppositely arranged first barb tips 203, and the first piercing tip 202 is located between the two first barb tips 203, separating the power line from the first retention slot 201 is not prone to occur after the power line is received in the first retention slot 201.

[0024] Please refer to Figs. 1-3 again, in one preferable embodiment of the metal piercing terminal according to the present application, an inner side wall of the second retention slot 301 is provided with two oppositely arranged second barb tips 303, and the second piercing tip 302 is located between the two second barb tips 303, separating the power line from the second retention slot 201 is not prone to occur after the power line is received in the second retention slot 301.

[0025] Please refer to Figs. 1-3 again, in one preferable embodiment of the metal piercing terminal according to

the present application, the first vertical plate 2 and the bottom plate 1 are perpendicular to each other, the second vertical plate 3 and the bottom plate 1 are perpendicular to each other, so that a stable supporting effect can be provided for the power line.

[0026] Please refer to Fig. 1 again, in one preferable embodiment of the metal piercing terminal according to the present application, the metal piercing terminal further includes a top plate 4 connected with one end of the second vertical plate 3 away from the bottom plate 1, one end of the top plate 4 away from the second vertical plate 3 abuts against the first vertical plate 2, a relative action between the first vertical plate 2 and the second vertical plate 3 is not prone to occur after external force is acted on the first vertical plate 2 and the second vertical plate 3, so that the metal piercing terminal is resistant to deformation.

[0027] Please refer to FIG. 1 again, in one preferable embodiment of the metal piercing terminal according to the present application, the metal piercing terminal further includes a first limiting plate 5 connected with one end of the top plate 4 away from the second vertical plate 3, wherein the first limiting plate 5 and the top plate 4 are perpendicular to each other, the first limiting plate 5 abuts against one side of the first vertical plate 2 away from the second vertical plate 3, such that the first vertical plate 2 can be prevented from moving in a direction away from the second vertical plate 3.

[0028] Please refer to FIG. 1 again, in one preferable embodiment of the metal piercing terminal according to the present application, the metal piercing terminal further includes a second limiting plate 6 connected with the top plate 4, the second limiting plate 6 and the top plate 4 are perpendicular to each other, one end of the second limiting plate 6 abuts against the first vertical plate 2, and the other end of the second limiting plate 6 abuts against the second vertical plate 3 to further improve the integrity of the bottom plate 1, the first vertical plate 2, the second vertical plate 3, the top plate 4, the first limiting plate 5 and the second limiting plate 6.

[0029] Please refer to FIG. 1 again, in one preferable embodiment of the metal piercing terminal according to the present application, the bottom plate 1, the first vertical plate 2, the second vertical plate 3, the top plate 4, the first limiting plate 5 and the second limiting plate 6 are integrally molded, thus, the metal piercing terminal can be fabricated by rapidly processing a metal piece.

[0030] As shown in FIG. 4, another metal piercing terminal is further provided in one embodiment of the present application, this metal piercing terminal includes a third vertical plate 7, a fourth vertical plate 8 parallel to the third vertical plate 7, an arcuate transition plate 9 connected between the third vertical plate 7 and the fourth vertical plate 8, a first support plate 10 connected with one end of the third vertical plate 7 away from the arcuate transition plate 9, and a second support plate 11 connected with one end of the fourth vertical plate 8 away from the arcuate transition plate 9; wherein the first sup-

port plate 10 and the third vertical plate 7 are perpendicular to each other, the second support plate 11 and the fourth vertical plate 8 are perpendicular to each other; a second reflow pad 12 is provided on the first support plate 10 and/or the second support plate 11; the third vertical plate 7 is provided with a third retention slot 701, and an inner wall of the third retention slot 701 is provided with two third barb tips 702 which are arranged to be opposite and spaced apart from each other; the fourth vertical plate 8 is provided with a fourth retention slot 801, and an inner wall of the fourth retention slot 801 is provided with two fourth barb tips 802 which are arranged to be opposite and spaced apart from each other.

[0031] During installation of the power line, the power line is put into the third retention slot 701 and the fourth retention slot 801, and is pierced by the third barb tips 702 and the fourth barb tips 802 respectively, thereby realizing electrical connection between the third barb tips 702 and the fourth barb tips 802, and the metal wire.

[0032] A lamp is provided in one embodiment of the present application, this lamp includes a light source plate and the metal piercing terminal according to any one of the embodiments described above.

[0033] It will be appreciated that, a technical solution in another specific embodiment can be a realizable technical solution that can further improved based on other embodiments.

[0034] It is obvious that, the aforementioned embodiments in the present application are only some examples for clearly illustrating the present application, rather than limiting the implementation modes of the present application. For those skilled in the art, modifications or changes in different forms can also be made based on the above descriptions. It is unnecessary and impossible to enumerate all implementation methods here. Any modification, equivalent replacement and improvement made within the spirit and the principle of the present application shall be included in the protection scopes of the claims of the present application.

Claims

1. A metal piercing terminal which comprises a bottom plate, a first vertical plate and a second vertical plate connected with the bottom plate; **characterized in that**, the first vertical plate and the bottom plate are arranged at a first preset angle, the second vertical plate and the bottom plate are arranged at a second preset angle, the first vertical plate and the second vertical plate are arranged to be opposite and spaced apart from each other; the first vertical plate is provided with a first retention slot, a bottom of the first retention slot is provided with a first piercing tip, the second vertical plate is provided with a second retention slot that faces the first retention slot, and a bottom of the second retention slot is provided with a second piercing tip; the bottom plate is provided

with a first reflow pad.

2. The metal piercing terminal according to claim 1, **characterized in that**, an inner side wall of the first retention slot is provided with two oppositely arranged first barb tips, and the first piercing tip is located between the two first barb tips.
3. The metal piercing terminal according to claim 1, **characterized in that**, an inner side wall of the second retention slot is provided with two oppositely arranged second barb tips, and the second piercing tip is located between the two second barb tips.
4. The metal piercing terminal according to claim 1, **characterized in that**, the first vertical plate and the bottom plate are perpendicular to each other, and the second vertical plate and the bottom plate are perpendicular to each other.
5. The metal piercing terminal according to claim 1, **characterized in that**, the metal piercing terminal further comprises a top plate connected with one end of the second vertical plate away from the bottom plate, and one end of the top plate away from the second vertical plate abuts against the first vertical plate.
6. The metal piercing terminal according to claim 5, **characterized in that**, the metal piercing terminal further comprises a first limiting plate connected with one end of the top plate away from the second vertical plate, wherein the first limiting plate and the top plate are perpendicular to each other, and the first limiting plate abuts against one side of the first vertical plate away from the second vertical plate.
7. The metal piercing terminal according to claim 6, **characterized in that**, the metal piercing terminal further comprises a second limiting plate connected with the top plate, wherein the second limiting plate and the top plate are perpendicular to each other, one end of the second limiting plate abuts against the first vertical plate, and the other end of the second limiting plate abuts against the second vertical plate.
8. The metal piercing terminal according to claim 7, **characterized in that**, the bottom plate, the first vertical plate, the second vertical plate, the top plate, the first limiting plate and the second limiting plate are integrally molded.
9. A metal piercing terminal, **characterized in that**, the metal piercing terminal comprises a third vertical plate, a fourth vertical plate parallel to the third vertical plate, an arcuate transition plate connected between the third vertical plate and the fourth vertical plate, a first support plate connected with one end

of the third vertical plate away from the arcuate transition plate, and a second support plate connected with one end of the fourth vertical plate away from the arcuate transition plate; wherein the first support plate and the third vertical plate are perpendicular to each other, the second support plate and the fourth vertical plate are perpendicular to each other; a second reflow pad is provided on the first support plate and/or the second support plate; the third vertical plate is provided with a third retention slot, and an inner wall of the third retention slot is provided with two third barb tips arranged to be opposite and spaced apart from each other; the fourth vertical plate is provided with a fourth retention slot, and an inner wall of the fourth retention slot is provided with two fourth barb tips arranged to be opposite and spaced apart from each other.

10. A lamp, comprising a light source plate, **characterized in that**, the lamp further comprises the metal piercing terminal according to any one of claims 1-9.

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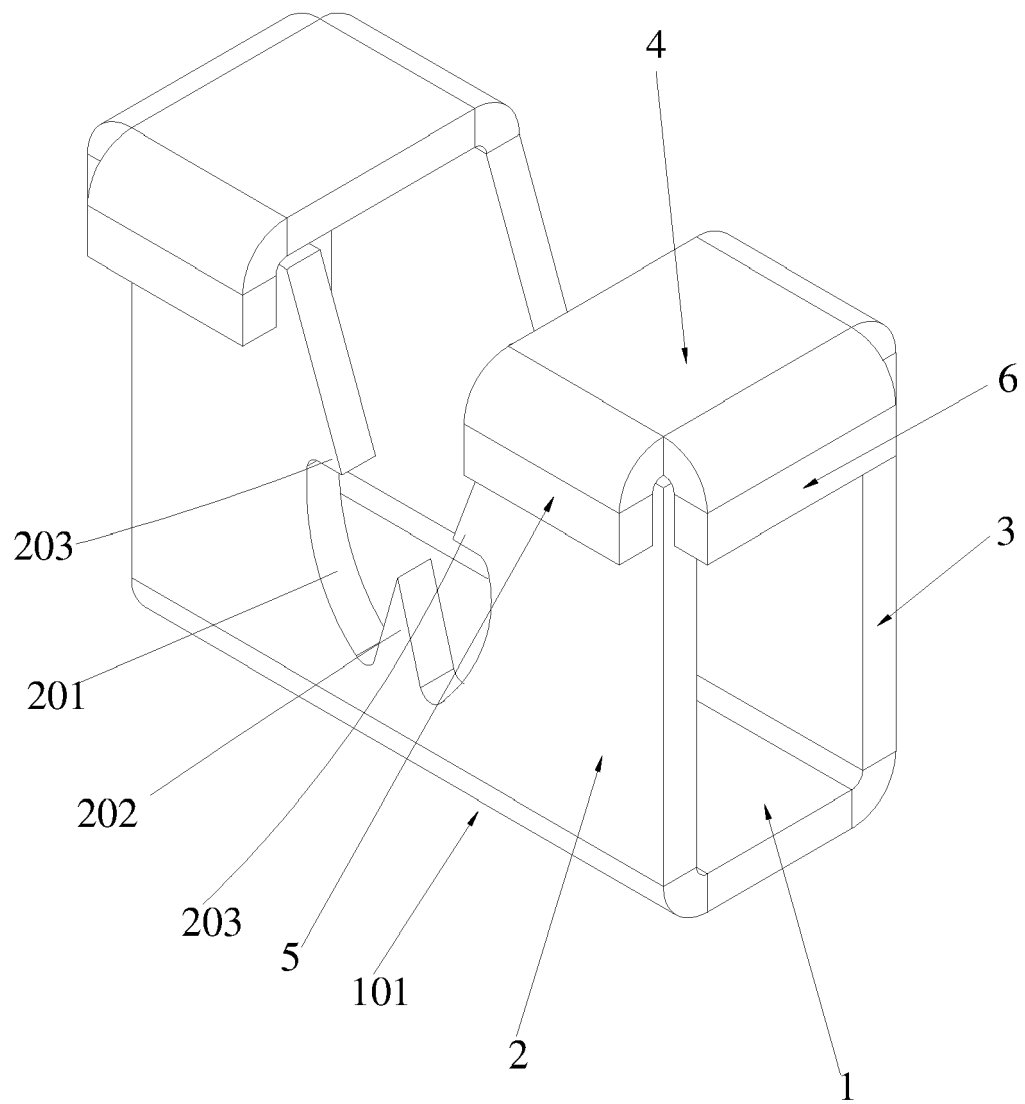


FIG. 1

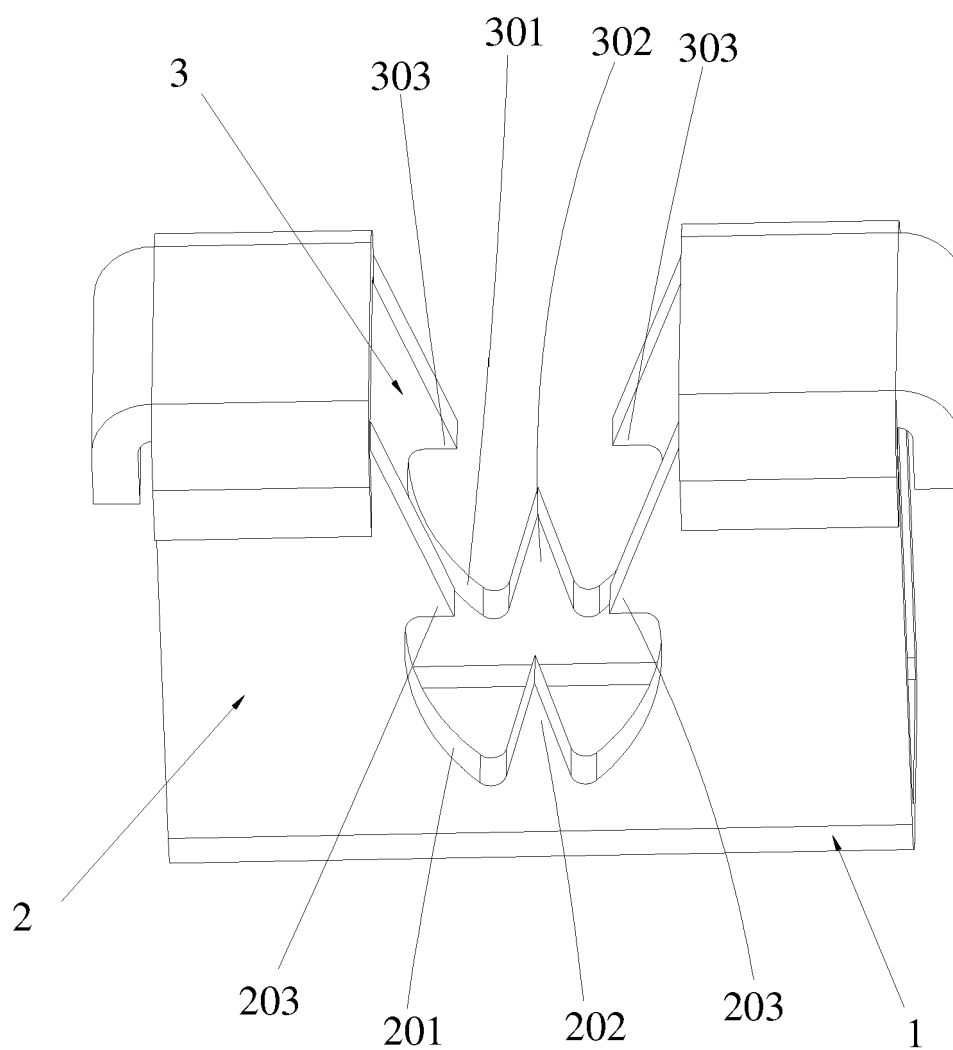


FIG. 2

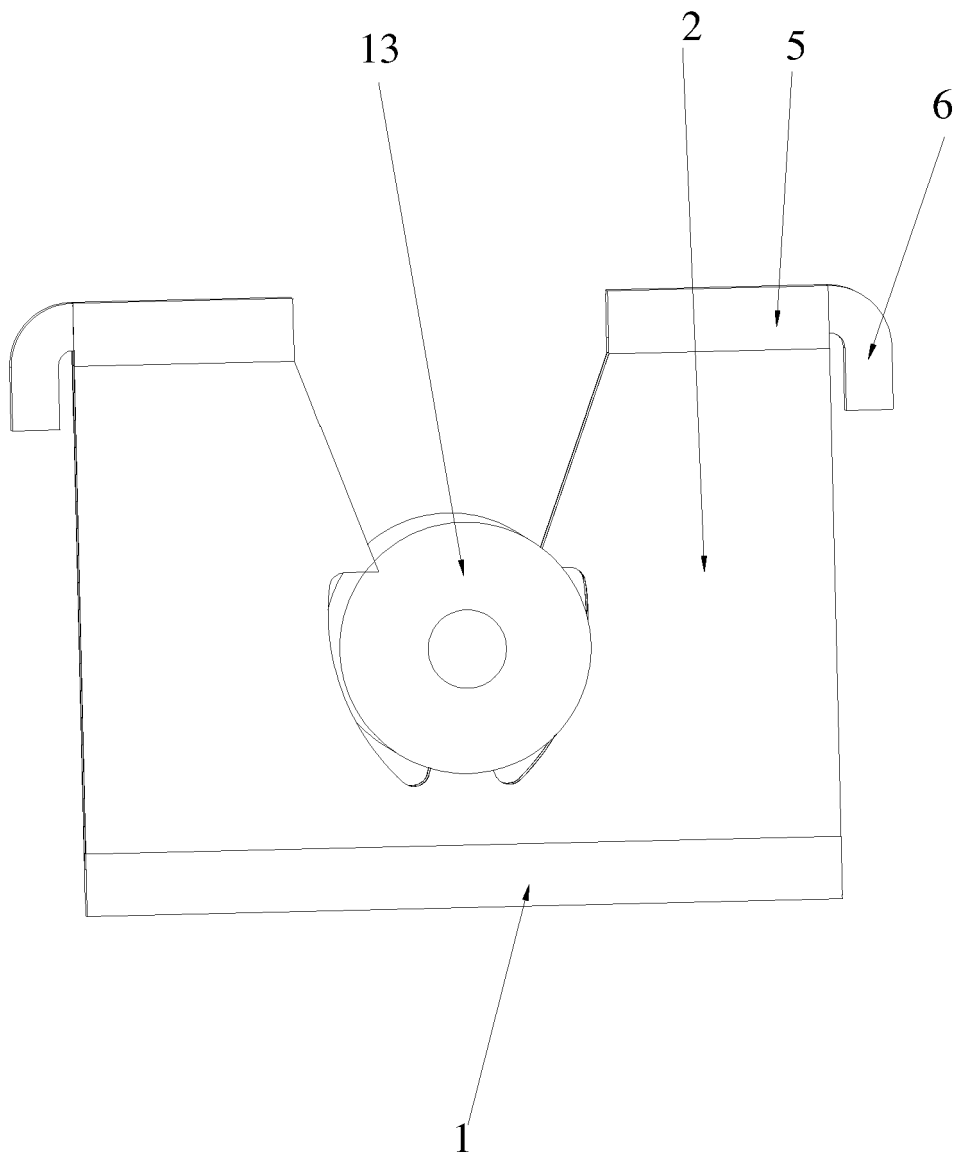


FIG. 3

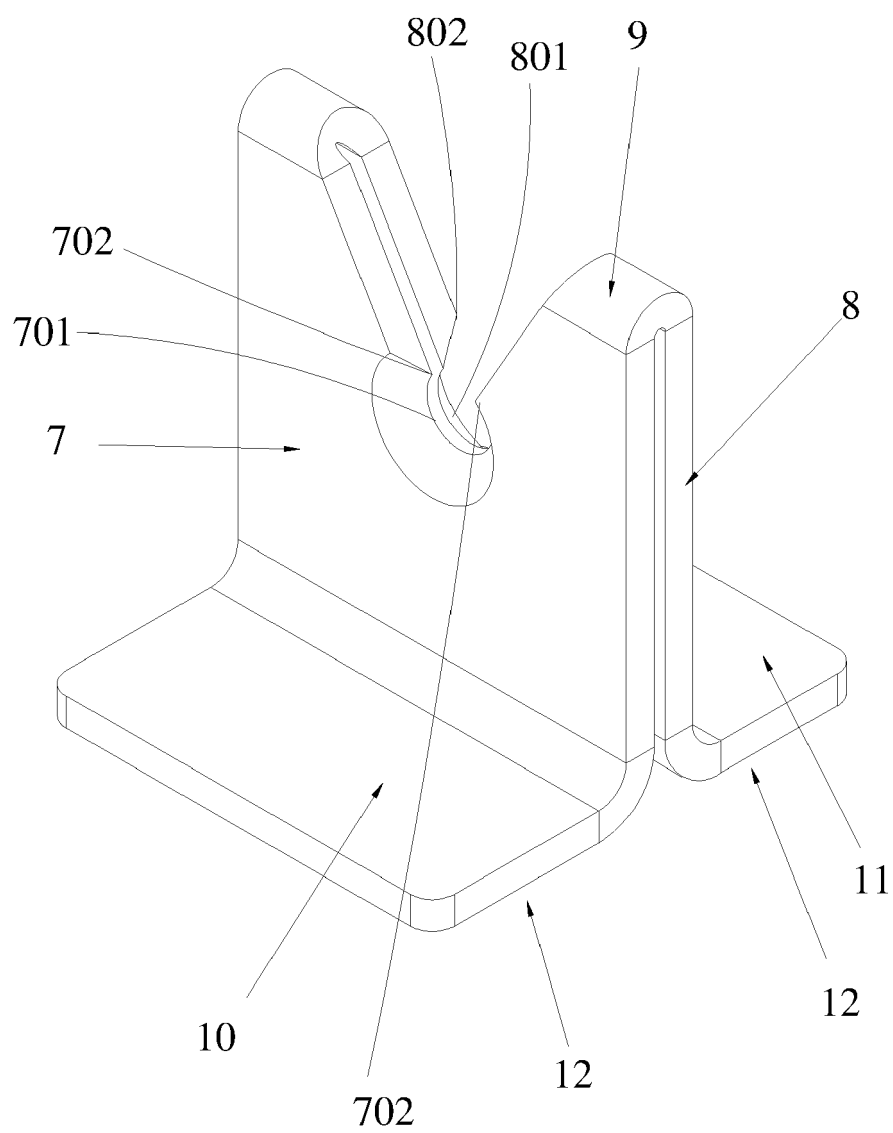


FIG. 4



EUROPEAN SEARCH REPORT

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 EP 21 18 6414

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CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document 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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5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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